Conference and Abstract Book

Belfast Eye Conference 2021

3rd and 4th July 2021

Hosted Virtually by
Queen's University Belfast

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Foreword

Welcome to the Belfast Eye Conference! Thank you for registering, and to those who submitted abstracts. We have an exciting, informative and broad programme, with speakers talking about subjects of which they have in depth and first hand experience. Some topics may be revision for you, some may be new learning, and some may offer inspiration, revealing fascinating avenues you may pursue in your careers to come.

Please visit the posters – like the talks, the posters cover a wide range of topics. If the poster author has included an email address on their poster, please take a minute to email them, to share the impact their poster had on your understanding, or the ideas it gave you, or perhaps just to say you liked it!

Also ensure you are there for Sunday afternoon, when we have talks from delegates, your peers, on topics we're greatly looking forwards to hearing about.

If you have any questions during any talks, please submit them via the Zoom Chat during the talk. We'll monitor the Chat and pick up the questions. You can either post your question for everyone to see, or send it just to us and we'll do our best to ask it for you, anonymously.

The talks are not recorded – speakers are not expected to share their slides, for various reasons.

Finally, before, during and after the conference, please get your phones out and – Tweet!

#BelfastEyeCon21

Enjoy the conference, Best wishes,

Michael Williams

Philip McCullough

Sheema Khan

Zoom link

https://zoom.us/j/91898458485?pwd=VXNVdEpUQVFBMjZkb2RrSGVaeW1Vdz09

Meeting ID: 918 9845 8485
Passcode: 662020

Please use this link to access both days of the conference.

Programme – Saturday 3rd July

Zoom meeting opens 09.15

9.30 – 9.45 Welcome
Mr Philip McCullough, Conference co-Lead & Intercalating Medical Student, QUB

Dr Williams, Senior Lecturer QUB and Hon. Consultant BHSCT
Undergraduate and Foundation Year Lead Royal College of Ophthalmologists

Prof McKeown, Head of School and Dean of Education
School of Medicine Dentistry and Biomedical Science

9.45-10.30 Imaging Modalities relating to the Eye
Dr Williams

10.30-11.00 An Introduction to Diabetic Eye disease
Miss Johnston

Break 11.00-11.30
Please view the e-Poster gallery & meet other delegates in breakout rooms (coffee not provided!)

11.30 -12.00 An Introduction to cataract Surgery
Mr Armstrong

12.00-12.30 An Introduction to Glaucoma
Miss Napier

12.30-13.00 An Introduction to Corneal transplants
Ms Patel

Lunch 13.00-14.00
Please have a look at the e-Poster gallery & chat with other delegates in breakout rooms

14.00-14.30 An Introduction to AMD
Ms Lagan

14.30-15.00 An Introduction to Paediatric Squint
Ms McNally

15.00-15.30 An Introduction to Retinal detachments
Mr McGimpsey

Break 15.30-15.45
Please call into the e-Poster gallery and discuss the day with other delegates in breakout rooms

15.45-16.15 An Introduction to Oculoplastics
Mr White

16.15-16.20 Close
Dr Williams

Programme – Sunday 4th July

WWIEM Scientists Presentations about their research 9.00-13.00

9.00-9.10 Introduction

Ms Sheema Khan, Conference co-Lead & Specialist Trainee, Ophthalmology
Dr Williams, Senior Lecturer QUB and Hon. Consultant BHSCT

9.10-9.40 Remote retinal evaluation in underdeveloped countries
Prof Peto

9.40-10.10 Eyecare Nurtures Good-health, Innovation, driving-safety and Education
Prof Congdon

10.10-10.40 2-HDP for novel treatment of diabetic retinopathy
Prof Curtis

10.40-11.10 Generating Induced Pluripotent Stem Cell-derived Blood Vessel Organoids for the Discovery of New Therapies for Diabetic Patients
Prof Margariti

Break 11.10-11.30 Please read the e-Posters & compare notes with other delegates in breakout rooms

11.30-12.00 The Multidisciplinary team: The role of the Optometrist
Prof Jackson

12.00-12.30 Wider world of Ophthalmology and Visual Science (external speakers)

12.00-12.15
Dr Raj Thakur. Founder of Re-Vana Therapeutics, a QUB spin-out company

12.15-12.30
Lorcan Butler. Brain Tumour Charity

Lunch 12.30-13.30.
Please browse the e-Poster gallery, and make contacts with other delegates in breakout rooms

Delegate research presentations - 10 min presentation + 5 mins questions and answers

13:30-13:45 A phenotypic and genotypic study of 10 patients with congenital stationary night blindness associated with the TRPM1 gene,
Christos Iosifidis

13:45-14:00 Operative outcomes of phacoemulsification cataract surgery in patients with diabetic retinopathy: A population-based study.
Jonathan Halim

14:00-14:15 Anatomical Outcomes for Macular Oedema Secondary to Retinal Venous OcclusionsRVOs other than Central Retinal Thickness.
Emma McAllister

14:15-14:30 Diclofenac vrsersus Corticosteroids following Strabismus Surgery: Systematic Review &and Meta-Analysis.
Abdulmalik Alsaif

Break 14.30-14.45 Please click on the e-Poster gallery and meet with other delegates in breakout rooms

14:45-15:00 Clinical Threshold Policies for Cataract Surgery and their Contribution to Regional Variation in Rates of Surgery
Jack Lisle

15:00-15:15 Adalimumab in patients with vision threatening uveitis: real world clinical experience
Jacob Fingret

15:15-15:30 Mapping the Daily Rhythmic Transcriptome in the Diabetic Retina
Hanagh Winter

15:30-15:45 A case of ocular Stevens-Johnson syndrome: the importance of the Ophthalmologists' role
Mustafa Butt

15:45-16:50 Thanks and conclusion
Dr Williams, Dr Khan, Mr McCullough

Abstract Booklet

Oral Presentations

Abstract #1 – Christos Iosifidis

A phenotypic and genotypic study of 10 patients with congenital stationary night blindness associated with the TRPM1 gene

Christos Iosifidis[1], Panagiotis Sergouniotis[1], Graeme C Black[1]

[1]Manchester Centre for Genomic Medicine, Saint Mary's Hospital and Manchester Royal Eye Hospital, Manchester Academic Health Science Centre, Manchester University Hospitals NHS Foundation Trust, Manchester, UK

Congenital stationary night blindness (CSNB) is a group of genetic disorders of the retina that present in childhood. Visual electrophysiology and genetic testing are key for diagnosing CSNB. *TRPM1* is one of the most commonly mutated genes in people with CSNB. In this study, we report the clinical and genetic findings in 10 patients with *TRPM1*-associated CSNB. The aim of this study is to highlight the role of copy number variants (CNVs) and intronic sequence alterations. A full clinical history was obtained for each proband, and all study subjects underwent visual electrodiagnostic testing. Blood samples were obtained, and DNA was extracted. DNA samples were processed using Agilent SureSelect target enrichment kits designed to capture all exons and 50 base pairs of flanking intronic sequences of 177 genes associated with inherited retinal disorders. Sequencing, bioinformatic analyses, and clinical interpretation were then performed. Five novel variants were identified including two heterozygous CNVs and one homozygous intronic variant. Notably, one of the patients with a CNV had developmental delay with behavioural difficulties. CNVs encompassing the TRPM1 gene can indeed lead to syndromic phenotypes and therefore, they should be considered in cases with cCSNB and developmental delay. Splicing is a complex process involving the removal of introns and joining of exons to form processed mRNA. Intronic variants can disrupt normal splicing and therefore may lead to disease. Our findings highlight the importance of looking into CNVs and intronic regions of the affected genes when investigating for CSNB and the spectrum of other retinal dystrophies.

