

## Saturday 20<sup>th</sup> February 2021

8.35 – 8-50

Name: Dr Jed Lusthaus

### **Title: The not so Xen experience**

Authors: Jed Lusthaus, Sophia Zagora, Pushpa Raman, Peter McCluskey

Institutions: 1. Discipline of ophthalmology, The University of Sydney 2. Sydney Eye Hospital

City: Sydney

State: NSW

Country: Australia

### Aim:

To report a case of delayed-onset infective necrotising scleritis following XEN gel stent with mitomycin-C (MMC).

### Method:

This is a case report outlining the presentation and subsequent management of a 68-year-old female who was referred to Sydney Eye Hospital with scleritis.

### Results:

The original Xen45 surgery was combined with cataract surgery and MMC 0.04% to manage the patient's primary open-angle glaucoma. The surgery was completed at a regional centre by a general ophthalmologist in March 2019. Past medical history was significant for rheumatoid arthritis requiring treatment with methotrexate and humira. The post-operative course was complicated by intermittent, nocturnal pain that commenced 2 weeks after surgery. Sudden deterioration of visual acuity to 6/18, intraocular pressure of 4 mmHg and worsening pain developed in October 2020. On initial presentation to Sydney Eye Hospital, 180 degrees of scleral necrosis was evident with a moderate anterior segment inflammatory reaction and structural hypotony. Empirical antibiotic treatment was initiated as per the hospital's blebitis protocol (hourly topical ofloxacin and cephalothin 5% drops, and oral moxifloxacin). Conjunctival swab grew staphylococcus aureus and staphylococcus lugdunensis. Significant clinical improvement was observed, but the XEN gel stent became exposed after 5 days of treatment with worsening structural hypotony. Urgent surgical revision was performed to remove the XEN gel stent and apply a turoplast plug with amniotic membrane graft. IOP gradually improved over 6 weeks to 15 mmHg with reversal of hypotonous changes, however visual acuity remains 6/60.

### Conclusion:

To our knowledge, this is the first reported case of scleritis following XEN gel stent insertion. It serves as a reminder that infection should be the primary suspect in surgically induced necrotising scleritis cases. Underlying inflammatory causes are less common. Furthermore, the choice of surgical tool in glaucoma patients is critical, especially in the context of systemic immunosuppression

8.50 – 9.05

Name: Dr Alannah Walsh

**Title: Isolated ocular relapse of acute myeloid leukaemia precipitating secondary angle closure glaucoma**

Authors: A Walsh, P Heydon, G Bhardwaj, A Lee, J Cheng

Institutions: Liverpool Hospital

City: Sydney

State: NSW

Country: Australia

**Aim:**

To report a rare cause of secondary angle closure glaucoma and its management; a case of isolated ocular relapsed acute myeloid leukaemia (AML) post allogeneic haematopoietic stem cell transplant (HSCT), presenting with elevated intraocular pressure (IOP) and serous retinal detachment.

**Method:**

A case report

**Results:**

A 39-year-old female presented with a painless, chemotic left eye with an elevated IOP of 38mmHg, a superior scleral mass and serous retinal detachment two months following HSCT for AML. She was treated with anti-biotic, anti-fungal and intravenous steroid therapy.

The serous retinal detachments rapidly enlarged precipitating angle closure over 270 degrees with vision deteriorating to counting fingers and IOP increasing to 55mmHg. An urgent incisional biopsy of the scleral mass combined with diagnostic and therapeutic drainage of sub-retinal fluid was performed. IOP control was achieved following surgical intervention with resolution of a normal angle with no evidence of peripheral anterior synechiae.

Relapsed AML was diagnosed with blast cells seen on cytospin and flow cytometry of the sub-retinal fluid. Subsequent bone marrow biopsy and lumbar puncture did not demonstrate any evidence of relapse. Localised radiotherapy resulted in rapid reduction in the size of the scleral mass and serous detachments, preventing a recurrence of secondary angle closure.

**Conclusion:**

This case demonstrates a rare and serious cause of secondary angle closure glaucoma. It illustrates the need for urgent surgical intervention to relieve the acute angle closure and subsequent radiotherapy to treat the cause and prevent its recurrence.

9.05 – 9.20

Name: Dr Tung Thanh Hoang

**Title: Bilateral blood reflux in Schlemm canals caused by a unilateral dural sinus arteriovenous fistula in a patient with cerebral venous thrombosis**

Authors: Tung Thanh Hoang

Institutions: Hanoi Medical University, Save Sight Institute, Sydney Eye Hospital

City: Sydney

State: New South Wales

Country: Australia

Aim:

We report a case of unilateral dural sinus arteriovenous fistula and contralateral cerebral venous thrombosis with bilateral reflux in Schlemm canals.

Method:

A 66-year-old female patient presented with bilateral red eyes for a few months. There was no history of trauma. She had uncontrolled diabetes and hypertension for many years. She had been diagnosed with conjunctivitis and treated with no improvement. The left eye was mildly proptotic. Both eyes had corkscrew episcleral vessels. The intraocular pressures (IOP) were at the high end of normal (19 mmHg OD; 21 mmHg OS). On gonioscopy, she was found to have blood reflux into Schlemm canals, which was more remarkable in the left than the right side. Funduscopy examination demonstrated moderate non-proliferative diabetic retinopathy with a venous stasis pattern. Her orbit/brain Magnetic Resonance Imaging, Time of Flight Magnetic Resonance Angiography and ocular B-ultrasound were clear. She was referred to the radiologist for digital subtraction angiography (DSA) only because of the bilateral blood reflux into Schlemm canal.

