Program

8.00   Registration
8.45   Welcome by James McKelvie

9.00 - 10.25 Session 1
Chairs: Dr James McKelvie and Dr Stephen Ng
9.00   Introduction to Session 1

                                    James McKelvie

9.05   Anterior Segment Update

                                    James McKelvie

9.20   The Changing Landscape of Eye Banking and Corneal Transplantation in New Zealand

                                    Nigel Brookes

9.30   Repeatability and Agreement between the Medmont-E300 topographer, and Revo-NX and Pentacam-AXL Tomographers in Keratoconic Subjects

                                    Lize Angelo

9.40   Weighty Matter - the Impact of Body Mass Index on the Repeatability and Reliability of Corneal Tomography Measurements in Patients with Keratoconus.

                                    James Lewis

9.50   Sub-400 Advanced Keratoconus: Implications of Repeatability Limits of Pentacam Tomography for Corneal Crosslinking

                                    Himanchu Wadhwa

10.00   Manifestation of Anterior Necrotising Scleritis and Reactive Infectious Mucocutaneous Eruption After COVID-19 2022: A Case Report

                                    Vince Wilkinson

10.10   Lids, Orbits and the Pursuit of Perfection

                                    Stephen Ng

Morning Tea 10.25 - 10.55am
Annual General Meeting

10.55 - 12.30 Session 2
Chairs: Dr Taras Papchenko and Dr Sarah Hull
10.55   Introduction to Session 2

                                    Sarah Hull

11.00   Anomalous optic discs and PHOMS

                                    Taras Papchenko

Program

11.15   Case Series of Paediatric Idiopathic Intracranial Hypertension from Auckland

                                    Daniel Scott

11.25   Feasibility and Safety of a Virtual Imaging Clinic to Investigate Children with Swollen Optic Nerves

                                    Emily Joe

11.35   Visual failure from Hypovitaminosis A in Two Children with Severe Autism Spectrum Disorder; The Need for Vitamin Replacement Therapy

                                    Glynis Hanrahan

11.45   Colchicine for Fibrosis Suppression

                                    Mark Donaldson

11.55   Machine Learning-based Glaucoma Detection using Fundus Images from Multiple Cameras

                                    Hansi Gunasinghe

12.05   Assessing Visual Function and Functional Vision in Community-based Settings

                                    Ruhella Hussain

12.15   The rise of premature eye disease

                                    Sarah Hull

Lunch 12.30 - 1.30pm

1.30 - 2.45 Session 3
Chairs: Dr Priya Samalia and Dr Oliver Comyn
1.30   Introduction to Session 3

                                    Oliver Comyn

1.35   Retina Update

                                    Oliver Comyn

1.50   Precision Medicine in Ophthalmology

                                    Andrea Vincent

2.05   Correlation between the Progression of Diabetic Retinopathy and Inflammasome Biomarkers in Vitreous and Serum – a Systematic Review

                                    Charisse Kuo

2.15   Plaque Brachytherapy for Treatment of Uveal Melanoma in Aotearoa between 2005 to 2020

                                    Joevy Lim

2.25   Gliptin-Induced Ocular Mucous Membrane Pemphigoid (MMP)

                                    Jane Shi

Program

2.35   Epiretinal Membrane in Uveitis: Rate, Visual Prognosis, Complications and Surgical Outcomes

Aaron Yap

2.45   Ophthalmic Acyclovir Utilisation in Aotearoa New Zealand

James Lewis

2.55   Infectious Aetiology is Common in Paediatric Uveitis

Priya Samalia

Afternoon Tea 3.10 - 3.40pm

3.40 - 4.55 Session 4
Chairs: Dr Thiyaga Krishnan and Dr Ammar Bin-Sadiq
3.40   Introduction to Session 4

Thiyaga Krishnan

3.45   Ophthalmic Nursing Update

Lyn Scott

4.00   Barriers to Accessing a Tertiary Keratoconus and Crosslinking Clinic in Auckland, and Associated Visual Outcomes, to Assess Health Inequity

Lize Angelo

4.10   Characteristics of Acute Referrals to Dunedin's Ophthalmology Clinic during COVID-19 Restrictions for Impact Assessment on Ophthalmic Service Demands

Liam Walsh

4.20   Predicting Ophthalmic Clinic Attendance using Machine Learning

Finley Breeze

4.30   Cosmetic Anterior Chamber Iris Implants – a Case Describing the Spectrum of Complications

Daniel Scott

4.40   Māori Perspectives on Ocular Healthcare in Aotearoa New Zealand

Isaac Samuels

4.50   Final Comments and Close of Conference

James McKelvie

Cornea / cataract update lecture

Dr James McKelvie

Dr McKelvie is a consultant ophthalmologist and corneal specialist, who also works at the University of Auckland, Waikato Hospital and Hamilton Eye Clinic.

Dr McKelvie will be presenting an update on cornea and cataract surgery.

The Changing Landscape of Eye Banking and Corneal Transplantation in New Zealand

Nigel Brookes - New Zealand National Eye Bank & University of Auckland

Aims:

To identify long-term trends in both primary indication and procedure for keratoplasty in NZ, and explore the corresponding implications for the NZ National Eye Bank (NZNEB).

Methods:

Analysis of the NZNEB's database of stored corneas and keratoplasties between January 1991 and December 2021.