Abstract #2 – Jonathan Halim

Operative outcomes of phacoemulsification cataract surgery in patients with diabetic retinopathy: A population-based study

Jonathan Halim[1]

[1]Ophthalmology Department, Barts Health NHS Trust, London, UK

Introduction: Diabetic eye disease is one of the most common causes of vision impairment worldwide. Many patients undergoing cataract surgery have co-existing diabetic eye disease, which can affect surgical outcomes.

Objectives: To evaluate the impact diabetic eye disease on the outcomes of cataract surgery.

Methods: A population-based study of patients undergoing phacoemulsification cataract surgery at three hospital sites serving areas of high prevalence of diabetes. Demographic, perioperative and visual acuity data were extracted and analysed. These parameters were compared between patients with diabetic eye disease and those without. Unfavourable visual outcomes and visual acuity loss were defined respectively as postoperative visual acuity and a loss of >0.30 logMAR.

Results: Between January 2018 to March 2021, 223 eyes undergoing cataract surgery had diabetic retinopathy and 2377 eyes did not. Patients with diabetic retinopathy were younger (median 68 vs 69 years, p=0.031). There were no significant differences in other demographic parameters, intraoperative and postoperative complication rates (p>0.5) between the two groups. However, the proportion of patients with unfavourable visual outcomes was higher in the diabetic retinopathy group compared to the group without (27.4% vs 14.2%, p<0.001). Visual acuity loss rate was also significantly higher in patients with diabetic retinopathy compared to those without (4.3% vs 0.9%, p<0.001)

Conclusions: Poor visual outcomes can occur in patients with diabetic eye disease despite a favourable cataract surgery. Further studies looking into the risk factors of visual acuity loss and the use of Ocular Coherence Tomography to detect macular pathologies are recommended.

Abstract #3 – Emma McAllister

Anatomical Outcomes for Macular Oedema Secondary to Retinal Venous Occlusions other than Central Retinal Thickness

Ms Emma McAllister[1] and Dr Michael Williams[2]

[1]Medical Student (Queen's University of Belfast)
[2]Consultant Ophthalmologist (Queen's University of Belfast, Belfast Health and Social Care Trust)

Introduction: Retinal Vein Occlusions are an eye condition, associated with significant morbidity, especially if left untreated. The objective of this scoping systematic review was to identify Optical Coherence Tomography (OCT) retinal parameters, not yet established in clinical practice, which could be of diagnostic or therapeutic value, focusing on measures other than that used in landmark trials, that is focusing on non-central retinal thickness type measures.

Aims: To identify what OCT retinal parameters, other than central retinal thickness, have been used as outcomes in studies of anti-VEGF or steroid intravitreal injections for the treatment of macular oedema secondary to Retinal Vein Occlusions.
To explore the usefulness or otherwise of such outcomes.

Methods: A search for relevant articles published in the last ten years was conducted using PubMed, Cochrane and conference abstracts and the data extracted was analysed.

Results: The literature revealed a variety of non-central retinal thickness type OCT retinal parameters were used as outcomes. The three most common outcomes were subretinal fluid/cysts (sixty-eight studies), layer continuity (fifty studies) and choroidal thickness (thirty-eight studies).

Conclusion: As is the nature of any scoping study, it has set out a landscape of findings for researchers to judge as meriting further study, or not. Future research may pursue the value of these in the clinical or research setting. Hopefully this scoping systematic review will inspire further research, and also move clinicians to reflect on their patients' OCTs in greater detail as they build clinical experience, all of which should ultimately help improve patient outcomes.

Abstract #4 – Abdulmalik Alsaif

Diclofenac versus Corticosteroids following Strabismus Surgery: Systematic Review and Meta-Analysis

Mohammad Karam[1*], Abdulmalik Alsaif[1*], Abdulrahman Al-Naseem[2], Abdulredha Almuhanna[1], Ahmad Aldubaikhi[3], Khaled Alkandari[4], Fatemah Hussain[1], Shatha Alfreihi[5]

[1] School of Medicine, University of Leeds, Leeds, United Kingdom
[2] School of Medicine, University of Manchester, Manchester, United Kingdom
[3] College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia
[4] Faculty of Medicine, Jordan University of Science and Technology, Jordan
[5] Department of Paediatric Surgery, King Abdullah Specialist Children Hospital, Ministry of National Guards, Riyadh, Saudi Arabia.

Introduction and Objective: Several studies investigated the use of diclofenac as an alternative to corticosteroids following strabismus surgery. This is the first meta-analysis that compares the outcomes of these studies.

Methods: A systematic review and meta-analysis were performed in line with the PRISMA guidelines. A search was conducted to identify all studies comparing diclofenac versus corticosteroids following strabismus surgery. An extraction spreadsheet for data collection and Review Manager 5.3 was used for data analysis based on the fixed and random effect models. Primary outcomes included discomfort, chemosis, inflammation, conjunctival gap, intraocular pressure (IOP) and conjunctival injection. Secondary outcomes were conjunctival congestion, discharge and drop intolerance.

Results: Seven RCTs and one retrospective study with a total sample of 469 eyes were included. At weeks 1 and 4 post-operatively, there were no statistically significant differences between diclofenac and corticosteroid, except for conjunctival injection at week 1 (MD= -0.21, P= 0.04) favouring diclofenac. Interestingly, all primary outcomes significantly favoured diclofenac at week 2, namely discomfort (MD= -0.34, P= 0.03), conjunctival chemosis (MD= -0.16, P =0.04), conjunctival inflammation (MD= -0.16, P = 0.02), conjunctival gap (MD= -0.17, P= 0.002), IOP (MD= -2.53, P < 0.00001) and conjunctival injection (MD= -0.30, P= 0.03). For secondary outcomes, conjunctival congestion was significantly improved in the dexamethasone group whilst discharge and drop intolerance was not statistically different.