Results:

Her DSA revealed a low-flow dural-carotid cavernous sinus fistula (CCF) (Barrow Type B) with inferior petrosal sinus obstruction on the right side. There was internal carotid venous obstruction, inferior petrosal sinus obstruction, and slightly dilated ophthalmic veins on the left side. Her coagulation profile was normal. Carotid and subclavian ultrasound were normal. The radiologist indicated that no intervention was possible since no accessible entry was identified. Therefore, she will be followed closely to monitor her intraocular pressures in both eyes.

Conclusion:

This case highlights the importance of gonioscopy in eyes with corkscrew vessels, even when the IOPs are normal.

10.30 – 10.45

Name: Dr George Kong

**Title: Twelve-month Outcomes of XEN45 Gel Stent using Small Posterior Incision Sub-Tenon ab interno Insertion Technique (Semi-Open) Compared to Standard Closed-Conjunctiva Technique for Medically Uncontrolled Glaucoma**

Authors: George YX Kong, In Young Chung, Brian GS Ang  
Institutions: 1. The Royal Victorian Eye and Ear Hospital 2. Centre for Eye Research  
Australia  
City: Melbourne  
State: VIC  
Country: Australia

**Aim:**

To evaluate the 12-month outcomes of a novel small posterior incision ab interno subtenon technique of XEN stent insertion (semi-open) compared to standard closed-conjunctiva insertion technique. The purpose of this novel technique is to ensure consistent sub-tenon placement of XEN stent with minimal breach of the conjunctiva.

**Method:**

A retrospective comparative study of 64 eyes of 58 patients that underwent XEN stent (XEN45 Gel Stent, Allergan Inc., Irvine, California, USA) insertion either with Semi-open technique (n=40) or standard closed-conjunctiva technique (Standard, n=24) was conducted. All cases received subconjunctival injection of 0.1 mL of mitomycin C (0.01-0.02%). Patients with open angle glaucoma and pseudophakic angle closure glaucoma were included. Exclusion criteria are patients with uveitic or neovascular glaucomas or less than 12 months of postoperative followup. Primary outcomes were mean intraocular pressure (IOP) change and surgical success. Surgical success was defined as per definition of World Glaucoma Association guidelines. Secondary outcomes included change in number of glaucoma medication classes and visual acuity, needling rates and safety outcomes.

**Results:**

Pre-operatively the two groups had similar baseline IOP levels (Semi-open  $19.9 \pm 6.1$  mmHg vs. Standard  $20.9 \pm 5.6$  mmHg,  $p=0.96$ ) and severity of glaucoma. The proportions of combined XEN and cataract surgery were similar between the two groups. Post operatively there were no statistical differences in IOP at day 1, week 1 and week 2 post op. However, IOP levels were statistically lower for Semi-open group from 1-month postop and at all subsequent time points up to 12 months postop (Semi-open  $11.1 \pm 2.6$  mmHg vs. Standard  $14.3 \pm 3.0$  mmHg). The 12-month surgical success was 98% in the Semi-open group compared to 67% in Standard group. Semi-open group had lower needling rate compared to Standard group (18% vs 71%,  $P<0.01$ ). Two cases in the Standard group required return to theatre for anterior chamber reformation. Stent erosion occurred in 2 eyes in the Standard group and none in Semi-open group.

**Conclusion:**

Semi-open technique for XEN stent achieved higher 12-month success rate compared to standard technique with lower needling and bleed revision rates.

10.45 – 11.00

Name: Dr Joshua Oskam

**Title: Congenital connection between the vitreous and the subarachnoid space was not associated with altered biomechanical behaviour**

Authors: Dr Joshua Oskam (1), Prof Anthony P Wells (1,2,3), Dr Jesse Gale (1,2,3)  
Institutions: 1) Capital & Coast District Health Board; 2) Capital Eye Specialists; 3) University of Otago Wellington;  
City: Wellington  
State: Wellington  
Country: New Zealand

**Aim:**

The concept of translaminar pressure gradient (TLPG) is understood to be a more specific description of the pressure-related stress on the optic nerve head. A simple concept to eliminate the TLPG would be to connect the prelaminar and retrolaminar fluid spaces with a conduit, but (notwithstanding the surgical challenges), the intracranial pressure could be too low to maintain a healthy spherical globe. Like tube implant surgery, one would expect a translaminar conduit to increase mechanical energy dissipation in the eye, measured as so-called “corneal” hysteresis. Here we report a 69 year old man with a right optic disc pit (a peri-papillary conduit) which connected the pre-papillary vitreous cavity to the subarachnoid space on enhanced depth imaging optical coherence tomography (EDI OCT).

**Method:**

Case report: the patient gave consent for additional investigations and publication of anonymous results. He attended for OCT imaging and intraocular pressure (IOP) measurements with Goldmann (GAT), and Pascal (DCT) tonometers, the Ocular Response Analyser (ORA) and Corvis biomechanical devices. Tonometry was also performed lying sitting and standing using an iCare device. A water drinking test was performed (IOP measures at 30, 45 and 60 minutes after drinking 1.0 L water).

