ILLINOIS COLLEGE OF OPTOMETRY

2021 RESEARCH PRESENTATIONS

TABLE OF CONTENTS

CLICK EACH TITLE TO EXPLORE

ICO

AAO

39 ICO PRESENTATIONS

Table of Contents

The Impact of Lecture Modality: Maintaining Flexibility for Students while Reducing Binge-Watching

Stephanie Adams, OD, PhD • Darren Koenig, OD, PhD • Reneta Simeon, BS • Robert Donati, PhD • Elizabeth Wyles, OD
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

BACKGROUND

Optometry schools adopted remote learning during the COVID-19 pandemic which demonstrated some advantages to embracing various lecture formats. Remote learning has continued in some capacity in optometric education as students appreciate the flexibility that asynchronous lectures offer, enabling them to learn at their own pace and from a distance when needed. With the increased frequency of higher education courses taught with at least some online-based components, consideration for course format becomes critical for student success (Martin 2020).

In 2005 a Hybrid-Flexible (HyFlex) course format was designed at San Francisco State University to address student time and distance restraints which were a barrier to graduate school enrollment (Beatty 2019). The HyFlex format offers remote participation options for learners while retaining the traditional lecture environment as well. HyFlex allows students to attend traditional lecture, watch the lecture recording at a later time, or to live-stream the lecture from a distant location. This design meets the needs of students who always prefer to learn in the traditional environment, students who always prefer to learn remotely, and students who prefer to use both methods according to their changing needs. HyFlex provides student autonomy in how and when they learn, requiring no in-person participation (Beatty 2019). However, a flexible lecture schedule may lack accountability leading to procrastination, which may lead students to continuously view many hours of lecture content, known as binge-watching, likely leading to poor understanding and academic outcomes (Tan 2008; Goda 2015).

This study examined first-year optometry student perspectives, behaviors, and binge-watching patterns of two didactic courses in Winter quarter of academic year 2020-21, Human Physiology and Pathology II (physiology), Geometric and Theoretical Optics II (optics). Each course used distinct remote learning formats with supplemental elements to increase student motivation and accountability.

CONTACT

Stephanie Adams, OD, PhD
sadams@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

METHODS

Physiology used asynchronous lecture capture recording (LCR), available at the time of lecture and thereafter. The course included weekly graded online assignments. Optics used a HyFlex-based design which created 3 lecture delivery options from a live presentation. Students could attend the in-person lecture, synchronous live-streamed lecture remotely, or view the asynchronous lecture capture (LCR) at a later time and place. This HyFlex-based course (HBC) included weekly graded online quizzes and extra credit engagement questions during the synchronous lecture. Neither course required in-person participation. A survey study was conducted after the conclusion of the courses to assess student's perspectives and behavior patterns in each course format.

One hundred seventeen first-year optometry students were invited to participate in the study. The anonymous survey was administered in person, privately, using Survey Monkey®, and most question responses used a Likert scale, ranking, or numerical scale. A full list of survey questions is available (Table). Data were analyzed with Microsoft Excel and SPSS version 27. This study was approved by the Illinois College of Optometry IRB (protocol #20015).

TABLE

Survey questions regarding HBC and LCR course formats.

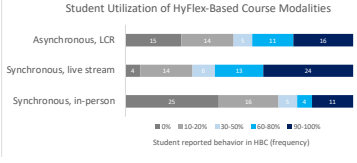
Think back to your Human Physiology and Pathology II course in Winter 2020-21, which delivered course content using Mediasite lecture capture recordings from Winter quarter 2019-2020.	
1. How important is it to be able to access lecture capture recordings/videos at your convenience?	Not at all important, not so important, somewhat important, very important, extremely important
2. What percentage of the **lecture capture recordings** did you watch?	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%
3. What percentage of the time did you watch the lecture capture recordings **during the officially scheduled lecture time?**	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%
4. How often did you need to **re-watch the majority of the lecture** after your first exposure to the course content?	never, rarely, sometimes, often, always
5. When preparing for an exam, what is the maximum number of **previously unwatched** lecture recording HOURS you would watch in a single day?	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, >10
6. The weekly open-book, untimed **lecture and case-study assignments** were important for keeping me on-track with the course material.	strongly disagree, disagree, neutral, agree, strongly agree
7. The course's format was critical to allow **flexibility** in my personal schedule.	strongly disagree, disagree, neutral, agree, strongly agree
8. **Pre-existing lecture capture recordings** should be used in this course in the future.	strongly disagree, disagree, neutral, agree, strongly agree
Think back to your Geometric and Theoretical Optics II course in Winter 2020-21, which delivered course content using in-person lectures, lectures viewable in real time on the Mediasite Live streaming platform, and/or the lecture capture recording to be viewed at a later time.	
9. What percentage of lectures did you attend **in-person**?	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%
10. What percentage of the time did you **remotely attend the live streamed lecture?**	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%
11. What percentage of the time did you watch **lecture capture recordings as your first exposure** to the course content?	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%
12. How often did you need to **re-watch the majority of the lecture** after your first exposure to the course content?	never, rarely, sometimes, often, always
13. When preparing for an exam, what is the maximum number of **previously unattended and/or unwatched** lecture recording HOURS you would watch in a single day?	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, >10
14. The opportunity to attend **weekly live-streamed lectures** at a scheduled time was important for keeping me on-track with the course material.	strongly disagree, disagree, neutral, agree, strongly agree
15. The **weekly open book, timed quizzes** were important for keeping me on-track with the course material.	strongly disagree, disagree, neutral, agree, strongly agree
16. The course's format was critical to allow **flexibility** in my personal schedule.	strongly disagree, disagree, neutral, agree, strongly agree
17. The **live streamed lecture format with the option to attend in-person, and a lecture capture recording option** should be used in this course in the future.	strongly disagree, disagree, neutral, agree, strongly agree

RESULTS

Sixty-one first-year students completed the in-person survey (52%). When asked how they utilized the HBC modalities, only 25% (n=15) of students reported attending in-person lecture at least 60% of the time, while 41% (n=25) reported they never attended lecture in-person. Sixty percent (n=37) of students reported they attended the synchronous lecture remotely at least 60% of the time, while only 7% (n=4) never used this modality (Figure 1).

FIGURE 1

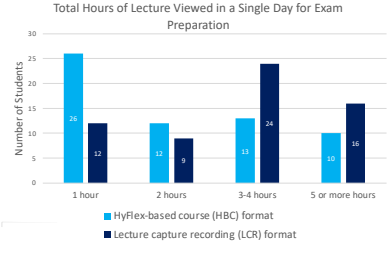
Student reported frequency of utilization of each possible HyFlex-based course (HBC) modality in optics. The most frequently utilized modality was the synchronous live streamed lecture. The least often utilized modality was synchronous in-person (traditional) lecture.



When preparing for exams, there was a significant association between course format and hours of lecture capture binge-watching (chi-squared test, p=0.017). The HBC had fewer students (n=13) who watched 3-4 hours of previously unseen lectures in a single day, and more students (n=26) who watched only 1 hour, compared to the LCR format (Figure 2).

FIGURE 2

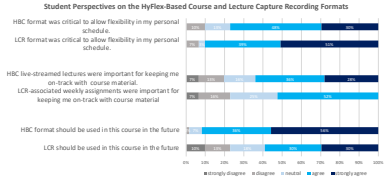
Hours of previously unseen lecture content students viewed in a single day when preparing for an optics (HBC) or physiology (LCR) exam. Course format and binge-watching hours were significantly associated (chi-squared test, p=0.017).



First-year students agreed or strongly agreed that both the HBC (78%) and LCR (90%) formats were critical for their schedule flexibility. Students agreed or strongly agreed that the synchronous remote lecture in the HBC was important for keeping them on track with course material (64%). Lastly, students were more supportive (agreed or strongly agree) of using the HBC format (92%) compared to the LCR format (60%) in the future (Figure 3).

FIGURE 3

Student perspectives on the HBC and LCR course formats. Students appreciate the flexibility that both HBC and LCR courses offer. Students report the HBC format with livestreamed lectures was important for keeping them on track with course material. Almost all students (92%) support the HBC format of optics in the future, while 60% of students support the LCR format of physiology.



CONCLUSION

The data suggest students adhere to a more consistent viewing schedule in an HBC format which appears to decrease binge-watching. The HyFlex-based course format offers needed flexibility with asynchronous lecture viewing, yet may also increase student accountability for those who benefit from a traditional or online synchronous lecture, ultimately giving learners the participation options to meet all of their changing needs.

REFERENCES

1. Beatty, B. J. (2019). Beginnings: Where Does Hybrid-Flexible Come From?. In B. J. Beatty, Hybrid-Flexible Course Design: Implementing student-directed hybrid classes. EdTech Books. Retrieved from https://edtechbooks.org/hyflex/book_intro
2. Goda, Y., M. Yamada, H. Kato, et al (2015). Procrastination and other learning behavioral types in e-learning and their relationship with learning outcomes. Learning and Individual Differences, 37. 72-80.
3. Martin, F., C. Wang, and A. Sadaf. (2020). Facilitation Matters: Instructor Perception of Helpfulness of Facilitation Strategies in Online Courses. Online Learning, 24(1).
4. Tan, Crystal, R. Ang, R. Klassen, et al. (2008). Correlates of Academic Procrastination and Students' Grade Goals. Current psychology. 27. 135-144.

ACKNOWLEDGEMENTS

This survey study was supported by the Research Resource Committee at the Illinois College of Optometry.

Table of Contents

Technological Resource Considerations to Support Successful Student Outcomes

Brian Au, BS • Robert Donati, PhD • Darren Koenig, OD, PhD • Reneta Simeon, BS • Stephanie Adams, OD, PhD • Elizabeth Wyles OD
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

When the COVID-19 pandemic prohibited traditional learning, educational programs were forced to adopt new technological methods for continued learning remotely[1]. This experience has broadened the possibilities for the future of optometric education. Educators now have the tools and experience to consider a permanent transition to the favored learning format, a blended environment[2]. Adopting a blended model requires both educational institutions and students to examine technological resources needed for student success. To study technological resources and outcomes of remote learning a survey study was conducted.

TABLE 1
Educational Model Definitions

Traditional Classroom	Traditional classroom teaching focuses on a number of elements including lecture, case studies, and team projects. Learning is conducted in a synchronous environment, meaning that the students must be in the same place at the same time in order to learn[3].
Online course	Online learning environments occur in an asynchronous mode, meaning that students have the opportunity to learn independently from anywhere and at any time[3].
Blended course	Blended learning environments utilize face-to-face teaching while incorporating an online learning component in an effort to increase learning, as well as student attitudes towards their work[2].

METHODS

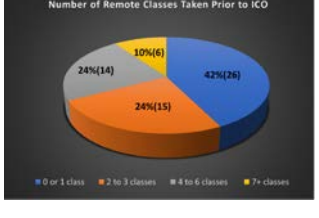
One hundred seventeen first-year optometry students were invited to participate in a survey study. The survey questions addressed remote or online learning experience prior to optometry school, comfort level with remote learning, use of electronic resources, recommended electronic resources, and technological challenges that negatively impacted learning (Figure 1). Student responses also provided feedback on the resources and experiences that may improve future educational outcomes in a non-traditional setting. The anonymous survey was administered in person, privately, using Survey Monkey®, and most question responses used a Likert scale, ranking, or rating of choices. The data was compared to student success, using grade point average (GPA) as the outcome measure, to determine if student success was dependent upon comfort level and prior remote/online experience. Data were analyzed with Microsoft Excel and SPSS version 27.

FIGURE 1
Use the QR code to view actual survey questions posed to the first-year students.