Conclusion: Diclofenac is comparable to various corticosteroids when used following strabismus surgery. Nevertheless, diclofenac yielded significant improvements in discomfort, conjunctival chemosis, inflammation, conjunctival gap, IOP and conjunctival injection mainly at two weeks post-operatively.

Abstract #5 – Jack Lisle

Clinical Threshold Policies for Cataract Surgery and their Contribution to Regional Variation in Rates of Surgery

J. Lisle[1], N. Ansari[2], M. Jabir[3],

[1]FY2, Sheffield Teaching Hospitals
[2]Specialty Trainee – Ophthalmology, Sheffield Teaching Hospitals
[3]Consultant Ophthalmologist, Rotherham General Hospital

Background/Aims: To characterise the national patterns in rates of cataract surgery across England, review clinical thresholds against NICE guidance, and determine how far variable access to cataract surgery is attributable to regional variation in policy stringency and social deprivation.

Methods:127 Clinical Commissioning Groups ("CCGs") provided cataract surgery data and threshold policies in response to a Freedom of Information request. Local cataract surgery rates were grouped by threshold stringency and analysed on an age group-corrected basis. ANOVA testing was used to assess effect of policy stringency on regional rates of cataract surgery.

Results: In England, rates of cataract surgery vary threefold across CCGs, from 1,980 to 6,427 per 100,000 population over 60, with a standard deviation (784.76) of 22% of the mean value, 3,598. Threshold policies vary across CCGs: 33 had no policy, 45 utilised policies accessible on the basis of Quality of Life ("QoL") impact, and 39, against NICE guidance, required a Visual Acuity ("VA") threshold be exceeded. Rates of surgery by CCG were negatively correlated with restrictiveness of policy (η^2 =0.18, p<0.01), and positively correlated with the Index of Multiple Deprivation (IMD), (r^2 = 0.11, p<0.01). Prior approval processes are not significantly associated with reduced rates of surgery.
Conclusion: Over two-thirds of CCGs continue to use threshold-based policies for access to cataract surgery, with one-third doing so solely on the basis of VA requirements, despite NICE guidance to the contrary. For NHS operations, variation in policy restrictiveness accounts for more of the variation in surgery rates than socioeconomic deprivation.

Abstract #6 – Jacob Fingret

Adalimumab in patients with vision threatening uveitis: real world clinical experience

Timothy Tang Lee Say [1], Verlyn Yang[5], Jacob M Fingret [1], Sophia L. Zagora [1,2,3], Richard Symes [1,3], Christine Younan[1,3], Elise Cornish [1,3], Anthony Sammel[1,2,4], Denis Wakefield[2,4], Deborah Speden[5], Peter McCluskey[1,2,3,5]

[1] Sydney Eye Hospital, Sydney, NSW, Australia
[2] St Vincent's Clinic, Darlinghurst, NSW, Australia
[3] Save Sight Institute, University of Sydney, Sydney, NSW, Australia
[4] University of NSW, NSW, Australia
[5] Royal Hobart Hospital, TAS, Australia

Background/aims*:* Biologics are rapidly emerging as an effective vision saving addition to systemic uveitis therapy. The aim of this multicentre retrospective study is to review the outcomes of a large group of patients treated with adalimumab.

Methods*:* A retrospective chart review of patients with refractory non-infectious, active uveitis treated with adalimumab was conducted. The main outcome measures were ability to reduce prednisolone dose, ability to control uveitis, final visual acuity and time to treatment failure.

Results*:* Forty-Six (46) patients with uveitis, treated with adalimumab were included in the study. There were 26 (56.5%) male patients and 20 (43.5%) female patients with 43 (93.5%) patients having bilateral active uveitis. The most common anatomical uveitis phenotype was pan-uveitis (n=17, 37.0%), followed by anterior uveitis (n=12, 26.1%), posterior uveitis (n=10, 21.7%) and intermediate uveitis (n=7, 15.3%). The most common diagnosis was idiopathic (undifferentiated) uveitis (n=19, 41.3%). At their latest review (mean:4.46 years; median 4.40 years), 35 (76.1%) patients were able to discontinue corticosteroids, while 11 (23.9%) patients were able to taper corticosteroids $\leq$7.5mg per day. One (2.2%) patient required a prednisolone dose of 10 mg. The mean visual acuity at the latest follow-up of the worse eye was logMAR 0.42 (SD 0.72), while the mean visual acuity of the better eye was logMAR 0.19 (SD 0.34). Of the 89 eyes, 21 (23.6%) eyes improved by at least 2 lines, 5 eyes (5.6%) deteriorated by 2 or more lines while vision was unchanged in the remaining 6 (70.8%) eyes. The time to recurrence was 1 in 12.47 person-years for adalimumab, with a 17.4% (8 patient) relapse rate. There were no serious adverse events.

Conclusions*:* This study highlights the efficacy of adalimumab in patients with vision-threatening non-infectious uveitis, preserving vision and allowing reduction of corticosteroid dose.

Abstract #7 – Hanagh Winter

Circadian clocks in diabetic retinal endothelial cells

Hanagh Winter[1], David Hughes[1], Andriana Margariti[1], Alan Stitt[1], Eleni Beli[1]

[1]Wellcome-Wolfson Institute for Experimental Medicine, Queen's University Belfast

Background: Diabetes has been reported to alter normal circadian rhythms and circadian disruption emerges as an important factor in the disease prognosis and treatment success. Our objective was to investigate whether diabetes affects circadian gene expression in endothelial cells and the mechanisms involved.

Methods: Induced Pluripotent Stem Cell-Derived Endothelial Cells (iPS-ECs) from healthy and diabetic patients were sequenced and differential analysis was performed. Genes related to circadian rhythms were identified. Primary human retinal endothelial cells (HRECs) were cultured in vivo in hyperglycaemic and hypoxic conditions to validate the results. Cells were synchronised with 50% serum shock and repeated samples collected every 2 hours over a 36 hour period. Circadian gene expression was measured using RT-PCR.

Results: ip-ECs from diabetic patients had a 5.7 fold reduction in *Dec2* mRNA expression and a 4.0 fold increase in *Bmal-2.* Synchronised HRECs under hypoxic conditions gained a more robust circadian oscillation but lower amplitude of *Bmal-1* and reduced *Cry1* mRNA expression, indicating an effect of hypoxia on circadian rhythmicity. Four weeks of hyperglycaemic conditions resulted in a slight increase of *Bmal-1* and a reduction in *Cry1* and *Cry2* mRNA expression. Expression of *Dec2* was most affected by hyperglycaemia. Hypoxia had a significant effect in reducing the expression of the majority of circadian genes.