**Results:**

The findings were predominantly symmetrical (Sitting IOP in mmHg: Goldmann IOP 10 OU, Pascal 14.7 OD 17.3 OS, ORA IOPcc 18.4 OD 18.8 OS IOPg 15.5 OD 17.5 OS, Corvis 14 OU). The ORA indicated hysteresis was 8.2 mmHg OD and 9.4 mmHg OS. The Corvis indicated no significant asymmetry in the pressure/deformation curves, for example the right eye with the conduit did not appear to dissipate energy. The IOP in mmHg by iCare tonometer standing sitting and lying was 10-14 in the right and 14-18 left for sitting and standing but rose to 18-21 lying. The water drinking test showed perhaps subtle flattening of the peak and faster return to normal on the right side compared to the left.

**Conclusion:**

These disc pits which connect to the subarachnoid space have been previously reported, but the implications for biomechanics and pressure have not. In this case, the connection between the prelaminar and retrolaminar fluid compartments was not associated with any major asymmetry in pressure, or energy absorption (hysteresis), as measured by the Corvis, ORA or water drinking test. Recent studies highlight the dynamism of the intracranial pressure with position, but in this case the IOP did not rise in the right eye with supine positioning.

11.00 – 11.15

Name: Dr Zung Mai

**Title: Colour vision defects in glaucoma are not systematically explained by short-wave automated perimetry**

Authors: Dr Zung Mai [1], Prof Anthony P Wells [1,2,3], Dr Robin Willink [4], Dr Jesse Gale [1,2,3]

Institutions: 1) Surgery & Anaesthesia, University of Otago Wellington; 2) Capital Eye Specialists; 3) Capital & Coast District Health Board; 4) Biostatistics Group, University of Otago Wellington

City: Wellington

State: Wellington

Country: New Zealand

**Aim:**

Subtle colour vision defects (CVD) are common in glaucoma, but they do not correlate closely with the results of standard automated perimetry (SAP): some with ocular hypertension have CVD, and some with advanced glaucoma have normal colour vision. We sought to test whether the results of short-wave automated perimetry (SWAP) is a better predictor of CVD in glaucoma, and whether CVD are part of a regional scotoma or a diffuse effect in the visual field.

**Method:**

This cross-sectional observational study recruited 54 glaucoma patients and conducted SAP (Zeiss Humphrey Field Analyser 3 24-2 SITA Fast), frequency doubling technology perimetry (FDT, Zeiss Matrix 2 FDT 24-2 Threshold), and SWAP (Zeiss Humphrey Field Analyser 2 24-2 SITA-SWAP), as well as Ishihara, Hardy-Rand-Rittler (HRR) and Lanthony (desaturated) D-15 tests of central colour vision. Our primary analysis used Kendall's tau to measure the probability that an increase in one variable, the mean of SAP or SWAP central points, was accompanied by concordant change in D15 score. A one-tailed test for the hypothesis that concordance was greater with SWAP than SAP was carried out with  $\alpha=0.05$ .

**Results:**

One participant was excluded with congenital protanomaly. The proportion of 106 eyes with CVD was greater in more severe glaucoma as expected, but mean deviation and colour tests did not correlate well. Our novel quantitative analysis using Kendall's tau did not show greater concordance between the central four points of SWAP and D15, as compared with SAP and D15. Age, gender, glaucoma type, surgery and recent IOP did not substantially affect the proportion with CVD. Qualitative and descriptive analyses overlaid three visual fields and colour scores to study patterns of concordance and discordance between tests.

**Conclusion:**

Colour vision in glaucoma is not as closely coupled to perimetry results as we might expect from our clinical impressions, even when more sensitive and seemingly colour-sensitive SWAP is used. Here, interesting patterns of concordance and discordance between tests highlight the range of regional and diffuse pathology that glaucoma may cause.

11.15 – 11.30

Name: Dr Bentley Logan

**Title: Short term safety and efficacy of phacoemulsification combined with Hemi-Ab interno canaloplasty (ABiC) and Hemi-gonioscopy assisted transluminal trabeculectomy (GATT) in primary open angle glaucoma: The Australian Experience**

Authors: B Logan, A Lee, J Cheng

Institutions: Liverpool Hospital

City: Liverpool

State: New South Wales

Country: Australia

Aim:

To review the safety and efficacy of phacoemulsification cataract surgery combined with Hemi-ab interno canaloplasty (ABiC) and Hemi-gonioscopy assisted transluminal trabeculectomy (GATT) in primary open angle glaucoma (POAG).

Method:

A prospective consecutive case series of 9 eyes of 8 POAG underwent 90 to 270 degree ABiC together with up to 180 degree of GATT at a single tertiary centre by a single surgeon. Outcome measures included visual acuity, IOP, surgical complications and number of glaucoma medications at one day, one week, one month and 3 months post surgery.