RESULTS

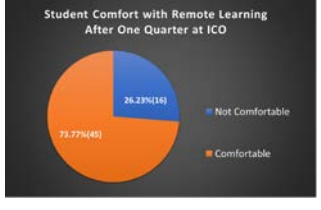
Sixty-one first-year students (52%) participated in the in-person survey. When considering the number of remote or online higher education classes taken prior to entering optometry school, 42% of students had zero or 1, 24% had 2-3, 24% had 4-6 while 10% had 7 or more (Figure 2).

FIGURE 2
Students report their experience with remote or online higher education classes taken prior to starting at Illinois College of Optometry.



After completing the fall quarter using remote learning at Illinois College of Optometry, 26% of students reported they still were not at all or not so comfortable with a remote learning format, while 74% were at least somewhat comfortable (Figure 3).

FIGURE 3
After one academic quarter at Illinois College of Optometry students were asked to rate their comfort level with a remote learning format. The Not Comfortable percentage includes student responses of not at all comfortable and not so comfortable. The Comfortable category includes student responses of somewhat comfortable, very comfortable, and extremely comfortable.

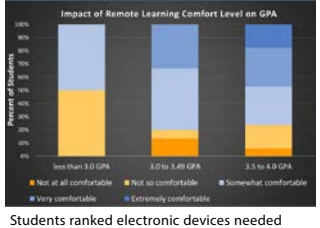


Although grade point average (GPA) was not significantly dependent on experience with remote or online courses (chi-squared test, p=0.12) the data demonstrated a visible trend. The data suggests students with a GPA <3.0 had less experience with remote or online learning compared to students with a higher GPA (Figure 4).

FIGURE 4
GPA was not significantly dependent on experience with remote or online courses (chi-squared test, p=0.12). However, the data show a visible trend of those with less remote/online experience are associated with lower GPA.

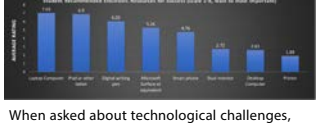
Grade point average was significantly dependent on remote learning comfort level (chi-squared test, p=0.01). Higher GPA was associated with higher comfort level (Figure 5).

FIGURE 5
Grade point average was significantly dependent on remote learning comfort level (chi-squared test, p=0.01). Higher GPA is associated with higher remote learning comfort level. Lower GPA is associated with lower comfort level.



Students ranked electronic devices needed for successful remote learning on a scale of importance from 1-least important to 8-most important. The top 4 recommended electronic devices are the laptop computer (mean 7.03), iPad® or other tablet (mean 6.9), digital pen (mean 6.03) and Microsoft® Surface or equivalent (mean 5.26) (Figure 6).

FIGURE 6
Student's ranking of electronic devices needed for successful remote learning on a scale of importance from 1-least important to 8-most important.



When asked about technological challenges, the two most common (>5 incidents) technological issues encountered that negatively impacted remote learning during a single academic quarter were internet connectivity or speed (33%) and institutional software or systems (24%) (Table 2).

TABLE 2
Students report technological challenges encountered that negatively impacted learning during a single academic quarter.

	Related to electricity outages	Related to your personal device(s)	Related to your internet connectivity or speed	Related to software or systems used by the institution
No incidents	42.3 % (25)	14. 8% (9)	4.9% (3)	8.6% (4)
1 to 4 incidents	52.5 % (31)	78.7% (48)	60.7% (37)	64.9% (42)
5 or more incidents	5.2% (3)	6.6% (4)	32.8% (20)	24.5% (15)

CONCLUSION

The data suggests that GPA is associated with student comfort level in a remote learning environment. Furthermore, lack of sufficient prior remote or online learning experience may negatively impact student success, as it is expected that more experience would increase comfort. Lastly, to successfully navigate the remote environment both students and optometric institutions need to embrace the best technological practices and share responsibilities to ensure proper device acquisition and a smooth experience with software and systems.

REFERENCES

1. Glory, I., L. Heavenlight, & K. Gibson (2020). Teaching and Learning Experiences in Medical Education During the COVID-19 Pandemic: The Case of Kilimanjaro Christian Medical University College (KCMUCo), Tanzania. Journal of Learning for Development, 7, 1–14.
2. Rozeboom, A. (2017). Blended Learning Versus the Traditional Classroom Model. (Master's thesis, Northwestern College, Orange City, IA). Retrieved from http://nwcommons.nwciowa.edu/education_masters/20/
3. Black, G. (2002). A comparison of traditional, online, and hybrid methods of course delivery. Journal of Business Administration Online, 1.

ACKNOWLEDGEMENTS

Thank you to the Research Resource Committee for the financial support throughout this project. Approved by the Illinois College of Optometry IRB, protocol # 20015.

CONTACT

Elizabeth Wyles, OD
ewyles@ico.edu
www.ico.edu

Table of Contents

Atypical AZOOR: Bilateral presentation with focal retinal deposits in a middle-aged black female

Raman Bhakhri, OD, FAAO, Chicago, IL
Shawn Yu, OD, FAAO, Los Angeles, CA

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Acute Zonal Occult Outer Retinopathy (AZOOR) is a rare inflammatory condition that is considered part of the white dot disease spectrum and may be due to viral or autoimmune causes. Signs and symptoms can include scotomas, persistent photopsia's, and potential vision loss. The condition typically presents unilaterally in young Caucasian females with fundus signs being minimal or absent leading to a delayed or missed diagnosis. We report an atypical presentation of AZOOR with bilateral presentation with focal retinal deposits in a middle-aged black female.

CASE HISTORY

A 60-year-old black female presented for a comprehensive eye exam with a complaint of occasional red flashing circles OD/OS that has started 1-year earlier but had recently subsided. Her previous eye examination at the onset of the circles was noted to be unremarkable. Her medical history included hypertension, hyperthyroidism, heart failure, and hyperlipidemia with all conditions being controlled with medications. Best corrected visual acuity was 20/20 OD and OS. External examination and all other entrance testing were unremarkable. Slit lamp examination findings were also unremarkable. IOP's were 16 mmHg OD/OS with Goldmann applanation tonometry. Dilated fundus examination revealed optic discs with 0.25/0.25 cup to disc ratio OD/OS. Focal yellow deposits were noted in the superior and inferior arcades as well as nasal to the nerve OD and OS. Fundus autofluorescence revealed circumpapillary hyper-auto fluorescence with extension into the superior and inferior arcades. Hypo autofluorescence was also noted inferior to the nerves OU within the area of hyper autofluorescence. Visual field testing showed superior temporal defects that corresponded to areas noted on FAF. Juxtapapillary OCT showed loss of the photoreceptor integrity line OD/OS with adjacent deposits. A uveitis panel was ordered and was unremarkable. Based on the examination findings the patient was diagnosed with AZOOR. Treatment with oral steroids was discussed with a retinal specialist, however, the patient declined. She continues to be followed.

FIGURE 1

Fundus photo of the right eye (1A) and left eye (1B) revealing focal yellow deposits in the superior and inferior arcades as well as nasal to the nerve. An area of atrophy is also noted inferior to the nerve in each eye. A demarcation line can be seen separating the normal retina from the affected retina in either eye.

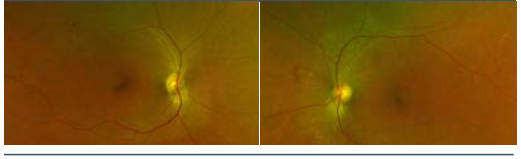


FIGURE 3

Spectral domain optical coherence tomography of the right eye (3A) showing a trizonal pattern of: normal retina followed by photoreceptors atrophy and retinal pigment epithelium atrophy. Figure 3B reveals the focal retinal deposits above the retinal pigment epithelium.

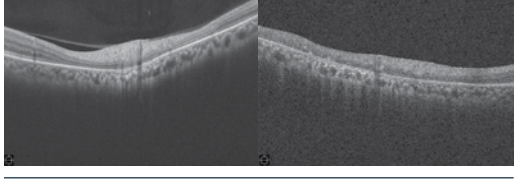


FIGURE 4

Visual field testing showing superior temporal defects in the right and left eye, extending from the blind spot that corresponded to areas noted on fundus auto fluorescence.

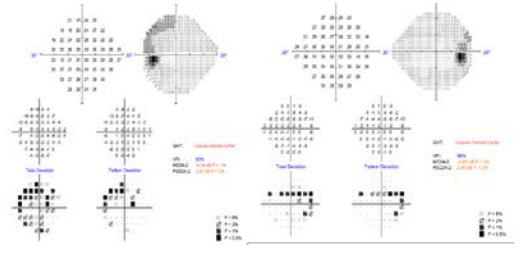
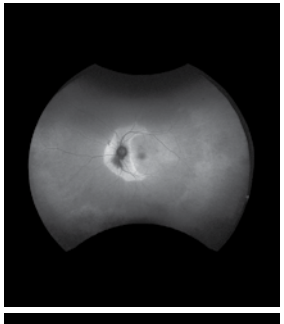
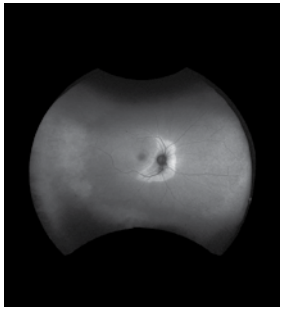


FIGURE 2

Circumpapillary hyper-auto fluorescence with extension into the superior and inferior arcades along with hypo autofluorescence inferior to the nerve right eye (Figure 2A) and left eye (Figure 2B) within the area of hyper autofluorescence. A demarcation line was noted that separated the areas of hyper auto fluorescence from the normal retina in both eyes.





DISCUSSION

Although AZOOR typically presents in younger Caucasian females, rare cases have been noted in older females, and those of other ethnicities. The condition is also observed unilaterally in most cases but many of these cases should be followed long term, as cases series and reports have noted delayed involvement of almost 50 months of the fellow eye. A finding unique to this case and in the literature is the presence of focal deposits in the areas of hyper autofluorescence. The deposits were isolated to the outer retina and possibly represent degenerated photoreceptors secondary to inflammation. Similar deposits have been noted in other conditions in which the photoreceptors have been damaged such as vitamin A deficiency retinopathy. Clinicians should be aware of presentations of AZOOR, beyond the typical findings noted in the literature, as these cases could go undiagnosed or be misdiagnosed.

REFERENCES:

1. Gass JD. Acute Zonal Occult Outer Retinopathy. Donders Lecture: The Netherlands Ophthalmological Society, Maastricht, Holland, June 19, 1992. J Clin Neuroophthalmol 1993;13:79-97.
2. Introini U, Casalino G, Dhrami-Gavazi E, et al. Clinical Course of Acute Zonal Occult Outer Retinopathy Complicated by Choroidal Neovascularization. Int J Retina Vitreous 2018;4:32.
3. Monson DM, Smith JR. Acute Zonal Occult Outer Retinopathy. Surv Ophthalmol 2011;56:23-35.
4. Mrejen S, Khan S, Gallego-Pinazo R, et al. Acute Zonal Occult Outer Retinopathy: A Classification Based on Multimodal Imaging. JAMA Ophthalmology 2014;132:1089-98.
5. Gass JD, Agarwal A, Scott IU. Acute Zonal Occult Outer Retinopathy: A Long-Term Follow-up Study. Am J Ophthalmol 2002;134:329-39.
6. Barnes AC, Lowder CY, Bessette AP, et al. Treatment of Acute Zonal Occult Outer Retinopathy with Intravitreal Steroids. Ophthalmic Surg Lasers Imaging Retina 2018;49:504-9.
7. Jampol LM, Becker KG. White Spot Syndromes of the Retina: A Hypothesis Based on the Common Genetic Hypothesis of Autoimmune/Inflammatory Disease. Am J Ophthalmol 2003;135:376-9.
8. Pisa D, Ramos M, García P, et al. Fungal Infection in Patients with Serpiginous Choroiditis or Acute Zonal Occult Outer Retinopathy. J Clin Microbiol 2008;46:130-5.