Results:

During the study period the NZ population increased 43%, and a total of 8539 corneas were stored by the NZNEB, of which 7470 were transplanted. Keratoconus was the leading indication for transplant until 2019 when it was overtaken by regraft, which has been increasing linearly in number over the whole period. From 2009 corneal cross-linking was introduced which is beginning to reduce numbers of penetrating keratoplasties (PK) for keratoconus. Almost all keratoplasties were PK until 2005 when lamellar techniques were first introduced. By 2021 PK still comprised 56% of grafts, with the remaining a changing mix of mostly Deep Anterior Lamellar Keratoplasty (DALK), Eye Bank-prepared Descemet Stripping Automated Endothelial Keratoplasty (DSAEK), and Descemet Membrane Endothelial Keratoplasty (DMEK).

Conclusions:

There have been huge changes in the NZ population, the indications and techniques of keratoplasty, and treatment of the once-leading indication keratoconus over the 31-year study period. The steadily rising population and additional burden of regraft has put increasing pressure on the NZNEB's existing NZ donor supply which is no longer sufficient, and has become the most critical priority for improvement. The NZNEB also has an increasingly centralised role in the preparation of tissue for DSAEK and in the future DMEK.

Repeatability and Agreement between the Medmont-E300 topographer, and Revo-NX and Pentacam-AXL tomographers, in keratoconic subjects

Authors:

Dr. Lize Angelo, Dr. Akilesh Gokul, Dr. Himanshu Wadhwa, Prof. Charles McGhee, Dr. Mohammed Ziaei

Aim:

To test the repeatability and agreement of the topography module of a spectral domain optical coherence tomographer, the Revo-NX (Revo NX, OptiMed, New Zealand), a Placido disc-based videokeratoscope, the Medmont-E300 topographer (E300 Topographer, Medmont, Australia) and partial coherence interferometer with Scheimpflug system, the Pentacam-AXL tomographer (Pentacam AXL, Oculus, Germany), in keratoconic subjects.

Method:

In this institutional prospective study, keratoconic subjects with non-operated eyes, had one eye randomized to have their central corneal thickness (CCT), thinnest corneal thickness (TCT), maximum keratometry (Kmax), mean keratometry (Kmean), steep and flat keratometry (Ksteep and Kflat), measured with these three devices. Three operators made 3 measurements on each device to check intra-observer repeatability. Bland-Altman plots were used to assess the agreement between the devices for each analysed variable.

Results:

The study comprised of 110 eyes of 110 subjects. Repeatability varied but was best in the Pentacam with CCT, Kmax, Kmean, Ksteep and Kflat, Revo had the best repeatability with TCT. The Medmont had better repeatability than the Revo with Kmax, Kmean, Ksteep and Kflat. Intraclass correlation coefficient (ICC) was greater than 0.94 in all devices. Agreement overall was poor between devices. However, there was agreement between the Pentacam and Medmont Kflat measurements ($p < 0.05$).

Conclusion:

The Pentacam device has the highest repeatability and Revo the worst, however, the Medmont is unable to measure CCT and TCT. Agreement is poor between devices so a new baseline must be established when changing devices.

Sub-400 Advanced Keratoconus: Implications of repeatability limits of Pentacam tomography for corneal crosslinking

Authors:

Himanshu Wadhwa[1], Akilesh Gokul[1], Ye Li[1], Isabella MY Cheung[1], Lize Angelo[1], Charles NJ McGhee[1,2], Mohammed Ziaei[1,2]

Purpose:

To assess the repeatability limits of corneal tomography in advanced keratoconus with thinnest corneal thickness (TCT) <400μm to assist in planning customized corneal crosslinking.

Methods:

A prospective single-centre repeatability study utilising Pentacam AXL. Three scans were performed on both eyes of all participants. Eyes with previous crosslinking, intraocular surgery, or acute corneal hydrops were excluded. Eyes were age and gender-matched and grouped into advanced or moderate keratoconus based on TCT of $\leqq$400μm and >450μm, respectively. Repeatability limits of TCT measurements were calculated using within-subject standard deviation (Sw) and intra-class correlation coefficient (ICC). Subgroup analysis of eyes with TCT ≤330μm (n=25) and 331-400μm (n=75) was also conducted.

Results:

The advanced keratoconus group comprised 100 eyes of 88 participants and the moderate keratoconus group comprised 100 eyes from 100 participants. TCT was less repeatable in advanced keratoconus with Sw 11.65±19.10 and ICC 0.92 compared to Sw 6.46±10.83 and ICC 0.89 in moderate keratoconus (p<0.01). Repeatability limits were 32.27μm and 17.07μm respectively. In subgroups of eyes with TCT≤330 and TCT331-400, repeatability limits were 56.25μm and 18.79μm with respective ICCs of 0.69 and 0.89.

Conclusions:

Repeatability of TCT in advanced keratoconus is significantly reduced compared to moderate keratoconus. Clinicians should consider using the mean of three repeat scans in advance keratoconus. In keratoconic eyes with TCT 331-400μm, the repeatability limit of 18.79μm should be accounted for when planning to use a <400μm corneal crosslinking protocol.

Manifestation of Anterior Necrotising Scleritis and Reactive Infectious Mucocutaneous Eruption After COVID-19 2022: A Case Report
Vince Wilkinson - University of Otago

Purpose:
To report a case of reactive infectious mucosal eruption and anterior scleritis in a double vaccinated patient following recent recovery from COVID-19. Reactive infectious mucocutaneous eruption (RIME) is a newly recognised complication of SARS COVID-19. Scleritis has also been reported in COVID-19 infections; however, these cases were from early in the pandemic prior to vaccine development and were not reported to occur concurrently with RIME.