Results:

Mean IOP decreased from  $16.89 \pm 3.54$  to  $12.75 \pm 3.21$  mmHg ( $P < 0.05$ ) at 3 months with a reduction in mean IOP of  $4.25 \pm 3.59$  mmHg. Mean logMAR visual acuity improved from  $0.32 \pm 0.19$  to  $0.12 \pm 0.13$  ( $P < 0.05$ ) at 3 months. Mean medications reduced from  $1.89 \pm 0.60$  to  $0.22 \pm 0.40$  ( $P < 0.05$ ) at 3 months. Complications included hyphaema, corneal oedema, IOP spike, inflammation and did not require surgical intervention. 6 out of 8 eyes remained drop free at 3 months post-surgery.

Conclusion:

Phacoemulsification combined with Hemi-ABiC and Hemi-GATT is a safe procedure and may be effective in lowering the IOP and number of glaucoma medications at 3 months in patients with POAG. Correlation with long-term follow up is required.

11.30 – 12.30

Name: Professor Graham Lee, Dr Lance Liu

**Title: Trabeculectomy Technique - ANZGS Consensus Group**

Authors: Graham Lee

Institutions: City Eye Centre

City: Brisbane

State: Qld

Country: Australia

Aim:

To determine surgical patterns of trabeculectomy technique used by ANZ surgeons.

Method:

Live polling and discussion of the key steps of the surgery. Intra-operative figures will be shown during the presentation to demonstrate examples.

Results:

The results will be presented in real time via web-polling. This could be done via Zoom polling option. Time-permitting, comments/questions will be fielded from the online viewers via chat or audio.

Conclusion:

Trabeculectomy techniques of glaucoma surgeons vary around the world and determined by the origin of their fellowship training and subsequent modifications learned from experience. It is valuable to share the ANZ collective experience to compare, contrast and potentially modify our techniques to achieve the best outcomes for our patients.

## Sunday 21<sup>st</sup> February 2021

8.30 – 8.45

Name: Dr Nicole Lim

### **Title: A Life Saving Tube**

Authors: Nicole Lim, Armand Borovik, Harry Leung, Katherine Masselos

Institutions: Prince of Wales Hospital, University of New South Wales

City: Sydney

State: NSW

Country: Australia

#### Aim:

We present an interesting case where an unexpected and potentially fatal finding was detected during the course of investigation of post-operative diplopia, following glaucoma drainage device surgery.

#### Method:

A 57-year-old female with a complex ocular history of traumatic cataract, HSV keratitis and multiple surgical interventions including endothelial keratoplasty and scleral fixation of intraocular lens, developed progressive glaucoma. She underwent insertion of a Baerdvelt 350mm tube placed in the sulcus.

#### Results:

Her post operative course was complicated by binocular diplopia, with both horizontal and vertical components. Longstanding ipsilateral ptosis and iatrogenic pupil distortion obscured the clinical picture. MRI and MR Angiography detected a contralateral 6mm posterior communicating artery aneurysm, for which she received semi-urgent coiling under the interventional neuroradiologists.

#### Conclusion:

This report presents a novel case and additionally discusses the well documented, but often clinically challenging complication of diplopia following glaucoma filtration surgery, including its potential mechanisms, clinical assessment, and management strategies.

8.45 – 9.00

Name: Professor Graham Lee

**Title: Ab Interno Needling for Bleb Revision - a video presentation and digital simulation**

Authors: Graham Lee

Institutions: City Eye Centre

City: Brisbane

State: Qld

Country: Australia

Aim:

To demonstrate another approach to bleb needling from ab interno.

Method:

Under peribulbar block, a 7/0 vicryl traction suture on a spatulated 3/8 needle (Ethicon, Somerville, USA) is inserted into the mid peripheral cornea anterior to the scleral trapdoor. A Lewicky self-retaining anterior chamber maintainer (BD Visitec, Warks, UK) is used to infuse balanced salt solution in a controlled fashion utilising the irrigation-aspiration mode on the phacoemulsification machine. A 23G needle bent at 90 degrees, bevel upwards is inserted or via a paracentesis opposite to the scleral trapdoor of the trabeculectomy just behind the limbus, anterior to the iris plane. The traction suture is used to infraduct the eye whilst the 23G needle was passed across the anterior chamber avoiding the corneal endothelium, iris and intraocular lens. The needle tip is inserted into the sclerostomy, under the scleral flap to elevate the scleral flap edge and advanced further to the wall of the Tenons cyst where the bevel-up tip was used to multiply perforate the fibrous tissue. Subconjunctival 5-fluorouracil 5% was injected via a 30G needle high in the superior fornix, avoiding haemorrhage as well as subconjunctival dexamethasone 0.1% into the inferior fornix.

Results:

Restoration of bleb function.

Conclusion:

Needling ab interno can be utilised for routine bleb needling, but is particularly useful if there is risk of significant conjunctival bleeding, poor access to the superior conjunctiva and if there is thin or scarred tissues prone to buttonhole. It does need to be performed in the operating theatre, where the anterior chamber can be controlled with continuous infusion, precise manipulation of the eye with the traction suture and remedial measures undertaken if bleb perforation or overdrainage from the flap occurs intraoperatively.

9.00 – 9.15

Name: Dr Hamish Dunn

**Title: A problem of gas transfer**

Authors: Dunn, HP

Institutions: Port Macquarie Eye Centre, University of Sydney, UNSW Rural Clinical School

City: Port Macquarie

State: NSW

Country: Australia

Aim:

Aim: To describe a case of suprachoroidal haemorrhage and persistent hypotony successfully treated with intravitreal C3F8 and choroidal drainage.