Table of Contents

CONTACT INFORMATION

Raman Bhakhri, OD, FAAO
rbhakhri@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Downbeat Nystagmus Secondary to Complicated Epidural Puncture and Undiagnosed Arnold Chiari Malformation Type 1

Raman Bhakhri, OD, FAAO, Chicago, IL • Len Messner, OD, FAAO, Chicago, IL • Megan Byer, OD, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

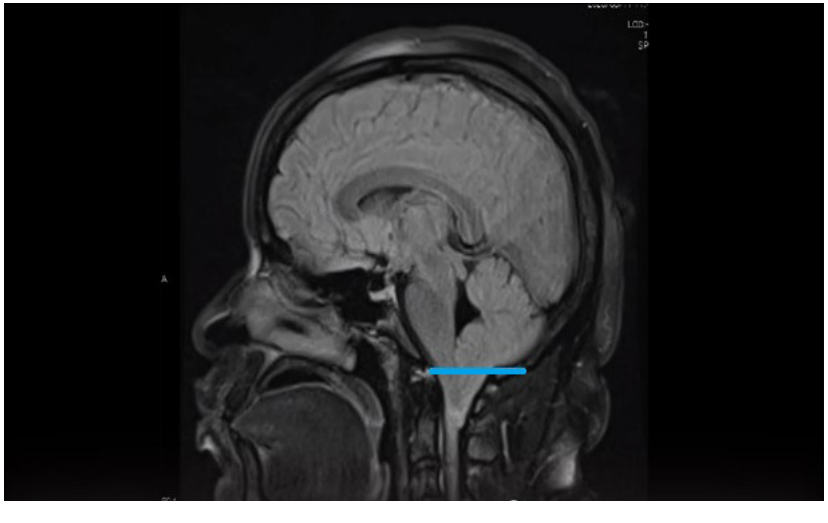
INTRODUCTION

Arnold Chiari malformation type 1(ACM1) is a rare (0.5-3.5%) congenital malformation resulting in herniation of the cerebellar tonsils through the foramen magnum. This can lead to potential damage of neuronal structures in the corticomedullary junction. The most common presenting symptom is a suboccipital headache; however, patients can also present with visual symptoms including decreased vision, diplopia, and nystagmus. Furthermore, different types of nystagmus can present with ACM1 depending on what part of the brain is impacted. This case details a patient who presented with a down beat nystagmus secondary to undiagnosed ACM1 that was exacerbated by a complicated epidural anesthetic procedure during labor.

CASE HISTORY

A 31-year-old African American female presented for a comprehensive eye exam with a chief complaint of decreased vision and uncontrolled eye movements that started after her delivery, six months earlier. Her delivery was unremarkable except for a dural puncture during the epidural anesthetic procedure. An epidural patch was placed on the patient until resolution and she was discharged from the hospital two days later. Best corrected visual acuity was 20/25 OD/OS. External examination revealed a down beat nystagmus OU that increased in amplitude in lateral and down gazes. Slit lamp examination was unremarkable. IOP's were 16 mmHg OD and 18mmHg OS with Goldmann applanation tonometry. Dilated fundus examination revealed a C/D ratio of 0.3/0.3 with no disc edema OD/OS. The macula and retinal periphery were unremarkable OD/OS. The patient was referred for an MRI with and without contrast which revealed a type 1 Arnold Chiari malformation. Based on this diagnosis, it is likely that the accidental dural puncture led to changes in cerebrospinal fluid gradients causing further tonsillar herniation and subsequent downbeat nystagmus. The patient was referred for surgical decompression and is awaiting surgery at this time.

FIGURE 1
QR Code link to a video of the downbeat nystagmus **(top).** Sagittal midline T1 weighted MRI showing Type 1 Arnold Chiari Malformation. There is downward displacement of the cerebellar tonsils of approximately 2.5cm through the foramen magnum (blue line) **(bottom).**



DISCUSSION

Down beat nystagmus in ACM1 is only seen in 4-6% of affected patients. Normally, the cerebellar flocculus inhibits the pathway from the anterior semicircular canal to upward eye movements. If damaged, as in ACM1, the eyes will tend to drift up followed by a correctional fast jerk movement downward. This mechanism was precipitated in this case due to the undiagnosed ACM1 which was exacerbated by the unintentional dural puncture. This led to leakage of CSF and decreased CSF pressure. As the CSF pressure drops, the cerebellar tonsils extend into the foramen magnum further, blocking the flow of cerebrospinal fluid into the cervical spinal canal and increasing the cerebrospinal fluid pressure exerted on the brain.

Fortunately, the condition can be corrected with surgical treatment. Clinicians should be aware of possible ocular complications during delivery in patients with ACM1.

REFERENCES

1. Ghaly RF, Tverdohleb T, Candido KD, Knezevic NN. Management of Parturients in Active Labor with Arnold Chiari Malformation, Tonsillar Herniation, and Syringomyelia. Surg Neurol Int 2017;8:10-.
2. Ghaly RF, Candido KD, Sauer R, Knezevic NN. Anesthetic Management During Cesarean Section in a Woman with Residual Arnold-Chiari Malformation Type I, Cervical Kyphosis, and Syringomyelia. Surg Neurol Int 2012;3:26.
3. Goodwin D, Halvorson AR. Chiari I Malformation Presenting as Downbeat Nystagmus: Clinical Presentation, Diagnosis, and Management. Optometry (St Louis, Mo) 2012;83:80-6.
4. Hullander RM, Bogard TD, Leivers D, et al. Chiari I Malformation Presenting as Recurrent Spinal Headache. Anesthesia and analgesia 1992;75:1025-6.
5. Leffert LR, Schwamm LH. Neuraxial Anesthesia in Parturients with Intracranial Pathology: A Comprehensive Review and Reassessment of Risk. Anesthesiology 2013;119:703-18.
6. Hullander RM, Bogard TD, Leivers D, et al. Chiari I Malformation Presenting as Recurrent Spinal Headache. Anesthesia & Analgesia 1992;75:1025-6.
7. Shaikh AG, Ghasia FF. Neuro-Ophthalmology of Type 1 Chiari Malformation. Expert Rev Ophthalmol 2015;10:351-7.

CONTACT INFORMATION

Raman Bhakhri, OD, FAAO
rbhakhri@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Development and Introduction of World Council of Optometry Resolution on Myopia Management Standard of Care

Sandra S Block[1], Susan Cooper[1], Elizabeth Lumb[2], Gary Orsborn[2]

[1]World Council of Optometrists, St. Louis, MO, USA; [2]CooperVision, San Ramon, CA, USA

PURPOSE

A seminal 2015 World Health Organization (WHO) report declared that "myopia & high myopia are increasing globally at an alarming rate, with significant increases in the risks for visual impairment from pathologic conditions associated with high myopia".1

Research shows myopia, regardless of magnitude, is associated with increased lifetime risk of visual impairment from conditions including retinal detachment & myopic maculopathy. (For references see WCO website)

The World Council of Optometry (WCO) and CooperVision (CVI) sought to communicate to optometrists worldwide that correcting pediatric myopic refractive error is no longer sufficient, and myopia management should be an obligation of optometrists.

METHODS

The WCO & CVI partnered to collaborate on myopia management:

- Oct. 2020 – Mar. 2021, a global committee of five representing both WCO & CV reviewed evidence on the myopia epidemic culminating in an agreement to address a needed change.
- For years, myopia has been considered a simple refractive error, addressed with corrective optical devices.
- Evidence shows that myopia is complex, including the possibility of ocular health complications not seen until years after myopia develops.
- Many studies have outlined risk factors, protective behaviors, and management that may impact the onset and progression and therefore the long-term effects of myopia.

RESULTS

WCO approved a 'Resolution for the Standard of Care for Myopia Management'.
WCO Board of Directors, representing all 6 regions, signed the resolution which was distributed worldwide to WCO member associations on April 13, 2021.
The resolution defined the evidence-based standard of care as having 3 main components:

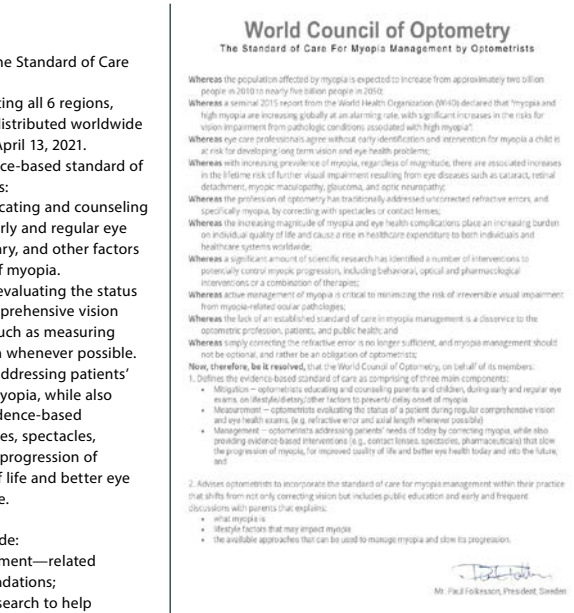
- Mitigation — optometrists educating and counseling parents and children, during early and regular eye examinations, on lifestyle, dietary, and other factors to prevent or delay the onset of myopia.
- Measurement — optometrists evaluating the status of a patient during regular comprehensive vision and eye health examinations, such as measuring refractive error and axial length whenever possible.
- Management — optometrists addressing patients' needs of today by correcting myopia, while also simultaneously prescribing evidence-based interventions (e.g., contact lenses, spectacles, pharmaceuticals) that slow the progression of myopia, for improved quality of life and better eye health today and into the future.

The goals of the partnership include:

- Disseminating myopia management—related research and clinical recommendations;
- Providing insights from new research to help optometrists stay current on evidence-based developments that they can apply in providing optimum care to their patients.

[1] The impact of myopia and high myopia: report of the Joint World Health Organization–BHVI Global Scientific Mtg on Myopia, University of New South Wales, Sydney, Australia, 16–18 March 2015. Geneva: World Health Organization; 2017.

Please use this QR code for direct access to the WCO Myopia Management page of our website where you will find the pdfs shown and references.



World Council of Optometry

The Standard of Care For Myopia Management by Optometrists

Whereas the population affected by myopia is expected to increase from approximately two billion people in 2010 to nearly five billion people in 2050;

Whereas a seminal 2015 report from the World Health Organization (WHO) declared that "myopia and high myopia are increasing globally at an alarming rate, with significant increases in the risks for vision impairment from pathologic conditions associated with high myopia";

Whereas eye care professionals agree without early identification and intervention for myopia a child is at risk for developing long term vision and eye health problems;

Whereas with increasing prevalence of myopia, regardless of magnitude, there are associated increases in the lifetime risk of further visual impairment resulting from eye diseases such as cataract, retinal detachment, myopic maculopathy, glaucoma, and optic neuropathy;

Whereas the profession of optometry has traditionally addressed uncorrected refractive errors, and specifically myopia, by correcting with spectacles or contact lenses;

Whereas the increasing magnitude of myopia and eye health complications place an increasing burden on individual quality of life and cause a rise in healthcare expenditure to both individuals and healthcare systems worldwide;

Whereas a significant amount of scientific research has identified a number of interventions to potentially control myopic progression, including behavioral, optical and pharmacological interventions or a combination of therapies;

Whereas active management of myopia is critical to minimizing the risk of irreversible visual impairment from myopia-related ocular pathologies;

Whereas the lack of an established standard of care in myopia management is a disservice to the optometric profession, patients, and public health; and

Whereas simply correcting the refractive error is no longer sufficient, and myopia management should not be optional, and rather be an obligation of optometrists;

Now, therefore, be it resolved, that the World Council of Optometry, on behalf of its members:

1. Defines the evidence-based standard of care as comprising of three main components:
   - Mitigation – optometrists educating and counseling parents and children, during early and regular eye exams, on lifestyle/dietary/other factors to prevent/ delay onset of myopia
   - Measurement – optometrists evaluating the status of a patient during regular comprehensive vision and eye health exams, (e.g. refractive error and axial length whenever possible)
   - Management – optometrists addressing patients' needs of today by correcting myopia, while also providing evidence-based interventions (e.g., contact lenses, spectacles, pharmaceuticals) that slow the progression of myopia, for improved quality of life and better eye health today and into the future, and

2. Advises optometrists to incorporate the standard of care for myopia management within their practice that shifts from not only correcting vision but includes public education and early and frequent discussions with parents that explains:
   - what myopia is
   - lifestyle factors that may impact myopia
   - the available approaches that can be used to manage myopia and slow its progression.