Method:
This case report illustrates a 25-year old male double vaccinated against COVID-19 (ComirnatyTM) who presented 9 days following a positive Rapid Antigen Test (RAT) for COVID-19 with RIME involving the oral and oropharyngeal mucosa, and concurrent bilateral anterior necrotising scleritis.

Results:
Consultation was sought from ophthalmology, otolaryngology, dermatology and dental regarding diagnoses and management. The patient's condition rapidly improved following treatment with IV methyprednisolone and an oral prednisone taper.

Conclusion:
In cases of diagnostic uncertainty, multidisciplinary collaboration is critical to achieve a timely diagnosis and prevent serious complications.

Lids, Orbits and the Pursuit of Perfection
Dr Stephen Ng – Waikato District Health Board

Abstract:
This talk will discuss new therapeutic options for treating oculoplastic & orbital conditions. It will also discuss how we as practitioners can improve the sustainability of our work, our roles and our mindset.

Anomalous optic discs and PHOMS
Taras Papchenko

Abstract:
A brief overview of anomalous optic nerves and recent clarification of what PHOMS represent and their significance in assessing of the optic nerve's appearance and function.

Case series of paediatric Idiopathic Intracranial Hypertension from Auckland

Daniel Scott - University of Auckland

Aim: To investigate the epidemiology and clinical profile of patients with Idiopathic Intracranial Hypertension (IIH) in Paediatric patients (aged less than 18 years old) in a New Zealand setting.

Methods: Retrospective case series of IIH patients seen at Greenlane Clinical Centre (Auckland) from April 2020 to May 2022, separated into prepubertal (<12 years) and pubescent (12-17 years) groups. Secondary causes of intracranial hypertension were excluded.

Results: A total of 20 referrals were received from Optometry (50%), Paediatrics (30%) and General Practice (20%) from 21/5/2020 to 10/3/2022. Probable/confirmed IIH was determined for 15 (75%) cases, the remaining 5 cases were identified with secondary intracranial hypertension causes (infection-related, vitamin-A-related, thrombosis-related and Myelin Oligodendrocyte Glycoprotein-related). The average lumbar puncture opening pressure was 37.5 cm H_2O (minimum 20, maximum 65). IIH patients commonly presented with headaches in 75% of cases. Treatment was with Diamox (93%) and/or Topiramate (26%). Separated by age group; 11 prepubertal children were mostly male (82%) with a BMI average of 20.5 kg/m², and all 4 pubertal children were female with an average BMI of 34.4 kg/m². One IIH patient demonstrated OCT-proven retinal nerve fibre layer thinning after resolution of papilloedema, in association with optic pallor on the clinical exam at the last follow-up visit. The average follow-up period for patients was 8.35 months.

Conclusions:
Paediatric IIH is classified into two subtypes, and in a New Zealand context a similar clinical profile was replicated. One in Fifteen patients suffered optic nerve pallor as a result of paediatric IIH.

Feasibility and Safety of a Virtual Imaging Clinic to Investigate Children with Swollen Optic Nerves

Emily Joe - University of Auckland

Aim:

To gather data on children newly referred with swollen optic nerves. Then assess the parameters of this data for clinical evidence and defining parameters to assist in creating a proforma for a virtual imaging clinic to reduce the burden of physical clinical attendance.

Methods:

A consecutive retrospective audit was performed. All paediatric patients (aged 0 – 16) seen by ADHB in a clinic or acute setting between 1st October 2020 and 1st December 2021 were retrospectively identified if newly referred with suspicion of swollen optic nerves. An auditing aid was created based on clinician experience and parameters identified from literature to be common markers of papilloedema. A proforma was then created, and is to be trialled as a screening tool in a simulated virtual imaging clinic, and subsequently reviewed for feasibility and safety.

Results:

Of the 61 patients included, 10 were diagnosed with Papilloedema, 36 with Pseudopapilloedema; (8 drusen, 26 anomalous), 12 were Normal and 3 were Unknown. Papilloedema diagnoses were six with IIH, two brain tumours, one post viral, and one of yet undetermined cause (investigation still ongoing). RNFL Global and Peak numbers were shown to have statistical significance ($p < 0.05$) between Papilloedema and Pseudopapilloedema groups.

Conclusion:

The data shows most patients with pathology were referred urgently to Acute Eye Service, and demonstrates that optometrists are recognising severe disease well. With these referrals, we need to ensure prompt neuro-imaging is undertaken (if indicated). This study also shows that RNFL Global and Peak numbers are both potentially useful parameters for diagnoses.

Visual failure from Hypovitaminosis A in Two Children with Severe Autism Spectrum Disorder; The Need for Vitamin Replacement Therapy

Glynis Hanrahan - University of Auckland

Aim
Vitamin A deficiency is a cause of malnutrition that can lead to ocular disease. WHO estimates that 228 million children worldwide are affected.
It is known that children with Autism Spectrum Disorder (ASD) can develop dietary restrictions. Here we describe two children with ocular complications of hypovitaminosis A.

Methods
This is a retrospective case report series looking at the presentation, investigations and management of two children with visual failure.