Method:

Methods: Case report

Results:

Results: An 84 year-old cattle farmer was referred with end-stage open angle glaucoma, recently complicated by idiopathic anterior uveitis and IOP of 44 in each eye on maximal medical therapy. His visual acuity was count fingers in the right eye and 6/60 in the left. He underwent Baerveldt tube insertion in the left eye. He became combative under local anaesthetic but was unable to have a general anaesthetic due to COVID-19 limitations. Unfortunately he developed Type-1 respiratory failure and aspiration pneumonia with severe coughing. On discharge from hospital he restarted maximal medical therapy against medical advice and developed a suprachoroidal haemorrhage and kissing choroidals. This failed to respond to medical therapy and anterior chamber reformation with viscoelastic. A choroidal drainage was performed, but the effusions recurred. Finally a repeat choroidal drainage and injection of intravitreal C3F8 stabilised the eye. After 6 months the right visual acuity was light perception, whilst the left visual acuity was 6/12 with IOP of 8 on no medications.

Conclusion:

Conclusion: Intravitreal C3F8 is a potential rescue therapy for recalcitrant hypotony with choroidal detachment. (Franks and Hitchings 1990; Yeung et al. 2011)

**9.15 – 9.50**

**Gillies Lecture**

Professor Robert Casson

**Title: Glaucoma: Challenges for the 21st Century**

In this Gillies Lecture, I discuss 10 of the most pressing challenges that we face in the fight against glaucoma. I discuss issues that span "the circles of concern" from cellular pathology to global epidemiology and some of the advances already made by world-leading Australian and New Zealand ophthalmic researchers and present ideas for further progress.

10.15 – 10.30

Name: Dr Nathan Kerr

**Title: Primary needling of the ab interno gelatin microstent reduces postoperative needling and follow-up requirements**

Authors: Nathan Mitchell Kerr, Samantha Lim, Maria Simos, and Trevor Ward

Institutions: Centre for Eye Research Australia

City: Melbourne

State: VIC

Country: Australia

**Aim:**

To evaluate the effect of primary needling at the time of ab interno gelatin microstent insertion on postoperative needling rates.

**Method:**

Retrospective, interventional cohort study. Eighty-six eyes of 72 patients with no prior incisional surgery. Consecutive eyes with open-angle glaucoma refractory to medical treatment that underwent ab interno gelatin microstent insertion (XEN; Allergan Inc., Irvine, CA) with or without primary needling.

Primary outcome measure was the proportion of eyes requiring postoperative needling.

Secondary outcome measures included the mean reduction in intraocular pressure (IOP), topical glaucoma medication use, complications, reoperations, and number of follow-up clinic visits over 12 months.

**Results:**

Fifty-one eyes (42 patients, median age 74 years) underwent XEN surgery with primary needling at the time of surgery and 35 eyes (32 patients, median age 73 years) underwent XEN surgery without routine primary needling. Eyes that received routine primary needling had an 84.8% lower rate of postoperative needling (3.9% versus 25.7%,  $P = 0.003$ ) and required fewer post-operative clinic visits ( $P = 0.043$ ). Median IOP was 18.0 mmHg (IQR, 13.0 – 23.0) on 3.0 (IQR, 3.0 – 3.0) classes of topical medications at baseline. At 12 months, the median IOP was 11.0 mmHg (IQR, 9.0 -14.0) in the primary needling group and 11 mmHg (IQR, 10.0 - 14.0) where primary needling was not routinely performed. Both groups demonstrated a high safety profile. In total, five eyes required further glaucoma surgery with insertion of a glaucoma drainage device.

**Conclusion:**

Primary needling at the time of XEN gel stent insertion is associated with a significant reduction in the need for postoperative needling and postoperative clinic visits. This modification provides a predictable postoperative course with a significant and sustained reduction in both IOP and glaucoma medication requirements with less intense post-operative management.

10.30 – 10.45

Name: Dr Sophia Zagora

**Title: Paediatric uveitic glaucoma in the time of biologic therapy**

Authors: Zagora, Sophia L., Karaconji, Tanya., Singh-Grewal, Davinder., Chaitow, Jeff., Jamieson, Robyn., McCluskey, Peter., Grigg, John R.

Institutions: Save Sight Institute, The University of Sydney; Paediatric Rheumatology, Children's Hospital at Westmead; The University of Sydney School of Medicine, Sydney; Paediatric Ophthalmology, Children's Hospital at Westmead; Department of Genetics, Children's Hospital at Westmead;

City: Sydney

State: NSW

Country: Australia

**Aim:**

Uveitis is a rare chronic condition, “orphan disease” in the paediatric population. The incidence is 4.3 per 100,000 and prevalence 27.9 per 100,000. It is sight threatening due to disease progression and treatment failure. The mainstay of uveitis treatment is steroids. Steroid induced glaucoma is well documented and has been found to account for a quarter of all acquired glaucoma in children. Steroid sparing agents (including JAK inhibitors) and biologic therapy (Adalimumab, Infliximab and Tocilizumab) are increasingly being used. The purpose of this study is to investigate rates, timing and visual outcomes of paediatric uveitic glaucoma surgery in relation to the treatment of the uveitis with biologic therapy and steroid sparing immunosuppression.