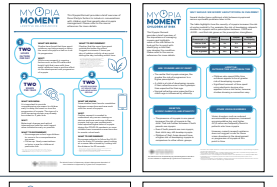
Mr. Paul Folkesson, President, Sweden

WCO website and references:
myopia.worldcounciloftometry.info

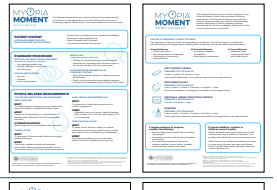
Clinical tools to reinforce three M's of managing myopia and available in 6 languages:

Myopia Moments

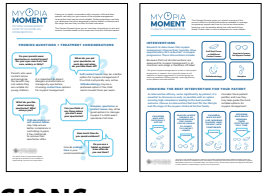
Mitigation:



Measurement:



Management:



CONCLUSIONS

The WCO/CVI partnership has raised awareness of pediatric myopia progression and encouraged optometrists to embrace myopia management as a standard of care.

The partnership will establish multi-lingual myopia management resources to actively address the challenge of managing myopia on the required scale.

It is the intention of both WCO and CVI to ensure that everyone is entitled to high quality, accessible, equitable, and integrated patient centered eye care.

For more information contact:
Sandra S. Block, OD, M Ed, MPH, FAAO, FCOVD, FNAP
sblock@ico.edu

Table of Contents

World Council of Optometry: Promoting Optometry around the Globe

Sandra S Block OD MEd MPH FAAO FCOVD Susan Cooper OD FAAO

WCO Mission

To facilitate the development of optometry around the world and support optometrists in promoting eye health and vision care as a human right through advocacy, education, policy development and humanitarian outreach.

Education Mentorships & Fellowships

WCO offers grants for:
• Projects that support the goals and objectives of WCO and work to advance optometry and its participation in addressing vision and eye health within the health system of a country.

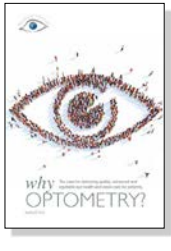
• Mentorships to match faculty/instructors from established schools of optometry with faculty from WCO member schools that are less established.

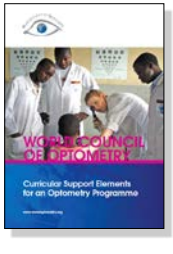
Optometry Advocacy and Leadership Program (OPAL)

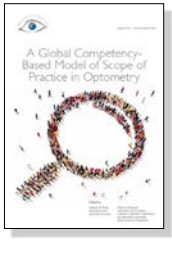
This course is a member benefit to prepare optometrists from around the world to advocate for optometry and offer the participants guidance to which will aid them in understanding how they can help lead their countries to address the challenges and opportunities facing our profession.

WCO is grateful for the financial support and expertise of the AAO and OGS for this program.

Resources on website







Our Membership Reach

The World Council of Optometry is the only global optometry membership association and represents optometry in 62 countries including national association, universities, corporations and individual optometrist and students

Examples of some 2021 WCO Activities:

- Acting as a Global Partner with the International Agency for Prevention of Blindness for World Sight Day initiative and the Advocacy to Action series.
- The Legislation, Regulation and Standards Committee has developed an LRS Toolkit to serve as a resource to guide optometrists in their respective country to develop associations, legislative framework and regulatory bodies.
- Global State of Optometry Survey is in development, which will map optometry human resources, scope of practice, competency levels, demographics, optometric education and regulatory requirements around the world.
- Pediatric Tool Kit providing care, resources and patient information is in development.
- Worked with the World Health Organization (WHO) on committees developing eye care intervention packages and competencies
- WCO *Resolution on the Standard of Care for Myopia Management by Optometrists*
- Launched Myopia Management microsite on WCO website
- Hosted webinars on Myopia Management and Dry Eye

Our Supporters

CooperVision Alcon AOA AAO OGS Essilor GoodLite

WCO Concept of Optometry

A healthcare profession that is autonomous, educated, and regulated Optometrists are the primary healthcare practitioners of the eye and visual system who provide comprehensive eye and vision care, which includes:

- Refraction and dispensing,
- Detection/diagnosis and management of disease in the eye, and
- Rehabilitation of conditions of the visual system

Education Initiatives

•***Curriculum Support Elements for an Optometry Program***, a guide to assist schools, colleges and universities intending to start or upgrade an optometry program with a basis for designing their curriculum.

•***Eyes Around the World*** – An education program that will cover 3 time zones in 24 hours taking place on November 20, 2021:

For more information about the World Council of Optometry, visit our website:

Join WCO:

Individual membership is open to optometrists, educators, researchers, and industry.

Join us to assist the development of optometry around the world!

Table of Contents

“Fitting Scleral Contact Lenses On a Thin Sclera”

Chelsea Bradley, OD, FAAO
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Scleral contact lenses are known to induce pressure on the globe, particularly the conjunctiva, sclera, and anatomical structures underlying the haptic of the lens. Therefore, fitting a scleral lens on a patient with a thin sclera could potentially cause complications such as further thinning or perforation. There are not many instances where a patient with scleral thinning would need a scleral lens, so research on this topic is limited. However, some examples of conditions that can be associated with both scleral thinning and need for a scleral lens are:

- Post-surgical scleral thinning in a patient with corneal ectasia or ocular surface disease
- Previous scleritis in a patient with corneal ectasia or ocular surface disease
- Connective tissue disorders such as Ehlers-Danlos or Marfan syndrome with keratoconus
- Keratoglobus
- Trauma

Considerations need to be made for when it is appropriate to fit a scleral lens on these patients.

CASE

- 47-year-old African American male with keratoconus (Figure 1) presents for contact lens fitting. Habitually uncorrected.
- Previously failed out of corneal GPs and hybrid lenses due to comfort, corneal integrity, and cost.
- Has area of focal, protruding scleral thinning from previous motor vehicle accident OS (Figure 2).
- Medical history unremarkable.
- BCVA in manifest refraction 20/25-2 OD, 20/50-1 OS.

FIGURE 1
Pentacam scan showing severe keratoconus OD and OS.

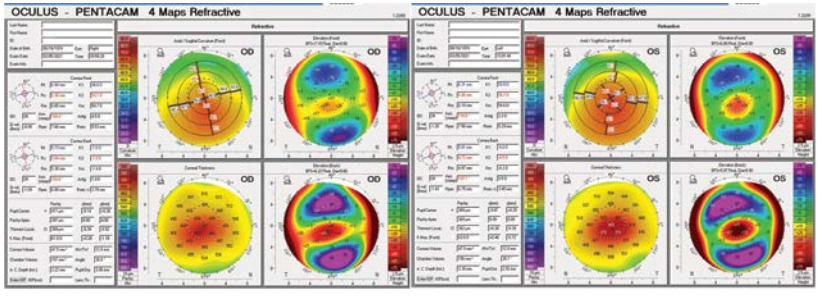
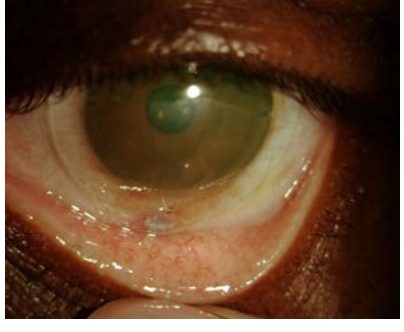


FIGURE 2
Focal area of nodular scleral thinning due to previous motor vehicle accident. Located where the haptic of a scleral lens will land.

FIGURE 3
Initial scleral lenses showing good fit OD, but the haptic compressing the area of scleral thinning OS due to the **vault being made incorrectly.** BCVA in lenses 20/25+1 OD, 20/20 OS, excellent patient comfort.



PLAN

Considering scleral thinning is focal and has minimal risk for progression, fit patient with scleral contact lens with vault over area of scleral thinning. Notching around the area of thinning would also be an option.

The patient was initially told the lens could not be dispensed due to potential harm to the area of scleral thinning. However, the patient reports feeling unsafe driving uncorrected. Lenses were dispensed with **strict instructions not to wear lens other than for driving and never more than two hours**, with explanation of potential complications if lens were to cause scleral perforation. **A rush order was placed for remake of OS lens with appropriately sized vault.**

Unfortunately, patient was lost to follow up even with several attempts to reach patient, by many phone calls and a certified letter written to patient reminding him of the risks of scleral perforation and encouraging him to RTC for new lens dispense.

CONCLUSIONS

Should you fit a scleral lens in a patient with a thin sclera?

- If you can fit a different type of lens (corneal GP or hybrid), you should
- Not on a patient with widespread or progressive scleral thinning
- Monitor very closely in a patient who does not have any evidence of scleral thinning, but has risk factors for developing thinning
- Likely okay when the thinning is focal and non-progressive (trauma or post-surgical)
- Vault or notch over the area to avoid friction

Research and case studies regarding these cases would be helpful to determine risk levels.

CONTACT

Chelsea Bradley, OD • cbradley@ico.edu
www.ico.edu • 3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Bell's Palsy in an Expectant Mother with Preeclampsia and Anxiety

Melissa Caceres, OD, Ashley Speilburg, OD, FAAO
Illinois Eye Institute (IEI), Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Bell's palsy is the most common diagnosis associated with facial nerve weakness and paralysis. The mechanism of the condition is unknown; however, a viral etiology is suspected. Resultant facial paresis or paralysis occurs due to facial nerve inflammation and edema (and likely compression of the nerve as it courses through the temporal bone). Classic presentation includes dryness of the eyes and mouth, taste disturbance, hyperacusis, and sagging of the lids and corner of the mouth on the affected side.[1]

Typically a self-limiting condition, the facial paresis may lead to eye injury secondary to poor eyelid closure and decreased lacrimation. Pregnancy and severe preeclampsia have been shown to be risk factors[1]; additionally, Bell's and anxiety disorder have been linked as frequent comorbidities.[2]

CASE REPORT

A 23-year-old African American female presented to the Illinois Eye Institute with an inability to close her left eye and frequent irritation for 1.5 months. She denied any recent illness, history of vascular systemic conditions, or other neurologic symptoms. The patient was 6 months pregnant and being monitored for preeclampsia by her OB.

The patient's entering visual acuities were 20/20 OD, 20/25 OS (PH 20/20 OS). Pupils were equal, round, reactive, (-)APD OD and OS. She was full to finger count on confrontations and demonstrated a full range of motion without restrictions on motilities. Pertinent clinical findings included 2+ inferior PEE OS; slit lamp and fundus examination were otherwise unremarkable.

Cranial nerve VII testing revealed left-sided facial weakness. The patient was unable to fully raise/wrinkle left eyebrow, completely close lid or resist lid opening (Figure 1), nor puff out left cheek or fully smile. Assessment of cranial nerves I, V, and VIII-XII were all normal and symmetric. During patient education, the patient became upset, exhibited rapid breathing, and had difficulty speaking.