Results
Two unrelated boys of Māori ethnicity had severe non-verbal ASD and diets restricted to potato chips and fries. Both patients presented with a change in visual behaviour. Visual acuity could not be measured. The first patient presented age 11 years and had conjunctival injection and optic disc pallor R>L. The second presented age 9 years and did not have any obvious fundus abnormalities.
MRI, lumbar puncture and blood tests were conducted under general anaesthesia. Both patients had low vitamin A levels of 0.2 umol (0.9-1.7) . MRI identified calvarial thickening including the skull base in both patients which is a known consequence of low vitamin A. The optic canals were narrowed with no increased signal in the optic nerves. Lumbar puncture demonstrated normal opening pressures.
Vitamin replacement therapy has led to a partial improvement in visual function in the second patient only.

Conclusion
Dietary restriction in ASD may lead to vision loss due to Vitamin A deficiency. Unfortunately, presentation can be late in in this subgroup of patients. Increased awareness of vitamin replacement is essential to prevent visual loss.

Colchicine for fibrosis suppression
Mark Donaldson - Eye Doctors

Introduction
Colchicine is an anti-inflammatory drug that modifies wound healing by interfering with fibroblast migration and its usage has been described for bleb rescue in glaucoma surgery. In this series a low dose colchicine regimen was followed to reduce risks of side-effects.

Methods
Six glaucoma procedures were selected on account of deteriorating fibrosis control or prospectively on account of risk factors for failure. Daily colchicine dosage was 500mcg per day. Colchicine was terminated if gastrointestinal symptoms intervened or if favourable stable bleb morphology and intraocular pressure control was achieved.

Results

Diagnosis	Age	Race	Operation (MMC mg/ml)	Colchicine Peak Dose	Start post-op day	Total days	Latest IOP (mmHg)	Pressure Medication (at last visit)	Complication
NTG	55	Chinese	Trab (0.2mg/ml)	1000mcg	36	74	7	0	
NTG	65	Euro	Phaco-trab (0.3mg/ml)	500mcg	10	210+	5	0	
PG	53	Euro	Trab (0.3mg/ml)	500mcg	14	9	15	0	Maculopathy (hypotony)
OAG	67	African	Baerveldt (0.0mg/ml)	500mcg	15	235+	19	1	
Trauma	61	Euro	Trab (0.2mg/ml)	1000mcg	7	30	8	0	Diarrhoea (colchicine)
OAG	69	Euro	Xen (0.3mg/ml)	500mcg	7	114+	8	2	

Hypotony maculopathy occurred in in a myopic patient with pigmentary glaucoma (PG) whose IOP was 4mmHg at time of reduced acuity. Colchicine was stopped and his acuity recovered and IOP gradually elevated. Diarrhoea occurred in one patient whose dose was increased after worsening of bleb characteristics. Diarrhoea ceased with withdrawal of medication.

Conclusion
Low dose oral colchicine was well tolerated and provided additional valuable fibrosis suppression.

Machine learning-based glaucoma detection using fundus images from multiple cameras

Hansi Gunasinghe - University of Waikato

Aim

Images taken by retinal fundus camera are useful for glaucoma screening. In this study, we evaluate the accuracy of deep learning-based automated glaucoma detection with respect to the camera model, in order to assess generalisation performance.

Methods

REFUGE and RIMONE, labelled glaucoma detection datasets drawn from three different models of fundus camera (1655 images in total), were used. REFUGE images were cropped around the optic nerve head to match the RIMONE images. Then, style transfer and randomised multi-image histogram matching were applied as pre-processing steps separately in order to compare them. Image features were extracted using RESNET101V2 and AlexNet pretrained neural networks, and then glaucoma detection models based on random forests and XGBoost were trained. The experiment was conducted by assigning images from one camera as training set and images from another camera as the test set.

Results

The highest average receiver operating characteristic curve (AUC) of 0.87 was obtained using the style transfer method then a random forest classifier with features extracted using AlexNet. For histogram matching, the best average AUC was 0.77. The style transfer-based preprocessed showed consistently improved accuracy compared to every other preprocessing method we tested.

Conclusions

The style transfer-based image preprocessing method is better than the histogram matching-based image preprocessing method, and the best classifier is the random forest. Hence, we conclude that style transfer as a pre-processing method helps to generalise the deep learning glaucoma detection models across multiple fundus cameras.

Assessing visual function and functional vision in community-based settings

Authors:
Ruhella R Hossain1,2, James McKelvie1,3 , Stephen Ng3, Stephen Guest3, Stuti Misra1
1. University of Auckland, Department of Ophthalmology, Auckland, New Zealand
2. Hawkes Bay DHB, Department of Ophthalmology, Hastings, New Zealand
3. Waikato DHB, Department of Ophthalmology, Hamilton, New Zealand

Purpose:
Visual impairment (VI) significantly affects quality of life amongst elderly and limits independence. However, conventional visual acuity (VA) measurements may underestimate the actual level of VI. Contrast sensitivity (CS) can aid in identifying other pathologies in individuals who report significant VI that cannot be explained by decreased VA. This study aimed to 1) quantify the prevalence of undiagnosed VI in Waikato's elderly population in community-based settings by measuring VA and CS; and 2) evaluate the impact of VI on visual satisfaction using the CatQuest-9SF validated patient reported outcome measurement questionnaire.