Conclusions: Diabetic conditions resulted in a specific reduction of *Dec2* expression in both patient derived iPS-ECs and HRECS in hyperglycaemic conditions. Hypoxia alone had a more pronounced effect on circadian gene expression and rhythmicity compared to hyperglycaemia alone.

Abstract #8 – Mustafa Butt

A case of ocular Stevens-Johnson syndrome: the importance of the Ophthalmologists' role

Mustafa Butt[1], Tej Patel[1]

[1] Addenbrookes, Cambridge Eye Unit

Introduction: We present a case of Stevens-Johnson syndrome with severe ocular involvement in a previously fit and well 38 year old female who was 4 weeks pregnant who underwent amniotic membrane transplant.

Case presentation: She presented with a 3 day history of painful red eyes and a fever to the GP which progressed to oral ulcerations and a widespread blistering rash on the face, chest and back. Infectious and autoimmune screens were normal and no new drug precipitants could be found. Initially, visual acuity was 6/6 in both eyes with some mucoid discharge, conjunctival injection and clear corneas. She was started on dexamethasone eye drops, lubricants and levofloxacin.

Systemic steroids were held initially as the patient was actively febrile and had signs of infection. A plan was put in place for amniotic membrane transplant if the patient required intubation. However there was a concern that the patient wouldn't tolerate intubation due to oropharyngeal mucosal ulceration. IV methylprednisolone was started but then developed a large epithelial defect covering 95% of the cornea, scattered punctate erosions and conjunctival epithelial defects. Visual acuity rapidly deteriorated to 6/36 LE and 6/12 RE.

The patient went on to have bilateral amniotic membrane transplant covering the cornea, the inferior fornix and epithelial defect

Learning points: The role of the ophthalmologist is crucial in managing acute ocular SJS/TEN. This report aims to highlight the salient steps in acute management of these patients and the significance of MDT approach.

Abstract #1 – Chantelle Smith

Management of Laser Pointer Injuries Causing Sight-Threatening Retinopathy

Chanelle Smith[1], Sunil Mamtora[2]

[1] University of Bristol
[2] Cheltenham Hospital, Severn Deanery

Introduction: The potential for laser pointers to cause permanent visual loss is grossly underestimated. Powerful lasers have become increasingly available online with the FFA reporting an increase in laser attacks of 25% on Heathrow airport. Serious retinopathy can often lead to significant visual loss and the need for surgical intervention.

Objectives: This literature review summarises the existing literature related to ocular damage secondary to high powered laser pointers. We also compare the extent of retinal damage associated with laser pointers of different colour and rated power and surgery needed to heal this retinopathy.

Method: A comprehensive systemic review was performed. A review of 23 papers which document laser pointer exposure to 54 eyes from the last 5 years were identified. Key word search terms included “laser pointer maculopathy” and “macular laser injury ”.

Results
In 43% of cases, blue was the most commonly reported colour associated with laser pointer maculopathy.
Many cases(41%) are unreported due to discrepancies between the labeled and actual power of lasers.
Initial presenting visual acuity was 0.30 or worse in 91% of cases.
89% had an improved final visual acuity compared to their presenting visual acuity.
31% needed surgical intervention of which 30% of patients had a final visual acuity of 0.10 or less even with surgical intervention.

Conclusion: Public awareness should be encouraged of illegal laser pointers. They can produce devastating visual sequelae and most cases require surgical and medical intervention. Further research is required to determine the most effective initial management for affected patients.

Abstract #2 – Chantelle Smith

Can a handheld non-mydriatic fundus camera replace traditional dilated fundus examination in the paediatric ophthalmology outpatient setting?

Chanelle Smith[1], Sunil Mamtora[2]

[1] University of Bristol
[2] Cheltenham Hospital, Severn Deanery

Introduction: All children seen in paediatric ophthalmology outpatient appointments with suspected amblyopia or reduced vision require retinal examination to exclude organic disease as a cause. Traditionally this involves dilated fundal examination with slit-lamp biomicroscopy which may be challenging as well as time consuming in this patient population.

Our study evaluated the feasibility for non-mydriatic fundus photography with a handheld fundus camera to replace dilated fundus examination to screen for retinal pathology in children.

Methods: One hundred eyes of fifty consecutive children presenting to a paediatric ophthalmology outpatient appointment underwent non-mydriatic fundus photography with a handheld fundus camera (Aurora, Optomed). Recorded parameters included age, refractive error, diagnosis, pathology identified using non-mydriatic fundus photography and pathology identified with mydriatic slit-lamp biomicroscopy. Additionally, a subjective assessment of the perceived difficulty of image capture using the handheld fundus camera and examination with slit-lamp biomicroscopy was recorded for each patient using a Lickert scale (1-5).

Results: Fundus photography was successfully undertaken in all patients. No pathology was identified with dilated fundal examination that had not been identified with non-mydriatic fundus photography. The age of children who participated in our study ranged between 2 months and 13 years.

Conclusion: Non-mydriatic, handheld fundus photography offers a safe alternative to traditional dilated fundus examination with slit-lamp biomicroscopy which is subjectively easier to undertake. This mode of examination is particularly suited to the paediatric population whose pupil size is usually larger than their adult counterparts.

Abstract #3 – Shailja Chalishazar

Ophthalmic examination in patients with candidaemia: is it necessary?

Shailja Chalishazar [1], Viraj Popat [1], Matthew Edmunds [1]

[1] Worcestershire Acute Hospitals NHS Trust

Introduction: Ocular candidiasis (fungal infection affecting the eye) has previously been documented in 16% of those with candidaemia (the presence of candida species in the blood). As visual outcomes of ocular candidiasis are poor, the Infectious Diseases Society of America (IDSA) advise dilated fundoscopy be performed in all non-neutropenic patients within the first week of candidaemia diagnosis. We audited whether such international guidance is being adhered to in our unit, with the aim of developing collaborative guidelines between ophthalmology and microbiology for appropriate referral and assessment of future patients.

Methods: Retrospective review of all patients with candida positive blood cultures at Worcestershire Acute NHS Hospitals Trust between 2014 - 2019. Data was collected regarding microbiological documentation of the necessity for ophthalmic review, whether ophthalmology review took place and the outcome of examination.

Results: Within the audit period, 57 patients with candida positive blood cultures were identified (median age 73 years; range 19 – 89 years, 60% male). Microbiologists recommended an ophthalmology review in 68%, with 92% of these patients receiving a full ophthalmology review and assessment. Of these cases, 0% were found to have any ocular manifestations of candidaemia.

Conclusion: In our unit, microbiology recommendations for ophthalmic review appeared inconsistent. If referred to ophthalmology, the majority were assessed within a reasonable time frame. Though visual outcomes of ocular candidiasis are poor, our study suggests that the prevalence of ocular involvement is low, bringing into question whether routine ophthalmic examination of all non-neutropenic patients with candidaemia is actually necessary.