**Method:**

Retrospective chart review of all paediatric uveitis patients presenting to the Children's Hospital Westmead, Sydney Eye Hospital and Save Sight Institute from 2005- 2020 .

**Results:**

There were 115 patients (207 eyes) diagnosed with paediatric uveitis during this period. The majority had bilateral uveitis (n = 100, 80%). 64 patients were female and 51 patients male. The most common aetiological diagnosis was JIA-U (n = 77, 67%), followed by idiopathic uveitis (n = 34, 29.6%). Anatomical diagnosis was 84% anterior uveitis and 16% non-anterior uveitis. Glaucoma surgery - trabeculectomy or tube surgery was required in 40 patients / 34.7% (49 eyes / 23.7%) and Cataract surgery in 46 patients / 40% (61 eyes / 29.4%). A number of patients underwent multiple surgeries. The mean duration of inflammation prior to commencement of a biological agent was 22.0 months (range: 1-48 months). Baseline age at commencement of biologic therapy was 9.12 years (3.42 SD). Of those patients on biologic therapy, the baseline VA was logMAR 0.24 (0.34 SD) and final VA was logMAR 0.18 (0.28 SD) with a mean change in VA from baseline of logMAR -0.07 (0.23 SD).

**Conclusion:**

Paediatric uveitis is a complex disease. The advent of biologic therapy and other steroid sparing agents, in this real world data, are having beneficial effects on visual outcome and uveitic glaucoma surgery in these patients.

10.45 -11.00

Name: Miss Georgia Neef

**Title: Characterising Ocular Blood Flow Changes with an Isometric Exercise Stimulus Using Optical Coherence Tomography Angiography in Healthy Participants.**

Authors: Georgia R.R. Neef; Jessica L. Witherow; Andrew J.R. White; Hamish P. Dunn.  
Institutions: Faculty of Medicine, University of New South Wales, Australia; Discipline of Physiotherapy, Faculty of Medicine & Health Services, Macquarie University, Australia; Faculty of Medicine & Health, University of Sydney, Australia; Port Macquarie Eye Centre, Port Macquarie, Australia  
City: Port Macquarie  
State: New South Wales  
Country: Australia

**Aim:**

Vascular dysregulation is a potential pathophysiological mechanism underlying glaucomatous optic neuropathy. We aimed to determine if isometric exercise elicits alterations in ocular perfusion in healthy participants using optical coherence tomography angiography.

**Method:**

In this prospective, cross-sectional study, thirteen healthy participants (median age 59, interquartile range 33.50-66.50) performed a sustained isometric handgrip exercise for 3 minutes to elevate mean arterial pressure. Measurements of systemic cardiovascular parameters, intraocular pressure, and 6-x6-mm optical coherence tomography angiography scans of the optic nerve head (peripapillary retina) and macula were taken before, during, and after the isometric exercise. The resultant en face optical coherence tomography angiograms were analysed using a custom approach to obtain peripapillary and macular vessel density at each time point.

**Results:**

Eleven optic nerve head and eleven macula scans were included in the final analysis. A significant post-exercise decrease in vessel density compared to baseline was observed at the region of the optic nerve head (mean change -25.96%; CI -28.98%,-22.94%) and peripapillary retina (mean difference -29.47%; CI -32.00%,-26.90%), and the foveal and parafoveal macula (mean difference superficial macula -29.63%; CI -33.03%,-26.23%, and -29.63%; CI -33.03%,-26.23%, respectively) (all  $P < 0.001$ ). During the period of isometric contraction, there was no significant change in vessel density in any region, despite an elevation in mean arterial pressure, indicating the presence of ocular autoregulation during isometric exercise.

**Conclusion:**

A significant post-exercise decrease in vessel density was evident within the analysed optic nerve head and macular regions. The mechanism underlying this novel observation remains unknown; thus, further research is required to characterise this physiological phenomenon. Our data also confirm previous results which indicate that in healthy participants, optic nerve head and macular autoregulation is sufficient to compensate for an increase in mean arterial pressure during isometric exercise.

11.00 – 11.15

Name: Dr Siobhan Manners

**Title: Creating a population-based visual field database for big-data research**

Authors: Siobhan Manners , William Morgan, Nigel Morlet , Wei Liu, Lynn Meuleners, Jonathon Ng

Institutions: University of Western Australia, Lions Eye Institute

City: Perth

State: WA

Country: Australia

**Aim:**

This project aimed to develop a method of exporting and standardising a database of HFA data with additional calculated variables for use in predictive modelling and linked data studies

**Method:**

Visual field data was obtained from tertiary hospitals, the Lions Eye Institute and other private practices throughout Western Australia. Customised algorithms were created to clean the data and create test reliability scores. Data has been prepared for subsequent phases, in which a binocular Integrated Visual Field will be synthesised to better represent real life vision. Novel pattern classification using Bayesian networks and logistical point regression models will then be applied to the binocular fields.

**Results:**

337,691 tests from 15 practices in metropolitan Perth, as well as the Lions Eye Institute and Royal Perth Hospital

Demographics: Data related to 61,985 patients, with an average of 5.46 tests per person (min 1, max 85). Gender was missing from 44% of tests, 54% of those with gender were female. The average age of patients at the time of their test was 65.75 years.