Method:
Prospective study completed at a Waikato retirement home (RH) and during marae-based COVID-19 vaccination drives where all adults were invited to participate. Best corrected visual acuity (BCVA) and CS were measured using Snellen and Pelli-Robson charts. Larger VA logMAR values represented worse VA while larger Pelli-Robson CS scores represented better CS, with the maximum score of 2.0 indicating normal CS of 100%. Participants with VA logMAR >0.3 in both eyes or >0.40 in either eye received a dilated fundus examination (DFE). Participants completed the CatQuest-9SF where more negative mean values suggested more visual satisfaction. Participants' level of CS in their worst eye was compared to their average CatQuest-9SF score.

Results:
In total, 100 adults were screened. Initially 25 participants were recruited from the RH. However, COVID-19 restrictions and RH-lockdowns prevented further sessions and required seeking alternative community-based events. Another five sessions were performed at marae-based COVID-19 vaccination drives with an additional 75 adults recruited. Participants were on average 62.9 years (IQR:50-77) and mostly female (n=65). Ethnicities included Māori (n=55), New Zealand European (n=27), and Other/Unknown (n=19). In total 42 of the 100 adults were referred to their local Opticians and 58 adults underwent DFEs. Ocular pathology for the 116 evaluated eyes included: cataract (n=44, CS score=0.98, VA=0.43), refractive error (n=28, CS score=1.73, VA=0.09), no pathology (n=15, CS score=1.81, VA=-0.01), other (n=15, CS score=1.14, VA=0.53), and pseudophakia (n=11, CS score=1.05, VA=0.33). Three eyes (2.6%) were either a prosthetic or had no visual potential. Average CatQuest scores for participants worst eyes (n=16) categorised by CS score were: CS score ≤1.0 (n=2) = 0.43 (Range -0.56 to 1.42), CS score >1.0 and ≤ 1.5 (n=2) = -1.84 (Range -2.48 to -1.19), and CS scores >1.5-2.0 (n=12) = -1.60 (Range -3.33 to 1.42).

Discussion:
A high number of undiagnosed cataracts and refractive error were identified in the community. Participants with cataracts had the worst average VA and worst CS scores. Participants with the best CS scores reported the highest visual satisfaction and least amount of activity limitation. Regular vision screening amongst the elderly in a RH or community setting may have merit and aids in early diagnosis of treatable conditions, such as cataracts. This study was limited by COVID-19 and further screenings are needed.

The rise of premature eye disease
Sarah Hull

Prematurity is a leading cause of low vision and blindness in children. Screening for retinopathy of prematurity aims to identify babies with high-risk disease and give treatment to prevent vision loss from retinal detachment. The number of babies needing to be screened is increasing as is the survival of extreme premature babies (age 23 and 24 weeks gestational age) who have a high rate of treatment. Managing this increasing work load requires efficiency of screening. Potential approaches to this and areas of further investigative need are discussed including telemedicine, artificial intelligence and prediction models using weight gain to re-classify the ROP screening system.

Retina update

Oliver Comyn

Precision Medicine in Ophthalmology
Andrea Vincent - University of Auckland

Precision medicine is an emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment, and lifestyle for each person. Combining this information will improve our ability to predict which treatments will work best for specific patients, better understand the underlying mechanisms by which various diseases occur, and improve approaches to preventing, diagnosing, and treating a wide range of diseases. In Ophthalmology, advances in the technologies of genomics, imaging and treatments, are already making precision medicine a reality, including pharmacogenomics, artificial intelligence, gene therapies and polygenic risk scores. This talk will cover examples of the application of precision medicine in Ophthalmology to maximise patient management and visual outcomes.

Correlation between the progression of diabetic retinopathy and inflammasome biomarkers in vitreous and serum – a systematic review

Charisse Kuo - University of Auckland

Authors:

Charisse Y. J. Kuo[1], Rinki Murphy[2], Ilva D. Rupenthal[1] and Odunayo O. Mugisho[1]

[1] Buchanan Ocular Therapeutics Unit, New Zealand National Eye Centre, Department of Ophthalmology, The University of Auckland, Auckland 1023, New Zealand

[2] Department of Medicine, Faculty of Medical and Health Sciences, The University of Auckland, Auckland 1023, New Zealand.

Background:

Diabetic retinopathy (DR) is characterised by retinal vascular lesions and is the leading cause of preventable blindness in the working-age population worldwide. Therefore, an upstream treatment which can halt DR progression is urgently required. Activation of the NOD-like receptor protein 3 (NLRP3) inflammasome pathway has been implicated in DR pathogenesis but its impact on DR development and progression remains unclear.

Aim:

To determine the role of the inflammasome in DR development, and whether systemic inflammasome biomarkers can be used to predict DR progression.

Methods:

Studies measuring vitreous and/or serum inflammasome biomarkers in DR patients with Type 2 Diabetes Mellitus were search systematically. Following risk of bias assessment, the recorded expressions of inflammatory biomarkers in vitreous and serum in DR patients were analysed at different DR stages.

Results:

Pro-inflammatory, chemotactic, but not anti-inflammatory biomarkers, were distinctly elevated in the vitreous and serum of patients with proliferative DR relative to control. A similarity was found between the proportion of studies showing an increase, no change or a decrease in pro-inflammatory, anti-inflammatory and chemotactic biomarkers in the vitreous and serum. Specifically, expression levels of the inflammasome biomarkers, IL-1β and IL-18, increased significantly from non-proliferative to proliferative DR in both vitreous and serum.

Conclusions:

Existing data showed significant elevation in vitreous and serum IL-1β and IL-18 from non-proliferative to proliferative DR, suggesting that the inflammasome is activated as DR progresses. Correlation between serum and vitreous inflammation further suggests serum inflammasome levels could be explored as potential biomarkers for DR progression.