RESULTS

The patient was diagnosed with Bell's Palsy. She was prescribed preservative-free artificial tears every 2-4 hours and a nighttime ointment. Because she was pregnant, hyperventilating, and unable to calm herself, emergency medicine services were called. The patient was closely monitored while awaiting response. She was able to calm herself and denied ambulance transportation. She was released to herself and encouraged to discuss the Bell's palsy and suspect anxiety attack with her OB. At her 2-week follow-up examination, she reported relief of symptoms with use of both the artificial tears and nighttime ointment. Additionally, she had noticed progress in her left lid closure (Figure 2). Per the patient, her OB concurred with the Bell's diagnosis and reviewed mental health services.

FIGURE 1
Initial presentation. Patient asked to look in primary gaze with eyes open (top) then asked to squeeze lids shut (bottom).

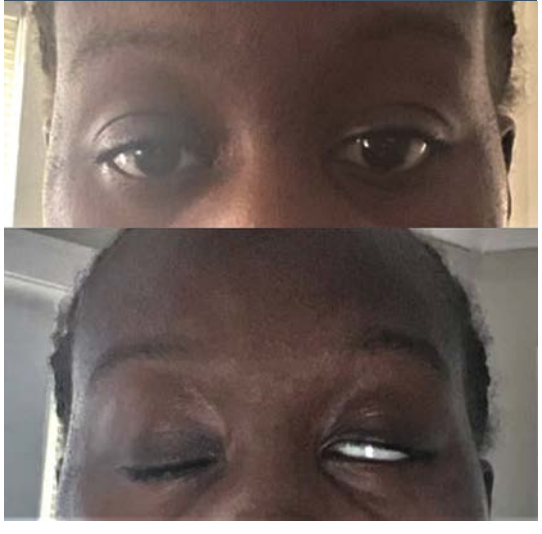


FIGURE 2
Follow-up appointment 2 weeks later. Patient asked to squeeze lids shut.

DISCUSSION

Bell's palsy is a diagnosis of exclusion. Bilateral presentation, involvement of multiple cranial nerves, or other neurologic symptoms call for urgent referral to rule out other life-threatening conditions. Most patients gradually recover within a 6-month period. Clinical practice guidelines recommend oral steroids within 72 hours of onset (with optional combination anti-viral treatment) and eye protection with close monitoring of the ocular surface. In patients with severe lagophthalmos, invasive options include botulinum injections, temporary tarsorrhaphy, or insertion of an upper lid weight.[1] In this case, no oral therapy was initiated because the patient presented outside of the 72-hour window.

Facial paralysis can be impactful on a patient's psychological well-being. Patients may feel stigmatized due to visible facial asymmetry and diminished facial expression. Individuals with acquired facial paralysis often report feelings of depression and anxiety.[3] It is our responsibility to counsel on resources and refer to mental health specialists when appropriate.

CLINICAL PEARLS

- It is crucial to rule-out other cranial nerve involvement and inquire about possible viral etiology, vascular systemic conditions, and other neurologic symptoms.
- Supportive care is critical for the prevention of corneal complications secondary to lagophthalmos.
- This case demonstrates the psychosocial impact of Bell's palsy. Patients should be educated about counseling services to better cope with the emotional challenges of facial paresis.

REFERENCES

1 Baugh RF, Basura GJ, Ishii LE, et al. Clinical practice guideline: Bell's palsy. Otolaryngol Head Neck Surg. 2013 Nov;149(3 Suppl):S1-27. doi: 10.1177/0194599813505967. PMID: 24189771.
2 Tseng CC, Hu LY, Liu ME, et al. Bidirectional association between Bell's palsy and anxiety disorders: A nationwide population-based retrospective cohort study. J Affect Disord. 2017 Jun;215:269-273. doi: 10.1016/j.jad.2017.03.051. Epub 2017 Mar 27. PMID: 28359982.
3 Bogart KR. Socioemotional functioning with facial paralysis: Is there a congenital or acquired advantage? Health Psychology, 2019; DOI: 10.1037/hea0000838

CONTACT

Melissa Caceres, OD
mcaceres@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Topical Timolol and Prednisolone Acetate vs Timolol alone in the Treatment of Pyogenic Granulomas

Thomas Collins OD • Raman Bhakhri OD, FAAO • Harneet Randhawa OD, FAAO • Mallory McLaughlin OD, FAAO

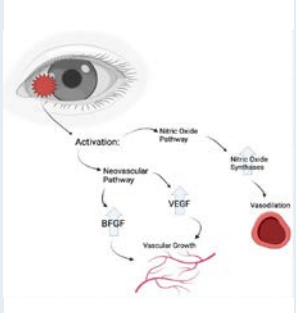
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Pyogenic granulomas are benign, acquired, vascular lesions that appear on the skin, subcutaneous, and submucosal tissue. Etiology involves trauma or chronic inflammation. Tissue injury causes activation of neovascular and nitric oxide pathways which combine in formation of the lesion. This case report compares and contrasts the efficacy of differing treatments in the management of pyogenic granulomas: prednisolone acetate combined with timolol versus timolol alone.

DIAGRAM 1
Pathophysiology of pyogenic granulomas



CASE PRESENTATION

Two patients present to Urgent Care with pyogenic granulomas. First patient, JW, presents with a large, elevated pyogenic granuloma at the nasal limbus OD secondary to macular hole surgery repair. Patient is asymptomatic to lesion. Second patient, SF, presents with an inflamed pyogenic granuloma on the caruncle OS due to chronic inflammation, secondary to trichiasis and dry eye. Patient reports redness and irritation associated with lesion.

TREATMENT AND MANAGEMENT

Patient JW is treated with topical timolol 0.5% BID OD and followed every 1-2 weeks to monitor changes. Patient SF is treated with topical prednisolone acetate 1% QID OS and topical timolol 0.5% BID OS and followed every 1-2 weeks for changes.

Patient JW at 2-week follow up exhibited minimal reduction in lesion elevation but no appreciable change in size. No changes in symptoms or intraocular pressure were noted. At 4 week follow up, lesion exhibited a minimal increase in size. Due to the recalcitrant nature of lesion, surgical excision was offered and scheduled as treatment.

Patient SF at 2-week follow up exhibited decrease in lesion size, elevation, and inflammation. Patient noted improvement in symptoms and no change sin intraocular pressure were noted. At 4 week follow up, lesion exhibited complete resolution in size, elevation, and inflammation. Patient notes complete resolution of symptoms. Patient to stop both topical timolol and prednisolone. At 6 week follow up no reoccurrence noted.

FIGURE 1A
Patient JW, large elevated vascularized lesion at nasal limbus, OD.

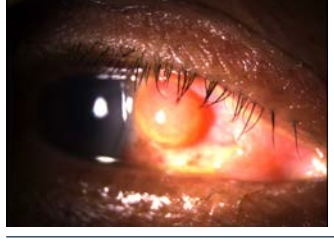


FIGURE 1B
Patient SF, elevated, vascularized, inflamed lesion at nasal caruncle, OS.

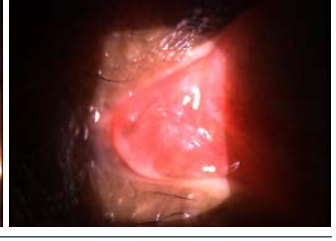


FIGURE 2A
2-Week follow up: Minimal reduction in lesion elevation was shown. No appreciable reduction in lesion size noted.

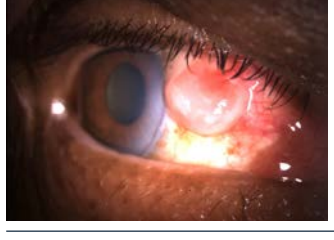


FIGURE 2B
2-Week follow up: Reduction in lesion size, elevation, and inflammation noted.

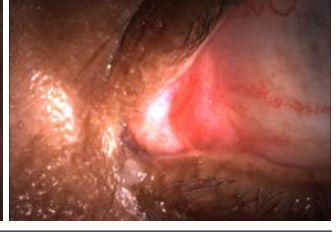


FIGURE 3A
4-Week follow up slight increase in lesion size and elevation noted.

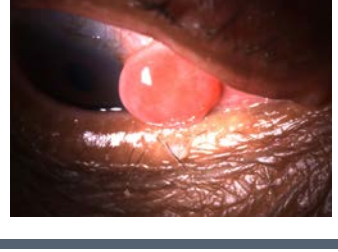
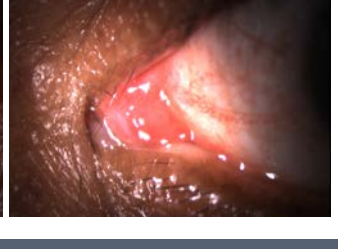


FIGURE 3B
4-Week follow up complete resolution of lesion noted.



DISCUSSION

Recent research shows that topical timolol is effective in resolution of pyogenic granulomas. Current proposed mechanisms state that beta-blockers cause vasoconstriction within capillaries supplying the lesion. Additionally, inhibition of vascular grown factors is also noted leading to eventual apoptosis of cellular tissue.

Topical corticosteroids as treatment for pyogenic granulomas has been standard of care for many years. The anti-inflammatory nature of steroids causes desired reduction of inflammatory molecules and leads to resolution of the lesions. However, topical steroid usage presents notable side effects. Moreover, use of topical corticosteroids in certain populations such as pediatric patients and steroid responding patient poses certain risks. Combination therapy was used in patient SF to determine the efficacy of treatment of pyogenic granulomas via two mechanisms of action.

CONCLUSION

Topical timolol and prednisolone acetate combined may be an effective first line treatment for conjunctival pyogenic granulomas, especially for patients who prefer a noninvasive alternative to treatment. In patient JW, timolol monotherapy has shown minimal reduction in lesion elevation and no reduction in size. While not as effective in this case, timolol should be considered as treatment for certain populations due to a more favorable safety profile. Patient SF treated with combination therapy showed improvement in as early as 2-4 weeks. Both topical timolol and prednisolone acetate, alone or in combination, should be considered as treatment.

REFERENCES

Available upon request.

CONTACT

Thomas Collins, OD • TCollins@ico.edu

Table of Contents

Horizontal Gaze Palsy and Facial Paralysis Secondary to Cocaine Consumption

Danielle Drozd, O.D.
Jesse Brown VAMC, Chicago, IL

BACKGROUND

The paramedian pontine reticular formation (PPRF) is the supranuclear relay center for conjugate horizontal eye movements. It is located in the pons of the brainstem adjacent to the facial fascicules, abducens nucleus, and medial longitudinal fasciculus (MLF). The PPRF receives afferent impulses from the frontal eye field & the parietal eye field. Efferent fibers project to the ipsilateral abducens nucleus & contralateral oculomotor nucleus through the MLF, stimulating both eyes to move horizontally.

The paramedian pontine area of the brainstem is supplied by the paramedian branches of the basilary arteries. Disruption to this blood supply can cause damage to the PPRF and surrounding structures.

Cocaine can lead to both ischemic & hemorrhagic strokes. Cocaine-induced ischemic strokes may affect both anterior & posterior circulation. The exact mechanism is uncertain, but potential causes include vasospasm, cerebral vasculitis, enhanced platelet aggregation, cardioembolism, and hypertensive surges associated with altered cerebral autoregulation and cerebral blood flow. Contaminants that are often mixed with the cocaine may contribute to the effects seen and influence the underlying pathophysiology. The onset of symptoms is usually immediate or within 3 hours of cocaine use.

CASE REPORT

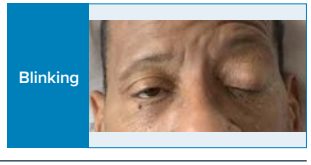
74-year-old African American Male with blurry vision OS, temporary binocular, horizontal diplopia, & right sided facial weakness first noticed 3 days after smoking cocaine.