Test Events: Counts for the number of tests per year increased from 664 tests in 1988 to 19279 tests in 2019.

Point Sensitivity: Raw sensitivity values were available for all tests Test Reliability: Test reliability indicators were available for all tests and reliability summary scores were calculated. Mean deviation was extracted for 98.2% of tests, with the majority being between -2 and 0dB . The VFI (an age-corrected measure of function) was present for all test, with nearly half (56.20%) being between 96% and 100% .

**Conclusion:**

Visual field data from 337,691 tests were collated into a single database that is fit-for-purpose in population studies related to visual field function. The database is relatively complete, containing raw sensitivity values for all tests, as well as reliability indicators for all tests. Demographic data is also present in the majority of tests, making it fit-for-purpose for linked data studies investigating co-morbidities and injuries and their relationship with visual fields.

The MD and VFI results extracted suggests the majority of tests being close to the normal reference values utilized by the HFA.

An integrated binocular visual field and novel pattern classification and clustering methods will be applied to the database for use in later linked data studies and potential clinical decision-making tools

11.15 – 11.30

Name: Miss Danit Saks

**Title: Characterisation of Localised Wedge-Shaped Vessel Defects in Glaucoma**

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Institutions: 1 Macquarie University, Sydney, NSW, 2 Flinders University, Adelaide, South Australia  
City: Sydney  
State: NSW  
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**Aim:**

Since retinal vasculature may be involved in the pathogenesis of glaucoma, there may be a relationship between pattern of vascular dropout and phenotype. Wedge-shaped vessel defects have been recognised in previous optical coherence tomography angiography (OCTA) case reports. Vessel dropout projects from the optic nerve head (ONH) around the fovea in an arcuate manner, similar to retinal nerve fibre layer (RNFL) defects. This study aims to investigate the prevalence and quantification of this vessel loss and its relationship to other parameters.

**Method:**

Spectral domain OCT and OCTA images from 290 subjects with suspect, early or moderate primary open angle glaucoma were reviewed (age:  $67.15 \pm 10.62$ ; mean deviation (MD):  $+2.38$  to  $-11.45$ DB, mean =  $-1.56$ ). Good quality OCTA images from 523 eyes were exported to ImageJ for analysis and to identify defects. Area and vessel density within the defect were quantified at the superficial vascular complex (SVC) level. Visual field (VF) location (superior or inferior hemisphere) was determined by consistent pattern deviation points at  $<2\%$ , at consecutive visits.

**Results:**

Vessel wedge defects were present in 10.9% of OCTA images (57/523 eyes;  $68.77 \pm 10.47$  years; MD:  $+2.11$  to  $-11.45$ DB, mean =  $-3.27$ ,  $p < 0.001$  compared to total cohort). Of these, 82% were located inferotemporally, including 6 eyes with both superior and inferior involvement. 47 wedge defects were able to be fully quantified due to location of the wedge relative to scanned area. Vessel density within the wedge defect averaged  $16.45 \pm 6.08\%$ , which was 81% of the global macular SVC density. Wedge area was on average  $5.51 \pm 4.54$  mm<sup>2</sup>, with a width of  $0.36 \pm 0.16$  mm at the ONH. Total cohort global SVC density correlated with global retinal nerve fibre layer and ganglion cell inner plexiform layer thickness (GCL IPL) ( $r < 0.33$ ,  $p < 0.001$ ), while wedge density was most correlated with inferotemporal GCL IPL thickness ( $r = 0.44$ ,  $p = 0.003$ ). When VF loss had occurred, vessel wedge defect hemisphere was associated with VF loss in the opposite hemisphere ( $n = 36$  eyes (80%) including across both hemispheres  $n = 4$ , no VF loss visible in 11 eyes). Compared to the total cohort, those with wedge defects were less likely to have hypertension ( $p = 0.030$ ) or other vascular-related diseases including diabetes, depression and migraines ( $p = 0.001$ ).

**Conclusion:**

This study quantified wedge-shaped vessel loss in a cross section of glaucoma patients and showed that approximately 11% of subjects have vessel defects, predominantly inferiorly, that correlate with VF loss in the opposite hemisphere. The lack of association with systemic vascular disease could suggest this represents a localised vascular pathology at the optic nerve head.

11.30 – 11.45

Name: Dr Catriona Downie

**Title: Trabeculectomy as initial management of uncontrolled pigmentary glaucoma secondary to cosmetic iris implants. Respecting the patient's wishes**

Authors: Catriona Downie MMed, Jason Cheng FRANZCO, Anne Lee PhD

Institutions: Ophthalmology Department, Liverpool Hospital

City: Sydney

State: NSW

Country: Australia

**Aim:**

To report the outcome of bilateral trabeculectomies for uncontrolled pigmentary glaucoma secondary to cosmetic iris implants.

**Method:**

Case report

**Results:**

A 26 year old woman with bilateral BrightOcular cosmetic iris implants presented with severe combined anterior uveitis and pigmentary glaucoma associated with raised intraocular pressures (IOP) of up to 42mmHg while on maximal medical management. The iris implants were inserted 4 years earlier in India. The iris implant appeared fixated at the level of the pigmented trabecular meshwork, with iris dialysis and correctopia noted behind the implant. The trabecular meshwork was heavily pigment with pigment cells in the anterior chamber and pigment spiculation of the anterior lens capsule. Visual acuity was unaffected. Ocular inflammation settled with steroid therapy but IOP remained elevated despite maximal medical therapy with residual pigment dispersion.