Plaque brachytherapy for treatment of uveal melanoma in Aotearoa between 2005 to 2020

Joevy Lim - University of Auckland

Plaque brachytherapy is a radioactive treatment for uveal melanoma and found to have non-inferior mortality rates compared to enucleation in a landmark randomised controlled trial (Collaborative Ocular Melanoma Study [COMS]).

Purpose:
To evaluate the clinical outcomes of plaque brachytherapy on the treatment of uveal melanoma in Aotearoa.

Method:
A retrospective, single-centre cohort study was conducted on uveal melanoma patients treated with plaque radiotherapy from 01/01/2005 to 31/12/2020. Medical records were reviewed for demographics, presenting tumour features, and clinical outcomes.

Results:
199 cases were identified. The mean age at diagnosis was 63.2±14.2 years. 106 (53%) cases were female, and 188 (94%) cases were of European ethnicity. Almost half (47%) of the cases were asymptomatic at presentation. The most common symptoms were photopsia and blurred vision. Presenting tumour features in the affected eye included mean Snellen visual acuity ≥6/12 (logMAR 0.26±0.48), mean intraocular pressure 15.0±3.7mmHg, mean largest tumour basal diameter 11.5±3.5mm and mean apical thickness 3.5±2.2 mm. The median time to treatment was 13 days (IQR 6–27 days). The mean follow up was 9.5±4.4 years and all-cause mortality was found in 57 cases (29%). The median survival time was 6.1 years; with 1 and 5-year overall survival probabilities of 96% and 78% respectively. Documented metastases occurred in 16 cases (8%) and the primary location of spread was to the liver.

Conclusion:
Patients with small to medium sized uveal melanomas receiving plaque radiotherapy in Aotearoa had comparable 5-year overall survival to the COMS (this study vs. COMS: 78% vs. 81%).

A convoluted case of ocular mucous membrane pemphigoid (MMP)

Jane Shi - Taranaki Eye Centre

Aim:

Ocular MMP is a chronic, relapsing-remitting autoimmune disease that is characterised by subepithelial blisters as a result of disruption to the adhesions between the conjunctival epithelium and sub-epithelium. We describe a convoluted case of ocular MMP that was initially presumed to be secondary to commencing gliptin therapy for type 2 diabetes mellitus. It later became apparent that the patient likely had pre-existing MMP in their nasal passage.

Methods:

Conjunctival biopsies were sent for immunohistochemistry and histology in December 2021. Histology came back which showed subepithelial inflammation, consistent with but not diagnostic of pemphigoid. Immunohistochemistry showed linear IgA deposition along the conjunctiva/connective tissue junction which is consistent with cicatricial pemphigoid.

Results:

In summary, the patient is now on oral Cyclosporin and Prednisone for immunosuppression as well as topical Chloramphenicol and preservative-free topical lubricants with the consideration of adding in autologous serum free eyedrops for ocular disease. There is ongoing follow-up from Immunology, Dermatology, General Medicine and Ophthalmology.

Conclusions:

The diagnosis of MMP is difficult as it affects mucous membranes in a non-specific manner. Direct immunofluorescence of biopsied tissue is the gold standard for diagnosis. The aim of treatment is to primarily limit the progress of inflammation and fibrosis of the affected mucous membrane. It is paramount that surgical treatment is held off until disease control is achieved, as surgery may precipitate further scarring and post-operative inflammation/infection. In advanced cases of ocular MMP, limbal stem cell transfer, amniotic membrane and corneal transplantation can be indicated for ocular surface reconstruction and visual rehabilitation. Multi-disciplinary involvement is often necessitated as seen in our case.

Epiretinal membrane in uveitis: rate, visual prognosis, complications and surgical outcomes

Aaron Yap - University of Auckland

Purpose

To describe the long-term morphometric optical coherence tomography features of epiretinal membrane (ERM) and visual acuity outcomes in patients with uveitis. To report the outcomes of the subgroup that underwent vitrectomy and epiretinal membrane peel.

Method

The prospective database that records consecutive patients referred to the uveitis service was interrogated to identify all patient with uveitis and epiretinal membranes from 2008 to 2021. Multivariate analysis of risk factors for epiretinal membrane progression was calculated. Outcomes of patient post-vitrectomy and epiretinal membrane peel were analysed.

Results

5450 eyes of 3925 patients were reviewed during the study period. A total of 216 eyes in 165 patients were identified to have a epiretinal membrane (4.0% of eyes, 4.2% of patients). The most common diagnosis was idiopathic disease in 45 patients (28.7%), followed by sarcoidosis in 21 (13.4%), HLAB27 in 15 (9.6%), toxoplasmosis in 15 (9.6%) and tuberculosis in 11 patients (7.0%). Risk factors for developing epiretinal membrane included older age (HR 1.034 $p<0.001$), intermediate uveitis (HR 5.224 $p<0.001$), posterior uveitis (HR 3.914 $p<0.001$), chronic inflammation (HR 2.560 $p<0.001$) and ERM other eye (HR 31.518 $p<0.001$). At diagnosis, epiretinal membrane was stage 1 in 171 eyes (79.5%), stage 2 in 28 eyes (13.0%) and stage 3 in 15 eyes (6.9%). Median visual acuity was 20/40 (IQR 20/30 – 20/50) and 20/40 (IQR 20/25 – 20/60) at diagnosis of ERM and final follow up, respectively. SVL was observed in 24 eyes (11.1%) and MVL in 49 eyes (22.7%). Progression of ERM grading occurred in 17 eyes (7.9%) during the study period. Epiretinal membrane peel was performed in 44 eyes (20.4%). Median visual acuity was 20/60 (IQR 20/40- 20/100) and 20/40 (IQR 20/30 – 20/60) baseline and twelve months after surgery, respectively. Improvement of vision occurred in 23 eyes (60.5%), remained stable in 4 eyes (10.5%) and worsened 11 eyes (28.9%).