Abstract #4 – Jonathan Halim

Cataract surgery during the COVID-19 pandemic in a major inner London hospital

Jonathan Halim [1]

[1] Ophthalmology Department, Barts Health NHS Trust, London, UK

Introduction: COVID-19 has caused a massive disruption on the delivery of cataract surgery as part of efforts to free up capacity to support intensive care provision.

Objectives: To explore the impact COVID-19 on the service delivery and outcomes of cataract surgery in a major London hospital significantly impacted by COVID-19.

Methods: Demographic, preoperative, intraoperative and postoperative parameters of patients undergoing cataract surgery during the pandemic sample period and a similar sample of pre-pandemic period were extracted and compared. The pandemic sample period was defined as starting from the first stay-at-home order announced by the Prime Minister and the most recent relaxation of the stay-at-home order.

Results: During the pandemic period, 252 operations were performed with 3 cancellations, compared to 463 operations and 1 cancellation pre-pandemic. Median age in both periods were similar (69 years). The proportion of male/female patients, left/right and first/second operated eye, and diabetic patients did not differ significantly ($p>0.05$). However, the proportion of eyes with ≥1 ocular co-pathologies operated during the pandemic period (52.0%) were significantly higher than the pre-pandemic period (36.5%) ($p<0.001$). Despite this, intraoperative and postoperative complication rates did not differ significantly ($p>0.05$), including PCR ($p=0.211$) and visual acuity loss rate ($p=0.897$).

Conclusions: COVID-19 has impacted the number of cataract operations performed as elective procedures were cancelled during the first lockdown. During subsequent restrictions, health services were allowed to operate. More severe cases were prioritised for cataract surgery, seen by the increased proportion of operated patients with ocular co-pathologies during the pandemic period.

Abstract #5 – Abdulmalik Alsaif

The Use of Fibrin Glue in Pterygium Surgery with Amniotic Membrane Transplantation: A Systematic Review and Meta-Analysis

Ahmed Aldubaikhi [1], Abdulmalik Alsaif [2], Mohammad Karam [2], Meshaal Aljebreen [1], Rand Alazaz [1], Tariq Almudhaiyan [1,3]

[1] College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia
[2] School of Medicine, University of Leeds, Leeds, United Kingdom
[3] Department of Surgery, Division of Ophthalmology, National Guard Hospital, Riyadh, Saudi Arabia

Introduction: The use of fibrin glue in pterygium surgery with amniotic membrane transplantation has been investigated in several studies. This is the first meta-analysis combining the data of these studies.

Objective: To compare the outcomes of fibrin glue versus sutures in pterygium surgery with amniotic membrane transplantation.

Methods: A systematic review and meta-analysis were performed as per the PRISMA guidelines. A search identified all studies comparing the outcomes of using fibrin glue versus sutures in pterygium surgery with amniotic membrane transplantation. Conjunctival inflammation, postoperative pain and discomfort, pterygium recurrence, pyogenic granuloma and surgical time were primary outcome measures. Secondary outcome measures included amniotic membrane transplant outcomes, time to recurrence, graft loss and subconjunctival haemorrhage. Fixed and random effects models were used for the analysis.

Results: Four RCTs enrolling 180 patients were identified. Conjunctival inflammation (OR=0.21, P= 0.0005) demonstrated a significant difference favouring the fibrin glue. However, there was no significant differences in terms of postoperative pain and discomfort (OR= 0.46, P= 0.25), pterygium recurrence (OR= 0.74, P = 0.48), pyogenic granuloma (OR = 0.47, P = 0.38) and surgical time (MD = -17.52, P = 0.13). For secondary outcomes, fibrin glue had significantly less cases of graft loss compared with sutures. No statistically significant difference was found in amniotic membrane graft outcomes, time to recurrence and subconjunctival haemorrhage.

Conclusions: Fibrin glue is comparable to the sutures used in the pterygium surgery with amniotic membrane transplantation. More studies are required to further support the findings of this study.

Abstract #6 – Rohan Sadera

A rare case of Waldenstrom's Macrogloblinaemia masquerading as multifocal chorioretinitis

Rohan Sadera [1], Dora Koutresi [2]

[1] Medical Student, University of Buckingham, Buckingham, UK
[2] Consultant, Ophthalmology, South Warwickshire Foundation Trust, Warwick, UK

Introduction: Waldenström's macroglobulinemia (WM) is an IgM-dominant lymphoma. We present a case of WM masquerading as multifocal chorioretinitis.
The objective of this case report is to highlight a rare clinical presentation of an undiagnosed, asymptomatic lymphoma.

Case presentation: A 72-year-old man presented in clinic for his routine glaucoma review (treated with Latanoprost). The patient was asymptomatic with a history of surgically-removed tongue Carcinoma (12 years ago) and left-sided HZO. Ophthalmic examination incidentally demonstrated multiple multifocal small, creamy ill-defined lesions scattered around the optic discs, with no associated anterior segment inflammation, vitritis or optic disc oedema and normal visual fields. Blood tests confirmed an elevated IgM, free kappa light chains, Kappa/lambda ratio, plasma viscosity and lymphocytes with a low haematocrit and platelet count confirming WM. A negative HLA29 excluded birdshot chorioretinopathy. Fluorescein angiogram and indocyanine green angiogram showed no intraocular inflammation. Ophthalmic electrodiagnostics detected no abnormalities. Therefore, intraocular inflammation was unlikely to have caused the retinal changes. The clinical picture was inconsistent with primary retinal lymphoma and very atypical for non-primary CNV/vitreoretinal lymphoma as lesions were not solid or associated with subretinal fluid. It was likely that the retinal changes were secondary to WM.
The patient continues to be asymptomatic and is being monitored conservatively.

Learning point: This is a case of non-Hodgkin's lymphoma with a rare presentation as chorioretinitis. The case demonstrated the importance of a thorough systemic investigation for an ophthalmic patient, considering ophthalmic assessment in patients with malignant lymphomatous disease and systemic association to ophthalmic diseases.

Abstract #7 – Gagandeep Sachdeva

A Rare Neonatal Presentation of Bilateral Dacryocele and Choanal Atresia: A Case Report

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Purpose: To describe a neonatal case presentation of concomitant bilateral choanal atresia and bilateral intranasal cysts, managed by membranous puncture, and marsupialization of nasal cysts.

Case Presentation: A newborn was found to have increased work of breathing, stridor and bilateral medial canthal swellings. The baby required 100% oxygen via a face mask to maintain oxygen saturations. The neonatal team was unable to pass an NG tube through either nostril. A CT scan showed the presence of bilateral choanal atresia, with enlargement of both lacrimal sacs. Nasal endoscopy confirmed this diagnosis and discovered the concomitant presence of bilateral intranasal cysts. ENT performed bilateral membranous puncture for the atresia, followed by marsupialization of the cysts by the oculoplastic team. The interventions allowed the neonate to make a good recovery.