Ocular hx: VS Cataracts OU
Physical: Neck anterocollis/right torticollis long-standing since 1993, Right lower facial asymmetry first noted 10/2002.
Medical hx: H/o lacunar infarct of right basal ganglion (3/2017), HTN, Hypercholesterolemia, Vitamin D deficiency, Chronic microcystic/normocytic anemia, Abdominal aortic aneurysm, COPD, Schizoaffective disorder with tardive dyskinesia, Cognitive dysfunction, Seizure disorder, Hep A & B, and h/o syphilis infection, h/o positive PPD, h/o CMV infection, h/o HVZ, h/o COVID-19 (5/2021)
Social Hx: Cocaine and EtOH abuse
Medications: Acetaminophen, Heparin, Amlodipine besylate, Cholecalcif, Cyanocobalamin inj, Albuterol, Quetiapine fumarate, Valbenazine, Divalproex sodium, Ferrous sulfate

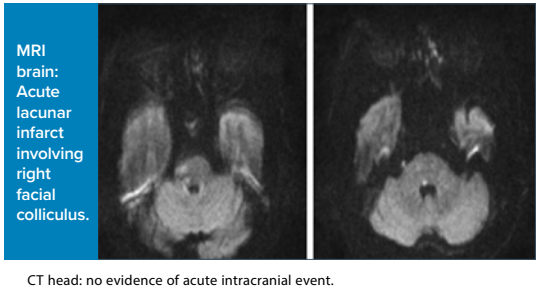
INITIAL EXAM (7/27/21)

VA cc: OD 20/40, OS 20/30, PHNI OU
Pupils: PERRLA (-) APD OU
CVF: FTFC OD, OS
CT sc & cc: R hyperphoria in primary, up, down, & left gaze.
EOMs: Abduction deficit OD, Adduction deficit OS.

Cranial Nerve testing:
CN V, VIII, X, XI, XII - normal & symmetric right & left.
CN VII - right lower & upper face droop, loss of nasolabial fold on right side. Upper & lower right sided weakness.
SLE: Right lower lid ectropion & lagophthalmos without ptosis.



Radiology studies:
MRI Brain w/o contrast: Acute lacunar infarct involving right facial colliculus. DWI signal along right side of pons.



CT head: no evidence of acute intracranial event.
CTA Head/Neck: no evidence of hemodynamically significant stenosis.
Neurological assessment: No motor weakness of lower or upper extremities.

DIFFERENTIAL DIAGNOSIS

- Right gaze palsy & right fascicular CN VII palsy
- Left Internuclear Ophthalmoplegia
- One and a half syndrome
- Partial left CN III palsy with right CN VI palsy

Final Diagnosis: Right gaze palsy with right fascicular facial palsy secondary to CVA involving right PPRF.

TREATMENT AND MANAGEMENT

- Refresh preservative-free ATs q2h OU & Lacrilube qHS OU
- Aspirin 81mg Qdaily and Atorvastatin 40mg Qdaily
- Outpatient psychiatric therapy for substance abuse and mental health
- Continued care with neurology
- Social work arranged transportation and home health services to optimize patient's compliance with outpatient appointments.

FOLLOW-UP (09/08/21)

Cc: Improved vision OS, endorses difficulty seeing objects on right side. Denies any diplopia.
VAs cc: OD 20/25, OS 20/30, PHNI OU
Pupils: PERRLA (-) APD OU
CVF: FTFC OD, OS
CT cc: R hyperphoria and 4pd esophoria.
EOMs: R gaze palsy
Cranial Nerve testing:
CN VII - right lower face droop with loss of nasolabial fold on right side, right sided weakness lower>upper.
SLE: Right lower lid ectropion & lagophthalmos without ptosis.

DISCUSSION AND CONCLUSION

Approximately 28% of vertebrobasilar system strokes are due to paramedian pontine infarcts. Nuclear infarctions usually involve adjacent tegmental structures, such as the facial nerve fascicules causing ipsilateral peripheral facial paralysis. Acute paramedian pontine infarcts typically present with faciobrachial dominant hemiparesis with dysarthria, somatosensory disturbance, and horizontal gaze abnormalities (abducens nerve palsy, INO, horizontal gaze palsy, or one-and-a-half syndrome).

In managing these patients, it is important to address all risk factors to prevent recurrence. In addition to cocaine abuse, other risk factors for a stroke present in this patient include HTN and hypercholesterolemia. It is also important to monitor these patients for other ocular manifestations. Optometrists should be able to efficiently evaluate all 12 cranial nerves when suspecting a stroke. This skill can help localize the lesion for a quicker diagnosis when referring for additional testing.

Follow-up care for these cases is important to examine the ocular surface and maintain aggressive ocular lubrication to avoid exposure keratopathy as prognosis for recovery is guarded.

REFERENCES

1. Bae, Y., et. al. (2013). Pathologic Correlation with MR Imaging. RadioGraphics, 33(1), 47-59.
2. Treadwell, S., & Robinson, T. (2007). Cocaine use & stroke. Postgraduate medical journal, 83(980), 389–394.
3. Kennard, C., & Leigh, R. (2011). Nuclear, internuclear, & supranuclear ocular motor disorders. Neuro-ophthalmology (102), 319-331.
4. Kataoka, S., et. al, (1997). Paramedian Pontine Infarction. AHA Journal. 28(4), 809–815. https://doi.org/10.1161/01.STR.28.4.809

CONTACT

Danielle Drozd, O.D.
ddrozd95@gmail.com

Table of Contents

Acute Retinal Necrosis Leading to a Diagnosis of Herpes Simplex Virus 2

Randi-Jo Francis, OD • Heather McLeod, OD, FAAO • Harneet Randhawa, OD, FAAO • Shaun Ittiara, MD
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Acute retinal necrosis is a viral inflammatory condition with no race or gender predilection and can occur in both healthy and immunocompromised individuals. The prevalence is 0.5-0.63 cases per million and it usually affects patients aged 20-60 years old. The etiology from most common to least includes varicella zoster virus, herpes simplex 1 and 2, cytomegalovirus, and Epstein-Barr virus. This case report reviews acute retinal necrosis due to herpes simplex virus 2. Prompt diagnosis and treatment results in good visual prognosis.

CASE PRESENTATION

A 36-year-old African American female presents to Urgent Care with complaints of ocular pain with associated migraine, photophobia, floaters, and decreased vision in the right eye with onset 1 week prior. Past ocular history was unremarkable, and past medical history positive for migraines in which she treated with Excedrin.

TREATMENT AND MANAGEMENT

Lab results were obtained which indicated she was positive for Herpes Simplex Virus 2. She was treated with valacyclovir 2g TID po x 3 days then 1g po thereafter, Pred Forte Q1H OD, cyclopentolate 1% TID OD, and aspirin 81 mg po. Visual acuity returned to 20 /20 OD and OS with unremarkable slit lamp examination. The inferior area of retinitis showed granular pigmentation which indicated improvement with medical management.

FIGURE 1
Initial examination pertinent findings

OD		OS
20/70+2 PHNI	VA(sc)	20/20
1+ diffuse injection	Conjunctiva	white and quiet
stellate KP's inferior	Cornea	clear
2+ cells, (-)flare, (-) hypopyon	A/C	deep and quiet
(+)cells	Vitreous	Clear
inferior: clumps of vitreous cells, retinal hemorrhages and retinitis	Periphery	flat x 360 degrees, no RD, no holes

FIGURE 3
B-Scan with overlying A-scan indicating vitreous cells OD

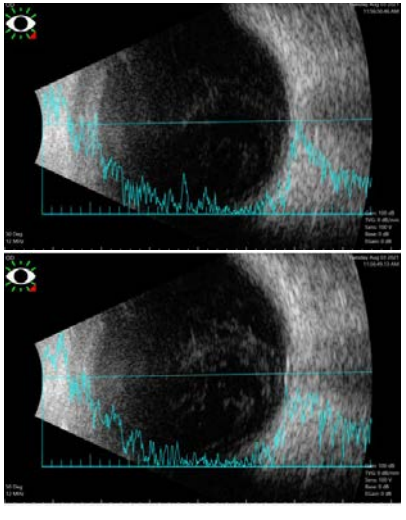


FIGURE 2
Inferior retinitis with adjacent hemorrhage OD

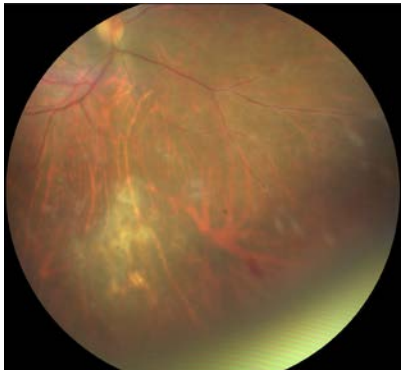
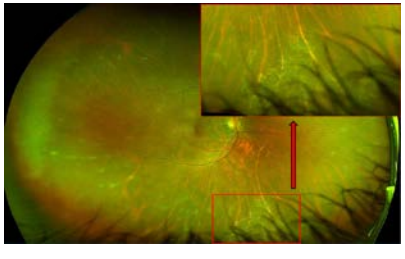


FIGURE 4
Inferior retinitis with granular pigmentary changes signifying improvement



DISCUSSION

According to the diagnosis by the American Uveitis Society, there are 5 main criteria for diagnosing this condition: at least one foci of peripheral retinal necrosis, circumferential spread, rapid progression in the absence of anti-viral therapy, occlusive vasculopathy with arterial involvement, and prominent inflammatory reaction in the anterior chamber and vitreous. This condition is typically unilateral but can become bilateral in 9-33% of cases. Acute retinal necrosis has the highest rate of retinal detachments compared to all other causes of uveitis, often resulting in poor visual acuity. Other complications of this condition include optic atrophy, cystoid macular edema, macular hole, and epiretinal membranes.

CONCLUSION

Acute retinal necrosis is a rare, viral uveitis syndrome with an aggressive inflammatory course that can be visually devastating. Prompt recognition and treatment is essential to provide the best visual prognosis, prevent complications, and contralateral eye involvement. An important factor in patient management is to counsel patients regarding their prognosis and long-term care. Due to the rarity of this condition, further studies are necessary to outline disease protocols.

REFERENCES

Available upon request

CONTACT INFORMATION

Randi-Jo Francis, OD
Rfrancis@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Review of Pentacam Corneal Tomography Normative Data on Black and LatinX Children Seen in a School-based Vision Clinic

Jennifer S. Harthan, OD, FAAO, FSLS · Xiaohua Zhuang, PhD, FAAO · Sandra S. Block, OD, M Ed, MPH, FAAO, FCOVD
S. Barry Eiden, OD, FAAO · Andrew Morgenstern, OD, FAAO

International Keratoconus Academy
Of Eye Care Professionals

ICO

INTRODUCTION

- Keratoconus (KC) is a bilateral and often asymmetric non-inflammatory disease characterized by progressive corneal thinning and protrusion [1,2].
- Current literature does not report on the prevalence or incidence of KC in a minority pediatric population.
- Failure to detect and diagnose KC in children may lead to long-term vision complications and contribute to poorer academic success.
- This study screened a low income, underserved, primarily Black and LatinX population over the period of three years by integrating corneal tomography into the standard comprehensive eye exam.
- The primary goal of the study was to report on the normative data of several Pentacam indices for the diagnosis of KC and monitoring the progression of the disease in a minority pediatric population.

METHODS

- This was a prospective observational single center study approved by the Illinois College of Optometry's IRB.
- Children aged 3 to 18 years who presented to the Princeton Eye Clinic within the Chicago Public Schools were invited to participate.
- In addition to comprehensive eye examinations with binocular and accommodative testing, image capture from the Pentacam (Ocular Optikgrate GmbH, Germany) tomographer was taken on each eye.
- The two indices utilized for screening for high risk of keratoconus from the Pentacam were the Belin ABCD index and the Belin/Ambrosio BAD3 index.
- Statistical analysis was performed with SPSS version 25.0 (IBM Corp., Armonk, NY, USA).