Conclusion

The rates of epiretinal membrane progression based on OCT morphology and visual acuity loss in patient with uveitis is low. Vision loss was attributable to chronic macular edema and scarring, as opposed to epiretinal membrane progression. The majority of patients that undergo ERM peeling experience improvement in visual acuity.

Infectious Aetiology is Common in Paediatric Uveitis

Priya D Samalia, Hannah Ng, Sarah Hull, Justin Mora, Joanne L Sims, Rachael L Niederer

Aim:
To describe the aetiology, complications, treatment and outcomes of pediatric uveitis

Methods:
Retrospective chart review of all pediatric subjects presenting with uveitis to a tertiary referral hospital in Auckland, New Zealand between January 1997 and March 2020

Results:
224 eyes of 143 pediatric subjects were included. Non-infectious uveitis occurred in 97 (67.8%) subjects and infectious aetiology occurred in 46 (32.2%) subjects. 126 (56.3%) eyes developed complications by final follow up, including ocular hypertension (60 eyes, 26.8%), cataract (55 eyes, 24.6%) and glaucoma (21 eyes, 11.6%). Conventional disease modifying anti-rheumatic drugs were required in 58 (40.3%) subjects and biologic disease modifying anti-rheumatic drugs in 31 (21.5%) subjects. Despite maintaining overall good visual acuity at final follow up, vision loss of 6/15 or worse occurred in 38(17.0%) eyes.

Conclusion:
Infections are an important cause of uveitis in this age group and complications commonly occur. A large proportion of children will require steroid sparing immunosuppression.

Barriers to accessing a tertiary keratoconus and crosslinking clinic in Auckland, and associated visual outcomes, to assess health inequity

Dr. Lize Angelo, Dr. Akilesh Gokul, Dr. Simone Freundlich, Prof. Charles McGhee, Dr. Mohammed Ziaei

Aim:
To investigate inequity in accessing care, including barriers to first specialist assessment (FSA) and follow-up clinics monitoring keratoconus progression and post-crosslinking care, and their effect on visual outcomes for keratoconic subjects.

Method:
Data was collected prospectively from subjects attending the keratoconus and crosslinking service at Auckland District Health Board, including; gender, ethnicity, NZ Deprivation Index (NZDep; area-based measure of socioeconomic status,1=low deprivation and 10=high deprivation), disease severity (maximum keratometry and thinnest corneal thickness), proportion of appointments attended, distance travelled to clinic and worse-eye habitual visual acuity (WHVA).

Results:
A total of 119 subjects, 54% males, were recruited from FSA clinic. Distance travelled was 13.3±10km, and NZDep was 6.8±2.7. Pacific Peoples (PP) and Māori were over-represented and had significantly lower attendance (Ethnicity(%) FSA, follow-up/attendance(%) FSA, follow-up): PP(42%,48%/58%,75%), Māori(26%,15%/66%,77%), European(21%,19%/88%,88%), Asian(9%,15%/91%,93%) and Other(2%,3%/75%,84%). Mean WHVA at presentation was 6/32. 144 subjects (59% males) were recruited from follow-up clinic. There was no difference between ethnicities in time to first offered and attended FSA from referral, or disease severity at attendance. However, PP and Māori had worse disease severity at follow-up. NZDep was significantly higher for PP and Māori(7.7±2.4,7.1±2.4, p<0.001).

Conclusion:
Māori and Pacific Peoples constitute most subjects attending this service and have significantly higher NZDep scores and lower attendance rates. Despite not having worse disease severity at presentation, vision significantly worsens with follow-up possibly due to increased non-attendance. Further studies are required to determine the root cause of this inequity in outcomes and to further explore possible solutions such as financial support.

Characteristics of acute referrals to Dunedin's Ophthalmology Clinic during COVID-19 restrictions for impact assessment on ophthalmic service demands

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Aim

This study aims to assess the impact of COVID19 on acute referrals to Dunedin's ophthalmology clinic around the 2020 lockdown(February–May 2020).

Method

Patient presentations to acute ophthalmology clinic were divided into three time periods for comparison; (1) before COVID19 restrictions(1st February–24st March), (2) during level-4 lockdown (25nd March–27th April), (3) after full lockdown reduced (data collected until end of June).

Patients were identified by National Health Index number(NHI). All clinical notes were accessed electronically or via hard-copy. Trends including initial presentation, referral source, demographics and treatment analysed.

Results

During level-4 lockdown(period-2) acute clinic presentations declined by 30%, whilst severity of cases increased compared to before restrictions(period-1). There was a statistically significant decline in European patient proportion(81%-70%), with Maori proportion increasing(3%-25%), the pacific-Island proportion remaining constant(2%). After restrictions eased(period-3) patient numbers increased similar to pre-lockdown(period-1) levels but case severity remained high. Numbers of referrers decreased during lockdown restrictions(period-2), those that did refer provided less information with less eye examinations. Referrers were less likely to self-triage referrals(untriaged 11%-26%) and more likely to classify cases urgent(5%-12%).