Learning Points: To our knowledge, dual pathology of bilateral intranasal cysts and choanal atresia has not been previously reported. The first key learning point is to consider choanal atresia in cases of congenital dacryocele due to intranasal cysts. Secondly, in a child with bilateral dacryocele presenting with increased work of breathing at birth or respiratory distress on feeding, both intranasal cysts and choanal atresia should be investigated. In order to manage patients with such conditions effectively, early liaison between Ophthalmic and ENT colleagues should be encouraged.

Abstract #8 – Tushar Vishnu Hari

Use of off licence intravitreal Fluocinolone Acetonide implants for treatment of left hemiretinal vein occlusion in a 72-year-old male.

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Introduction: Retinal vein occlusion (RVO) is a common cause of sudden loss of vision. Current treatments include intravitreal anti-vascular endothelial growth factor (VEGF) injections or dexamethasone implants.

Case Presentation: Our 72-year-old male patient presented with a left hemiretinal vein occlusion with macular oedema since January 2013. Initial treatment was intravitreal dexamethasone implants. Although he showed an excellent response, it became short lived with further retreatment, with the effect lasting for 8-10 weeks on average before oedema returned. This necessitated additional treatment with numerous anti-VEGF injections in addition to treating angiographically ischaemic areas with retina laser.

Coelho et al reported fluocinolone acetonide (FA) implant in their patient with non-ischaemic RVO and followed up for 12 months, with improvements in visual acuity and optical coherence tomography (OCT). We report the use of off licence FA in our patient with nearly 14 months follow up.
Visual acuity: 6/30 before implant, to 6/12 after implant with pinhole.
Central subfield thickness (CST): at baseline: 477µm; maximum pre-FA: 555µm; immediately pre-FA: 447µm; at 14 months post-FA: 311 µm.

Learning Points: Our experience supports Coelho's findings for the use of FA in RVO related macular oedema unresponsive to anti-VEGF and/or dexamethasone implants. This supports the role of intraocular steroids in this condition but requires further study to verify the findings of these two cases, especially considering the now much reduced treatment burden for our patient and how this may extrapolate when many more are treated in this way.

Abstract #9 – Yen Ning Mau

Vascular Changes in Retinal Dystrophy Detectable by Optical Coherence Tomography Angiogram

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Introduction: In recent years, studies have shown vascular changes in retinitis pigmentosa (RP) retina compared to controls. The studies had used optical coherence tomography angiography (OCTA) to image the retinal vasculatures at the superficial capillary plexus (SCP), deep capillary plexus (DCP), choriocapillaris (CC) and foveal avascular zone (FAZ).

Objective: This review aims to summarise the vascular findings of RP patients which were observed with OCTA.

Methods: Research of retinal vasculature in RP patients were searched across five databases which were Ovid Embase, Ovid Medline, Web of Science, Cochrane Library and Scopus. The results of included studies were then summarised based on the layers of retina.

Results: The final selection consist of 33 articles. Most studies reported that SCP, DCP and CC vessel density (VD) were significantly lower in RP patients than in controls. Some studies recorded non-significant differences between RP and control retinas in each layer. There were mixed results about the difference in FAZ area between RP patients and controls. Significant correlations were found between SCP VD, DCP VD and best corrected visual acuity (BCVA). CC VD did not significantly correlate with BCVA. There were heterogenous results about the correlation between FAZ area and BCVA. OCTA parameters were recorded to be significantly correlated to visual field.

Conclusion: OCTA has more advantages than fundus fluorescein angiography and indocyanine green angiography, but it is not superior to other imaging modalities such as optical coherence tomography and fundus autofluorescence. OCTA can be used adjunctly with other investigative tests to provide multi-modal imaging to RP patients.

Abstract #10 – Charlotte Shan Ho

Reducing Omission of Eye Drops During Hospital Admission: A Quality Improvement Study

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Introduction: Chronic ophthalmic conditions, such as glaucoma and dry eye disease (DED), are frequently encountered debilitating eye conditions that can lead to substantial reduction in vision and quality of life. However, there is ongoing evidence to suggest that topical ophthalmic therapy is inappropriately omitted on admission.

Objectives: The primary aim of this audit was to investigate the trust adherence to the NICE guideline on the prescribing standard of eye drops during hospital admission. The secondary aim was to raise awareness and ensure successful compliance to the national standards to reduce unintentional eye drop omission on admission and subsequent complications.

Methods: Electronic medical records of all medical and surgical adult inpatients were studied prospectively on two different occasions. Following the initial audit, interventions focusing on clinician education were implemented. The same data collection method was used in the re-audit.

Results: Sixty-four (mean age: 81.8 ± 8.9 years) and fifty-eight (mean age: 81.6 ± 11.8 years) patients with regular eye drops prescriptions were identified in the initial audit and re-audit respectively. Following the intervention, documentation of ocular diagnosis and eye drops on clerking notes demonstrated significant improvement from 40.6% to 58.6% ($p = 0.046$), and eye drop reconciliation within 24 hours of admission improved from 45.3% to 69.0% ($p = 0.008$). All patients (100%) received the correct eye drop prescription before and after the intervention.

Conclusions: Education is effective in promoting adherence to national guidelines, therefore reducing the incidence of inappropriate eye drop omission on admission.

Abstract #11 – Susmit Das

Feasibility and clinical utility of handheld fundus cameras for retinal imaging

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Introduction: Handheld fundus cameras are portable and cheaper alternatives to table-top counterparts. To date there have been no studies comparing feasibility and clinical utility of handheld fundus cameras to traditional table-top devices.

Objectives: We compare the feasibility and clinical utility of four handheld fundus cameras (Remidio NMFOP, Volk Pictor Plus, Volk iNview, oDocs visoScope) to a table-top camera (Zeiss Visucam$^{NM/FA}$).

Methods: Ten healthy participants (mean age±SD=21.0±0.9 years) underwent fundus photography with five fundus cameras to assess success/failure rates of image acquisition. Eight participants with optic disc abnormalities (mean age±SD=26.8±15.9) underwent imaging with the top three scoring fundus cameras. Images were randomised and subsequently validated by ophthalmologists (n=10) masked to the diagnoses and devices used.

Results: Image acquisition success rates of 100% were achieved in non-mydriatic and mydriatic settings for Remidio, Pictor and Zeiss, compared with lower success rates for iNview and oDocs. Image quality and gradeability were significantly higher for Remidio, Pictor and Zeiss (p<0.0001) compared to iNview and oDocs. For cup:disc ratio estimates, similar levels of bias were seen for Pictor (-0.05±SD:0.16), Remidio (-0.07±SD:0.14) and Zeiss (-0.09±SD:0.15). Diagnostic sensitivity of Zeiss (86.3%; 95% CI, 78.4%-94.1%), Remidio (81.3%; 95% CI, 72.6%-89.9%) and Pictor (80.0%; 95% CI, 72.5%-87.5%) were similar.