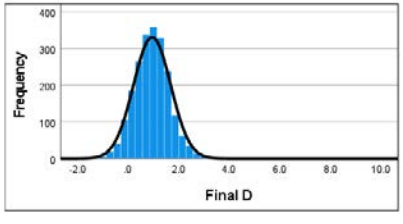
RESULTS

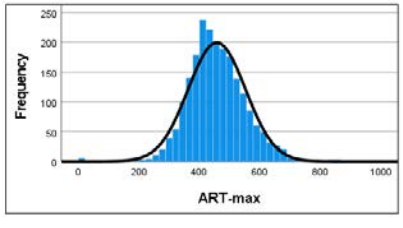
- There were 2133 subjects screened and the right eye data was analyzed.
- Over half of the subjects, 55.9% (n=1192) were female and 44.10% (n=941) were male.
- The mean corneal astigmatism of the sample was -1.39D + 1.45.
- The sample consisted of 39.80% (n=842) of subjects between the ages of 13-18, 57.20% (n=122) between the ages of 7-12, and 3.30% (n=71) between the ages of 3-6.
- This study mainly focused on two minority groups, Black (n=1370, 64.2%) and LatinX (n=763, 35.8%).

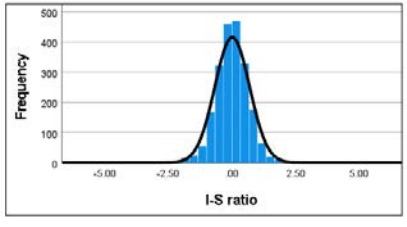
TABLE 1
Descriptive Statistics

	Count	Percentage		Mean	SD	Percentile 25th	50th	75th
Age (3 - 6)	71	3.30%	Sphere	0.01	2.30			
Age (7 -12)	1220	57.20%	Cylinder	-1.39	1.45			
Age (13 - 18)	842	39.50%	Axis	112.65	70.24			
Black	1370	64.20%	FinalD	0.95	0.74	0.49	0.94	1.39
LatinX	763	35.80%	ART-max	457.34	94.83	397	450	513
F	1192	55.90%	I-S Ratio	0.01	0.68	-0.39	0	0.4
M	941	44.10%	Asymmetry	1.91	111.15	-7	-1	5
Total	2133							

FIGURES 1-3
Histograms for the Pentacam Indices







The distributions of the Pentacam indices show long tails with extreme values. These extreme values (above or below 3 SD from the mean) are considered as outliers, which were excluded from the subsequent analysis to look at the effect of Race.

- The means of the Pentacam indices for the Black individuals were 0.94 + 0.66 for FinalD, 459.93 + 85.56 for ART-max, 0.03 + 0.56 for I-S ratio, and -0.98 + 7.69 for Asymmetry; and for the LatinX individuals were 0.91 + 0.63 for FinalD, 453.68 + 81.33 for ART-max, -0.03 + 0.56 for I-S ratio, and -1.55 + 8.26 for Asymmetry (See Table 2).

TABLE 2
Means and standard deviations of the tomography measurements by race

	Study Cohort	Black	LatinX
FinalD	0.93 (0.67)	0.94 (0.66)	0.91 (0.63)
ART-Max	456.92 (87.68)	459.93 (85.56)	453.68 (81.33)
I-S Ratio	0.005 (0.60)	0.03 (0.56)	-0.03 (0.56)
Asymmetry	-1.17 (15.77)	-0.98 (7.69)	-1.55 (8.26)

- A statistically significant difference was observed between the two minority groups for I-S ratio (p=0.008), but not for FinalD, ART-max or Asymmetry.

CONCLUSION

- Screening for keratoconus in the pediatric population is important as the younger the onset of keratoconus, the poorer and faster the prognosis, the increased likelihood of a penetrating keratoplasty (PK), and a higher risk of future PK rejection.
- This study presents the normative data on several Pentacam indices for Black and LatinX children for the first time.
- Results of this study may provide helpful insight to aid in the detection and diagnosis of KC in children.
- Longitudinal studies are needed to monitor the subjects over time to see how many will convert to the diagnosis of keratoconus and what factors will contribute to the disease.

REFERENCES

1. Rabinowitz, Y.S., et al., Accuracy of ultrasonic pachymetry and videokeratography in detecting keratoconus. J Cataract Refract Surg. 1998.24(2):196-201.
2. Davidson, A.E., et al., The pathogenesis of keratoconus. Eye (Lond). 2014.28(2):189-95.

ACKNOWLEDGEMENTS

This study was supported by the International Keratoconus Academy and Oculus by allowing utilization of a Pentacam at the Chicago Princeton Eye Clinic.

Jennifer S. Harthan, OD, FAAO, FSLS
JHarthan@ico.edu

Table of Contents

Comparison of Intracanalicular Dexamethasone Insert 0.4mg to Loteprednol Etabonate Ophthalmic gel 0.38% in Patients with Keratoconus, Allergies, and Dry Eye

Jennifer S. Harthan, OD, FAAO, FSLS · Chelsea Bradley, OD, FAAO · Elyse Nylin - Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

- Keratoconus (KC) is a bilateral, asymmetric, non-inflammatory corneal ectasia and is associated with not only decreased visual acuity, but also reduced tear film quality [1].
- The TFOS DEWS II Report has included allergic conjunctivitis as a risk factor for dry eye disease [2].
- Steroids play an important role in in the treatment of both allergic conjunctivitis and dry eye disease.
- The purpose of this study is to determine if a physician administered intracanalicular dexamethasone insert improves the signs and symptoms of ocular allergy and dry eye disease in KC patients compared to the use of topical loteprednol etabonate ophthalmic gel 0.38%.

METHODS

- Patients > 18 years of age with bilateral keratoconus wearing gas permeable contact lenses who presented for their routine visit with signs and symptoms of dry eye and allergies were asked to participate in the study.
- After screening and informed consent was obtained, one eye was randomized to receive the dexamethasone insert at the screening visit.
- The fellow eye was prescribed loteprednol etabonate ophthalmic gel 0.38% following a 4,3,2,1 weekly taper.
- This project was approved by the Illinois College of Optometry's IRB.
- Descriptive statistics are presented.

RESULTS

- The study was completed by 18 individuals with keratoconus (36 eyes) wearing bilateral gas permeable contact lenses.
- The average age of subjects at the time of the study was 48.4 ± 14.8 (range: 24-74 years).
- 10 females and 8 males participated.
- The mean overall OSDI score of all participants at the baseline screening exam was 48.6 ± 15.9 and improved at the final visit to 33.7 + 12.7 (p<0.005).

FIGURE 1 - Osmolarity being measured

FIGURE 2 - MMP-9 levels being measured

FIGURE 3 - Inferior palpebral conjunctiva with hyperemia and papillae

FIGURE 4 - Intracanalicular dexamethasone being inserted

- There was a statistically significant improvement in papillary response (p=0.0002), itching (p<0.005), osmolarity (p=0.0019), MMP-9 levels (p<0.005), and corneal staining (p<0.005) for eyes who received the intracanalicular insert from baseline after 1 month of follow up.
- There was also a statistically significant improvement in papillary response (p=<0.005), itching (p<0.005), osmolarity (p<0.005), MMP-9 levels (p<0.005), and corneal staining (p=0.0004) for eyes who received the loteprednol etabonate gel from baseline after 1 month of follow up.
- There was no change for either group in tear-break-up time, meibomian gland dysfunction, or intraocular pressure

TABLE 1 - p values of clinical signs from baseline after 1 month follow up of treatment

	Dexamethasone Insert	Loteprednol Etabonate Ophthalmic Gel
Papillary Response	0.0002	<0.005
Itching	<0.005	<0.005
Osmolarity	0.0019	<0.005
MMP-9 Levels	<0.005	<0.005
Corneal Staining	<0.005	0.0004
Tear-Break-Up-Time	0.009	0.667
Intraocular Pressure	0.607	0.231

CONCLUSION

- The intracanalicular dexamethasone insert demonstrated an improvement in signs and symptoms of dry eye and allergy in patients with keratoconus.
- Drug delivery platforms are an innovative and exciting advancement in eyecare.
- They may allow patients to eliminate topical medications which are generally associated with lack of compliance and difficulty of use and may be just as efficacious and safe.

REFERENCES

1. Walters TR, et al. Efficacy and Safety of Sustained Release Dexamethasone for the Treatment of Ocular Pain and Inflammation after Cataract Surgery: Results from Two Phase 3 Studies. J Clin Exp Ophthalmol. 2016;7(4):572.

2. Stapleton F, et al. TFOS DEWS II Epidemiology Report. Ocul Surf. 2017 July;15(3):334-365.

ACKNOWLEDGEMENTS

This study was an investigator-initiated trial sponsored by Ocular Therapeutix.

CONTACT

Jennifer S. Harthan, OD, FAAO, FSLS
JHarthan@ico.edu
www.ico.edu

Table of Contents

Bilateral 360 Choroidal Detachments in Ocular Syphilis

Hulisz, Adam, OD
Jesse Brown VAMC

BACKGROUND

Syphilis is frequently termed the "great masquerader" as it presents much like other entities such as VKH disease. This confusion causes an increase in cost to the patient and delay of proper treatment. Syphilis can present as inflammation in only one segment of the eye or in all segments. The signs that have a more characteristic presentation to syphilis are superficial retinal precipitates that are creamy, white in appearance, which was not identifiable with the patient in this case report.

BASELINE FINDINGS

Patient demographics: 71-year-old African American male
Ocular history: Normal tension glaucoma suspect and history of fist trauma OD 10 years prior
Medical history: GERD, erectile dysfunction and an abdominal gunshot wound with an exploratory laparotomy
Medications: sildenafil, pantoprazole, acetaminophen, and fluticasone
Allergies: No known drug allergies

INITIAL PRESENTATION

Chief complaint: new floaters OU that is accompanied by flashes of light in his temporal vision for one month

TREATMENT AND MANAGEMENT

Initially, patient began Durezol QID OU and labs were ordered. The patient was subsequentially admitted to the hospital for a course of intravenous penicillin and completed a 14-day course of penicillin via peripherally inserted central catheter (PICC) line.

1 Week Follow Up Visit in Conjunction with Retinal Specialist
Resolution of symptoms per patient history. Resolution of conjunctival injection and improvement of anterior chamber reaction, vitreous cell, choroidal detachments. Durezol was decreased to BID OU.

Clinical findings at presentation.