Conclusion

During COVID19 restrictions acute presentations declined but case severity increased, suggesting patients sought help only when conditions were serious. Those patients not attending during COVID restrictions may have presented with more serious eye conditions afterwards. Restrictions affected ethnic groups differently. DHB driven strategies improving virtual triaging and telehealth within COVID frameworks should be considered. Strategies should focus on equitable care provision particularly for Maori and Pacific.

Predicting ophthalmic clinic attendance using machine learning

Finley Breeze - University of Auckland

Background

Clinic non-attendance in New Zealand is associated with poorer health outcomes and costs $29m per annum. Initiatives to improve attendance typically involve expensive and ineffective brute-force strategies.

Aim

To develop a predictive model for ophthalmic-clinic attendance.

Methods

Nationwide ophthalmology clinic data from 2009 to 2022 were aggregated for analysis. Variables included patient age, ethnicity, sex, deprivation quintile, weather and several clinic related factors. Feature engineering included binary encoding of predictive categorical variables. Machine learning models were evaluated using the area under the receiver operating characteristic curve (AUROC), sensitivity, specificity and precision. Model weighting was adjusted to account for the highly imbalanced dataset. 10-fold cross validation was used.

Results

Data included 3.3 million clinic appointments with 5.9% non-attendance rate. Raw data were divided for model training, validation and testing to enable a robust validation framework. A nationwide model achieved sensitivity of 73%, specificity of 69%, AUROC of 0.76 and precision of 12.8%. Using a comprehensive dataset from the Waikato Hospital Ophthalmology department, predictive performance marginally improved with an AUROC of 0.8, precision of 19%, sensitivity of 72% and specificity of 72%.

Conclusion

It is possible to use machine learning algorithms to predict clinic non-attendance. The AUROC confirms this model enables clinically useful predictions of clinic attendance. The model AUROC in the current study is competitive with previously published predictive models of attendance in the literature. This level of discrimination is high enough to be used in advanced scheduling methods and targeted public health interventions.

Cosmetic anterior chamber iris implants – a case describing the spectrum of complications

Daniel Scott - University of Auckland

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Background:
Insertion of cosmetic anterior chamber iris implants are associated with the risk of sight-threatening complications.

Methods:
We report complications associated with bilateral cosmetic anterior chamber iris implants in a 27-year-old female patient without pre-existing ocular or systemic disease.

Results:
The patient first presented with right acute anterior uveitis after returning to New Zealand from India four weeks following insertion of bilateral cosmetic anterior chamber iris implants in 2012. The uncorrected visual acuity (UCVA) was 6/6 and 6/5 in the right and left eyes. Chronic bilateral low-grade anterior uveitis was treated with topical dexamethasone 0.1% eye drops, and the patient was discharged following an extended period of quiescence without regular treatment. She represented five-years after the initial surgery with uveitis and elevated intraocular pressures, shortly followed by corneal decompensation and cataract. UCVA deteriorated to 6/180 bilaterally. The fixation points of the iris implants were closely associated with iris defects and contacting the trabecular meshwork in otherwise open angles. After nine-years follow-up, extensive ophthalmic surgery has been required for visual rehabilitation that includes; corneal transplant, cataract and glaucoma surgery, in addition to cosmetic iris explantation.

Conclusions:
Insertion of cosmetic anterior chamber iris implants are associated with secondary sight-threatening complications. This case reinforces the importance of easily accessible patient information, so an awareness of surgical risk can be understood prior to consenting for this procedure. The complications highlighted in this case serve as a reminder that these patients require ongoing close follow-up and extensive anterior segment complications can develop requiring multiple surgeries.

Māori perspectives on ocular healthcare in Aotearoa New Zealand

Isaac Samuels - University of Auckland

Aim:
Ocular health inequities are pervasive in the New Zealand health system and have been highlighted in previously published academic literature. Despite the determinants of health being clearly defined, these inequities continue to persist. This project aimed to identify Māori perspectives surrounding ocular health care in Aotearoa New Zealand and the integration of Hauora Māori (Māori health) and eye health.

Methods:
Three focus groups were conducted with Māori community members (n=15), in which participants discussed topics ranging from the integration of hauora Māori and eye health to access barriers within the New Zealand eye health service. Data analysis was conducted by two researchers using reflexive thematic analysis using standard qualitative research methodology.

Results:
Six themes were derived from the data. Māori patients highlighted (1) the importance of high quality communication; (2) the systemic nature of barriers to accessing services; (3) the importance of acknowledging previous healthcare experiences; (4) acknowledgement of Māori cultural beliefs; (5) the importance of holistic approaches to Māori health and (6) the role of clinicians in ensuring patients understand the proceedings of clinical interactions.

Conclusion:
The themes highlighted during this study resonate strongly with concepts which are fundamentally important to Māori. These include the importance of culturally safe health services, the right to pertinent information-transfer between patients and clinicians and the respect of cultural customs and beliefs within the clinical setting. Overall, this project provides a voice to ocular health inequity in Aotearoa and provides insights into the lived experiences of Māori suffering as a result.

Intravitreal injection service at Waikato Hospital

Lyn Scott

I am a CNS at Waikato hospital a role I have had for 10 years now. This presentation is on how we manage the problem of the growing demand for intravitreal injections at Waikato hospital.