Conclusions: Remidio and Pictor achieve comparable results to the Zeiss table-top fundus camera. Both devices achieved similar scores in feasibility, image quality, image gradeability, diagnostic sensitivity and demonstrated less bias and greater agreement between cup:disc ratios. This suggests that these devices potentially offer a more cost-effective alternative in certain clinical scenarios.

Abstract #12 – Rand Alazaz

Accelerated Corneal Collagen Cross-linking Treatment Modalities 18 mW/cm2 (5- min) versus 9 mW/cm2 (10-min) in Patients with Progressive Keratoconus: Systematic Review and Meta-Analysis

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Introduction: Keratoconus is a progressive thinning and steepening of the cornea resulting in irregular astigmatism. Cross-linking (CXL) is used to slow the progression of keratoconus. Accelerated cross-linking has been developed to replace the conventional method with longer duration. Several studies have compared the effectiveness of 10min and 5min protocols. However, there are currently no systemic reviews or meta-analyses comparing the outcomes of the two interventions. This study will be the first in the literature to report on these outcomes.

Objectives: To compare the outcomes of two accelerated CXL protocols, 18mW/cm2 (5-min) vs 9mW/cm2 (10-min).

Methods: A meta-analysis was performed as per the PRISMA guidelines. A search of databases identified studies comparing 18mW/cm2 (5-min) and 9mW/cm2 (10-min) accelerated CXL protocols. Primary outcome measured the findings of topography (K1, K2, Cylindrical, and Thinnest) and Higher-order Aberration (HOA) (Coma, Trefoil, Spherical, and total HOA). Secondary outcomes included visual acuity (Un-corrected Visual Acuity (UCVA), and Best-corrected Visual Acuity (BCVA)). Fixed and random effects models were used for the analysis.

Results: Four studies were included. The 10-min protocol had significantly improved outcomes in terms of the mean changes in K1 and K2 (P = <0.00001), corneal total HOA (P= 0.0002) and corneal coma (P= 0.00001). For secondary outcomes, no statistically significant differences were found in UCVA, BCVA, cylinder, Thin, spherical aberration and trefoil.

Conclusion: Accelerated CXL 10-min protocol had improved K1, K2, and HOA outcomes, but no significant difference in terms of the other outcomes.

Abstract #13 – Sammie Mak

Visual Hallucinations – A Differential of Charles Bonnet Syndrome

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Introduction: A patient reported visual hallucinations of ten months' duration last year. He is currently being treated as Charles Bonnet Syndrome (CBS) in an eye unit. We discuss the necessary investigations before considering an atypical case of CBS with normal vision and healthy retina (macula).

Case Presentation: A 72-year-old gentleman presented with sudden onset of blurred vision and visual hallucinations in the right eye. He was thought to have CBS with normal ocular examination. Two months later, visual field test showed right sided homonymous hemianopia. Magnetic Resonance Imaging (MRI) brain reported chronic left posterior cerebral artery (PCA) infarct and incidental pituitary adenoma.

Learning Points: CBS is well recognised entity, commonly associated with advanced Age-Related Macular Degeneration (ARMD). However, it has been reported to occur in the absence of ocular pathology. In CBS patients experience vivid and/or troubling visual hallucinations. Up to 50% of all people with macular degeneration may experience CBS. Eye Clinic Liaison Officers (ECLO) have an important supporting role in these cases. Therefore, it is critical for clinicians to be aware of its diagnostic criteria. In addition, it is vital to consider visual field tests and the differential diagnoses in such patients, especially when ocular examination is normal. This case highlights that symptoms that mimic CBS can develop as a result of undiagnosed cerebral event.

Conclusion: Visual symptoms in particular, visual hallucinations may develop following cerebrovascular event. When patient present with visual hallucinations, ophthalmologists must consider visual field test and neuroimaging to exclude the possibility of cerebral pathology.

Abstract #14 – Shahzeb Mirza

One and a half syndrome: an uncommon presentation of a common problem

Shahzeb Mirza

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Introduction: One-and-a-half-syndrome (OAHS) presents with a conjugate horizontal gaze palsy in one eye and an internuclear ophthalmoplegia in the other. This is caused by a single lesion affecting the paramedian pontine reticular formation alongside the ipsilateral medial longitudinal fasciculus. Lesions can be caused by ischemic, haemorrhagic, inflammatory, neoplastic and demyelinating processes.

Case presentation: 49 year old female attends the emergency department after waking up with sudden onset dizziness, diplopia, headache and both eyes fixed to her left side. Past medical history includes diabetes, hypertension, Hypercholesterolemia, fatty liver and obesity. Observations were normal aside from raised blood pressure. Examination revealed a conjugate gaze palsy to the right with limited adduction of her left eye. Nystagmus was present on left eye abduction. Blood results showed raised glucose and total cholesterol. CT head was fast tracked to MRI brain which revealed acute infarct in the pons region. Her risk factors for stroke were optimized and she was rehabilitated in the local stroke unit. She was seen by ophthalmology and orthoptics a few weeks later as an outpatient.

Learning point: Although this remains an atypical presentation of a cerebrovascular accident (CVA), this patient possessed many of the risk factors. Alongside this and the presence of sudden focal neurology, CVA should be foremost suspected and specific diagnostic imaging should not be delayed.

Abstract #15 – Shu-Yi Claire Chan

Isolated Ocular Motor Nerve Palsies: Abnormal neuroimaging outcomes are independent of age.

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Objective: Neurologically isolated ocular motor nerve palsies (IOMNPs) present a management dilemma. Underlying sinister intracranial pathology is thought to be more prevalent in patients <50 years without coexisting ischaemic risk factors and patients in this subgroup are more likely to be offered neuroimaging. With populations rapidly ageing and advanced neuroimaging now readily available, we investigated abnormal neuroimaging outcomes in the traditionally low risk <50 years group.

Methods: This is a retrospective cohort study of all patients presenting with IOMNP to a tertiary neuro-ophthalmology service in Singapore over a four-year (2015 to 2019) period. Clinical data was obtained through manual review of case records. Common aetiologies, age-based differences in prevalence of causes and abnormal neuroimaging outcomes were statistically analysed.