Despite extensive counselling and informed consent, the patient refused iris implant removal. Bilateral sequential trabeculectomies enhanced with MMC were performed without complication. A surgical iridectomy was unable to be performed due to the iris implants, however provided a barrier for anterior movement of the iris and ostial obstruction.

Intraocular pressures in the two months following surgery have been between 8-15mmHg without any antihypertensive treatment. Visual acuity remains unaffected.

**Conclusion:**

To our knowledge this is the first reported case of trabeculectomy with mitomycin C in a patient with insitu cosmetic iris implants. In this difficult case where the patient refused conventional management of iris implant explant, initial trabeculectomy has restored normal IOP, and preserved vision and cosmesis with minimal trauma. Further long-term effects on the corneal endothelium from the iris implants await to be seen.

11.45 – 12.00

Name: Dr Kerr Brogan

**Title: Refractive outcomes following lens extraction in nanophthalmos**

Authors: Kerr Brogan, Alan Rotchford  
Institutions: Tennent Institute of Ophthalmology  
City: Glasgow  
State: Glasgow City  
Country: United Kingdom

**Aim:**

Following publication of the EAGLE study we are performing lens extraction more readily in nanophthalmos to prevent and treat angle closure. We set out to examine refractive outcomes following phacoemulsification and intraocular lens insertion in nanophthalmic eyes. Performance of commonly used biometry formulae were compared.

**Method:**

From the electronic phacoemulsification database of a single institution, a cohort of consecutive eyes with axial length (AL) less than two standard deviations below the mean (i.e. <20.5mm) undergoing uncomplicated surgery, "in-the-bag" placement of a non-toric IOL, no previous refractive procedures, and documented target and post-operative refraction were identified. Targeted spherical equivalents using several biometry formulae (Hoffer-Q, Haigis, SRKT and Holladay-1) were compared to actual post-operative refractive outcomes.

**Results:**

From a dataset of 14,265 operated eyes, 164 had nanophthalmos (prevalence 1.1%) of which 137 (83.5%) met the full inclusion criteria.

Median refraction reduced from +5.75D (IQR +3.50 to +6.88) pre-operatively to -0.06D (IQR -0.75 to +0.88) post-operatively. Mean absolute refractive error (MAE) was 0.91D (SD 0.79) for nanophthalmic eyes and only 66.0% of nanophthalmic eyes were within 1D of target refraction.

Mean error, MAE and proportion within 1D of target were best for the Haigis formula (-0.01D; 0.04D; 74% respectively), followed by Holladay-1 (+0.21D; 0.21D; 71%), Hoffer-Q (-0.31D, 0.30D; 72%) and SRKT (+0.52D; 0.51D; 61%).

However, the spread of results was substantially greater than for eyes of average AL for all formulae.

**Conclusion:**

Refractive outcomes even in uncomplicated lens extraction is far less predictable in nanophthalmic eyes than in eyes of normal AL.

12.00 – 12.15

Name: Dr Noor Ali

**Title: Kahook Dual Blade Goniotomy: An audit of the first 101 cases in a tertiary university hospital in England.**

Authors: Ali, NQ, Bilip M, Kontos G, Taylor R.

**Aim:** to audit the results of the first 101 eyes that underwent Kahook Dual Blade Goniotomy in combination with Cataract extraction performed at Oxford University Eye Hospital between 2018 and 2020.

**Methods:** Retrospective review of the medical records as per the audit guidelines at our institution. Results analysed as per the world glaucoma association guidelines on reporting of interventional glaucoma procedures in research:

Success (IOP <21mmHg with no topical drops, or 20% reduction in NTG)

Qualified Success (IOP <21mmHg with 1 drop only)

Mean reduction in IOP at last follow up

Mean reduction in topical agents at last follow up

**Results:** 101 eyes underwent surgery were identified. The mean age at time of surgery  $76 \pm 9$  years (range 47-90). There was an equal distribution of males to females 52:49. The glaucoma subtypes by frequency were: OAG 40%, NTG 10%, PACG 29%, Mixed Mechanism 8%, PAC 6% and OHT 1%. The mean IOP at time of listing:  $21 \pm 6$  (12-36). Mean number of topical meds at time of listing: 1.40 (42% 3 meds, 25% 2 meds, 8% 4 meds, 17% 1 med). The mean follow up time was 18.8 months. At last follow up, 'Success' was achieved in 45% of eyes and 'Qualified Success' was achieved in a further 19%. The mean IOP at last visit:  $16 \pm 4$  mmHg, with a mean reduction in IOP:  $5 \text{ mmHg} \pm 7 \text{ mmHg}$ . The mean reduction in number of topical glaucoma meds  $-1.43 \pm 1.38$ . The occurrence of post-operative hyphaema within the first week was 3%.

**Conclusion:** KDB goniotomy can achieve significant lowering of IOP and reduction in number of glaucoma drops in combination with phacoemulsification in both open and closed angle glaucoma patients. The risk of post-operative hyphaema is lower than reported in other case series.