Results: Of 353 patients included, there was no significant difference in the percentage of patients with abnormal neuroimaging outcomes in the ≥50 years group (32.4%) vs the <50 years group (30%). Even with age segregation at ≥60 yrs and ≥70 yrs, the percentage of patients with neuroimaging abnormalities was equivalent among young and old. After accounting for bias from previous cancer history and presumed ischemic pathology, the percentage of abnormal neuroimaging outcomes was as high as 15.5% ≥50 yrs, 14.9% ≥60 yrs and 18.5% ≥70yrs.

Interpretation: The prevalence of abnormal neuroimaging outcomes in patients with IOMNPs is comparable in the young and old age groups. In patients presenting with IOMNPs, if clinical history is suspicious, neuroimaging should be considered irrespective of age and coexisting ischemic risk factors.

Abstract #16 – Katherine Kok

Spontaneous visual recovery following stroke induced cortical blindness.

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Introduction: Cortical blindness (CB) is a term to describe loss of vision caused by damage to the primary visual cortex. We report a case of bilateral cortical blindness caused by extensive bilateral posterior circulation infarcts (POCI) and his unexpected recovery of vision.

Case presentation: An 81 year old male presented with occipital headache, left hemiparesis, dysarthria, bilateral loss of vision. He had past medical history of hypertension, ischemic heart disease, transient ischemic attack and atrial fibrillation.

Initial CT Head and MRI showed extensive POCI involving bilateral occipital lobes - left more than right, bilateral temporal lobes and left cerebellum with haemorrhagic transformation above and below tentorium. Patient was commenced on long-term anticoagulation by stroke team.

On day 2, visual acuity (VA) was light perception confirmed by the ophthalmologist and ocular examination was unremarkable. Diagnosis of stroke-induced CB was made. A week later corrected VA was hand movement and 6/60 in right and left eye respectively. Patient had healthy discs with no retinal pathology.

6 months later in Geriatric clinic, patient mentioned intermittent episodes of improvement of vision lasting up to 30 minutes.

9 months after the infarct, corrected VA was 6/9 and 6/12 in right and left respectively. Again no acute ocular abnormality was noted. His 120-2 static perimetry showed gross constriction of peripheral fields. 3 years post-incident, VA remains 6/9 and 6/12 in right and left eye respectively.

Learning point: Spontaneous recovery of vision after CB although rare is a possibility even in the absence of visual rehabilitation therapy.

Abstract #17 – Yarrow Scantling-Birch

Not all that glitters is chloramphenicol: the importance of a thorough ophthalmology assessment in acutely agitated elderly patient

Yarrow Scantling-Birch1, Hasan Naveed 2

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Background: There is a rising number of ocular comorbidities amongst our elderly population in the UK, making ophthalmology a busy outpatient specialty. Delirium remains a common acute condition afflicting the elderly, especially on medical and surgical wards, with a high mortality if left untreated. The rates of acute delirium attributed to an ocular comorbidity are poorly described in the literature.

Case history: 83-year-old gentleman was admitted to hospital feeling unwell. He was treated for a presumed heart failure exacerbation and chronic leg ulcers. He had a background of a previous enucleation procedure in his right eye. During this admission, he became acutely agitated and delirious, refusing all medication and engagement with healthcare staff. On further systemic examination, it was noted that he had lost vision in his left eye (VA 6/60) and there were several corneal opacifications. He was commenced on chloramphenicol drops and monitored for a subsequent 2 days. On day 3, there was no light perception, a large epithelial defect and significant mucopurulent discharge. He was urgently referred to ophthalmology who treated for a severe microbial keratitis with poor prognosis. Our gentleman lost vision and deteriorated further on the ward.

Discussion: The differential for delirium is wide and the literature remains sparse with respect to ophthalmic aetiology. Infective keratitis accounts for 10% of preventable blindness worldwide. Early recognition of ophthalmic emergencies is a dying skill amongst junior doctors. A lower threshold for a full system assessment, including vision, could have altered the trajectory of this acute delirium case.

Abstract #18 – Oisín Cappa

Molecular dissection of the retina to elucidate early changes in diabetes

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Introduction: Diabetic retinopathy (DR) is a leading cause of blindness globally and more effective treatments aimed at the earlier stages of the disease are required. Although often considered primarily a vascular disease, there is evidence of early glial and neuronal dysfunction. Recently developed technology to measure gene expression in individual cells has provided an opportunity to explore how the diabetic environment impacts these different cell types.

Objectives: To measure the effect of diabetes upon the individual cell types of the retina.

Methods: Retinas from a murine model of streptozotocin-induced diabetes were dissociated into single cells. Single cell RNA sequencing was performed using the 10X Genomics and Illumina platforms. Sequencing data was processed using the Seurat package in R to define cell types and perform differential gene expression.

Results: Over 30,000 thousand cells, representing all the main cell types, were profiled from control and diabetic retinas. No significant changes in cell proportions were observed, but diabetes caused significant differential gene expression in most cell types. Prominent changes in protein synthesis and oxidative phosphorylation occurred in many cells. Muller cells showed an increase in metallothionenin genes, potentially offering protection against oxidative stress.

Conclusions: This study has confirmed early molecular changes in neural and glial cells during diabetes and as expected, suggested changes within vascular cells. Enrichment of the relatively rare endothelial cells and pericytes will be required to provide more conclusive data regarding vascular effects. We have identified many novel potential targets for early interventions to prevent or slow diabetic retinopathy.

Abstract #19 – Michael Glenn

Comparative Genomic Analyses of Keratitis-Associated *Staphylococcus aureus* Isolates.

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Introduction: Bacterial Keratitis is a serious infection of the cornea and a leading cause of monocular blindness worldwide. *Staphylococcus aureus* is one of the most prevalent bacterial species associated with keratitis and insight into the genome of this pathogen will provide valuable information which may be applied to diagnostics and improving patient outcome.

Objectives: Here, we aim to carry out whole-genome sequencing and a broad comparative genomic analyses on a total of 60 *S. aureus* isolates which have been successfully cultured from corneal infections. This will include defining the antibiotic resistance and virulence gene profile of these isolates, along with performing a phylogenetic analyses to assess evolutionary relationships.

Methods: Isolates were collected from Liverpool Royal University Hospital and DNA extracted using Qiagen's PowerSoil Pro kit. Sequencing libraries were prepared using the Nextera XT kit, and sequencing carried out on the Nextera platform. Data was supplemented with long MinION reads (Oxford Nanopore Technologies) in order to fully circularise our bacterial chromosomes.

Results: Full virulence and antibiotic resistance gene profiles were generated for this set of isolates highlighting the presence of many clinically relevant genes including the PVL exotoxin, associated with more severe infection. Phylogenetic analyses revealed an evolutionary diverse selection of isolates originating from a range of clonal complexes. 4 cases of recurrent infection pairs proved to share identical sequence type.

Conclusions: Sequencing this cohort of *S. aureus* pathogens provided high resolution insight into the genome of one of the most common pathogens associated with keratitis.