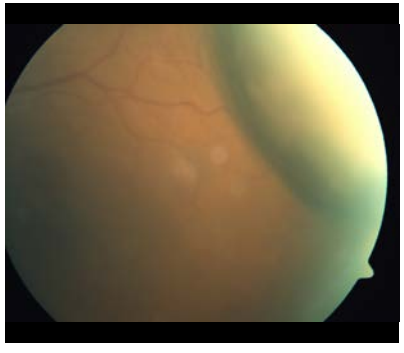
OD		OS
20/40 (20/30)	**BVA (PAP)**	20/50 (20/20)
NL	**Pupils, EOMs, CVFs**	NL
Diffuse 1+ conjunctival injection	**Conjunctiva**	Diffuse 1+ conjunctival injection
1+ punctate epithelial erosions; tr-1+ small, focal, white endo KPs; tr endothelium pigment	**Cornea**	1+ punctate epithelial erosions; tr-1+ small, focal, white endo KPs; tr endothelium pigment
Shallow, 1-2+ mixed cell	**AC**	Shallow, 2-3+ mixed cell
17mmHg	**IOP**	17mmHg
2-3+ NS, diffuse 1+ pigment on ant capsule	**Lens**	2-3+ NS, diffuse 1+ pigment on ant capsule
1-2+ pigment cell, 1+ WBC	**Vitreous**	1-2+ pigment cell, 2+ WBC
0.40v/0.40	**C/D**	0.50v/0.55
NL	**ONH, macula, vessels**	NL
Lobular, choroidal detachments 360 encircling posterior pole	**Periphery**	Lobular, choroidal detachments 360 encircling posterior pole

OD, OS, Drawing on day of initial presentation

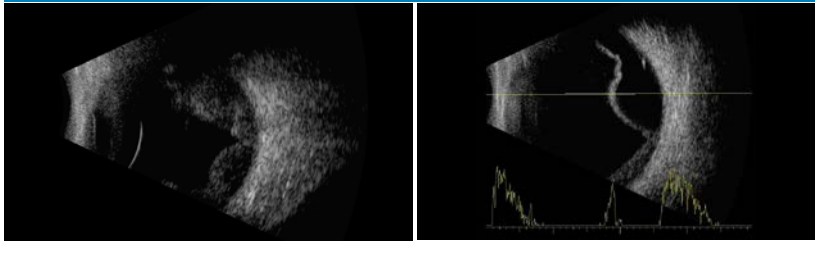
Laboratory/Radiology Testing

ACE	Normal
QuantiFERON TB	Normal
ANA	Normal
ANCA	Normal
HLA-B27	Normal
Chest X-Ray	Normal
Lysozyme	Abnormally high 13.3mcg/mL
Syphilis CIA/RPR	Reactive/RPR 1:128 titer

OS Fundus Photo



OD, OS, B-Scan Photo



DISCUSSION AND CONCLUSION

Choroidal effusion is an abnormal accumulation of fluid in the suprachoroidal space. The most common differential diagnoses are VKH, hypotony, and choroidal effusion syndrome. This patient was diagnosed with syphilis that presented with bilateral choroidal detachments that has not been previously noted in the literature. Although syphilis may be thought of as a rare condition, there is evidence of a current increase in its prevalence within the United States. As primary syphilis manifests with a rash that ultimately resolves without treatment, patients may not receive appropriate medical treatment. Tertiary stage syphilis may present in different organs including the eyes. Being able to identify typical and atypical presentations of syphilis is important for achieving the correct diagnosis. Through clinical findings upon examination and serology testing, syphilis can be properly detected. Previous reports of patients with higher RPR titers and absence of ocular pain and photophobia also had a human immunodeficiency virus (HIV) coinfection. The results of the HIV testing are still pending for this patient. Should the HIV testing reveal co-infection, the patient will then be placed on appropriate highly active antiretroviral therapy (HAART). This report aims to provide another presentation of ocular syphilis that has not been previously documented.

REFERENCES

1. Lin YC, Lo KJ, Chen SJ, Hwang DK. Ocular syphilis mimicking Vogt-Koyanagi-Harada disease. Taiwan J Ophthalmol. 2019;9(4):271-275. Published 2019 Dec 13. doi:10.4103/tjo.tjo_63_19
2. O'Keefe GA, Rao NA. Vogt-Koyanagi-Harada disease. Surv Ophthalmol. 2017;62(1):1-25. doi:10.1016/j.survophthal.2016.05.002
3. Davis JL. Ocular syphilis. Curr Opin Ophthalmol. 2014;25(6):513-518. doi:10.1097/ICU.0000000000000099
4. Fu EX, Geraets RL, Dodds EM, et al. Superficial retinal precipitates in patients with syphilitic retinitis. Retina. 2010;30(7):1135-1143. doi:10.1097/IAE.0b013e3181cdf3ae
5. Tomita H, Sato S, Matsuda R, et al. Serum lysozyme levels and clinical features of sarcoidosis. Lung. 1999;177(3):161-167. doi:10.1007/pl00007637
6. Ormerod LD, Puklin JE, Sobel JD. Syphilitic posterior uveitis: correlative findings and significance. Clin Infect Dis. 2001;32(12):1661-1673. doi:10.1086/320766.

CONTACT

Hulisz, Adam, OD
AHulisz@eyedoc.ico.edu
www.ico.edu
820 S. Damen Ave, Chicago, IL 60612.

Table of Contents

Hypotony Maculopathy Secondary to Surgical Iridectomy During Phakic Intraocular Lens Implantation

Devon Kennedy, OD, Raman Bhakhri, OD, FAAO, Lindsey Kennedy, OD
Westlake Village, CA

Background

Hypotony maculopathy is a rare postoperative complication from phakic intraocular lens implantation. Clinically, hypotony is defined as vision loss due to low IOP. Numerically, it can also be defined as any IOP less than 6.5 mmHg. Most commonly, hypotony occurs after ocular surgery, a traumatic ocular event, or inflammation. This can lead to an increase in aqueous humor outflow or reduction in aqueous humor production leading to the collapse of the scleral wall. This case illustrates identification and treatment of hypotony maculopathy in which visual recovery led to an excellent post-surgical outcome.

Case Report

Patient History

- 35-year-old Caucasian male
- Emergency Oncall CC: Patient reported a new onset of epiphora with notable superior ocular pain OS, occurring within 48 hours of undergoing implantable collamer surgery with concurrent surgical iridectomy OU
- Med HX: Unremarkable
- Ocular HX: ICL surgery OU
- Medications: brimonidine tartrate 0.2% TID OU and prednisolone phosphate 1%- gatifloxacin 0.5% TID OU

Exam Findings

48-hour Postoperative Exam

Visual Acuity:
OD: 20/20
OS: 20/60 PH20/30 (BCL in place)
Slit Lamp examination:
OD: mild superior corneal edema, suture at incision site, trace cells, PI (patency undetermined due to edema), ICL with good vault.
OS: *1+ central folds, 2+ cells with shallow chamber, PI (patent) at 12 o'clock position, ICL with good vault, (+) Seidel sign; UDFE: retina grossly attached*
Goldmann: 2mmHg OS (BCL removed)

Plan: Replaced BCL, add Timolol QAM OS and Azopt BID OS, all other gtts continued; RTC in 24 hours for IOP check

72-hour Postoperative Exam

Visual Acuity:
OD: 20/20
OS: 20/100 PH20/30-- (BCL in place)
Slit Lamp examination:
OD: mild superior corneal edema, suture at incision site, trace cells, PI (patency undetermined due to edema), ICL with good vault.
OS: *2+ central folds, 2+ cells with increased shallowing of AC, PI (patent) at 12 o'clock position, ICL with good vault, (+) Seidel sign*
Goldmann: not taken due to increased AC shallowing

Plan: Immediate suture placement OS with oncall ophthalmologist

Diagnostic Imaging

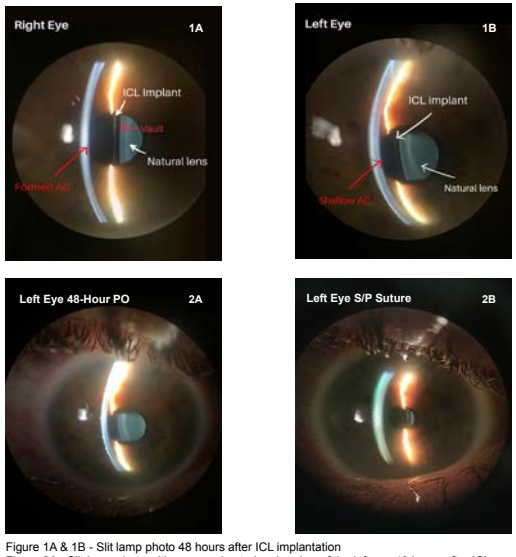


Figure 1A & 1B - Slit lamp photo 48 hours after ICL implantation
Figure 2A - Slit lamp photo with narrowed anterior chamber of the left eye 48 hours after ICL
Figure 2B - Slit lamp photo with fully formed anterior chamber 12 hours s/p suture placement OS

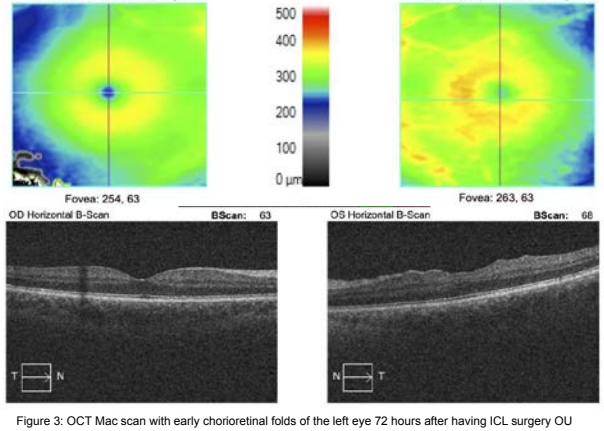


Figure 3: OCT Mac scan with early chorioretinal folds of the left eye 72 hours after having ICL surgery OU

Treatments

- Treatment is based on the etiology of hypotony with the goal of stabilizing IOP and restoring vision
- **Treatment for wound leak induced hypotony:**
  - Bandage contact lens
    - Helps to promote epithelial migration and wound healing
  - Aqueous suppressant drops
    - Decreases wound leak outflow which can help promote healing of overlying epithelium
    - Beta blockers, alpha-2 agonist, carbonic anhydrase inhibitor
  - Compression suture
- BCL and aqueous suppressant drops were used with limited improvement leading to compression suture placement for wound closure

Visual Outcomes

- Visual recovery was observed four days after compression suture placement

Visual Acuity	Goldmann Tonometry
OD: 20/20	OD: 12 mmHg
OS: 20/20	OS: 14 mmHg
OU: 20/15	

- All pressure drops and pred-gati discontinued; patient continued Prolensa for one month to reduce retinal inflammation.

Conclusion

- Always evaluate intraocular pressure and Sidel sign after any intraocular surgery
- Close follow-up and monitoring is necessary for wound leak patients
- Use a slit lamp evaluation in addition to diagnostic testing to determine urgency.
- Clear communication between the patient, surgeon, and co-managing optometrist is vital to positive visual outcomes.
- The patient had a successful ICL surgery providing the patient with 20/15 vision.
- **Clinical Pearl:** Early identification and clear communication is vital in ensuring appropriate management and positive visual outcomes

References

1. Pederson JE. Ocular hypotony. In: Ritch R, Krupin T, Shields MB, editors. The glaucomas. 2. Mosby: St. Louis; 1996. pp. 385–395.
2. Jerkins MD B, Salim MD S. Hypotony Macuulopathy. EyeWiki. https://eyewiki.aao.org/Hypotony_Maculopathy. Accessed January 17, 2021.
3. Thomas M, Vajaranant TS, Aref AA. Hypotony Maculopathy: Clinical Presentation and Therapeutic Methods. *Ophthalmol Ther*. 2015;4(2):79-88. doi:10.1007/s40123-015-0037-z
4. Costa VP, Arcieri ES. Hypotony maculopathy. Acta Ophthalmol Scand. 2007;85:586–597. doi: 10.1111/j.1600-0420.2007.00910.x
5. Gass JDM. Hypotony maculopathy. In: Bellows JC, editor. Contemporary ophthalmology, honoring Sir Steward Duke-Elder. Baltimore: Williams and Wilkins; 1972. pp. 343–366.
6. Jampel HD, Pasquale LR, Dibernardo C. Hypotony Maculopathy Following Trabeculectomy With Mitomycin C. *Arch Ophthalmol*. 1992;110(8):1049–1050. doi:10.1001/archopht.1992.01080200029011

Table of Contents

Improved Best Corrected Visual Acuity of a Moderate Refractive Amblyope by Toric Implantable Collamer Lenses

Devon Kennedy, OD, Raman Bhakhri, OD, FAAO, Lindsey Kennedy, OD
Westlake Village, CA

Background

Isoametropic amblyopia is vision loss due to high uncorrected bilateral refractive error. While more commonly seen in highly hyperopic or astigmatic patients, amblyopia can also present with greater than 6.00 diopters of myopic correction. First line treatment consists of prescribing maximal refractive spectacle correction with two or six hours of daily patching, or atropine penalization. However, there is growing evidence of improved visual acuity in adult refractive amblyopes after refractive surgery.

Case Report

Patient History

- 23-year-old Caucasian male
- CC: Patient presented to clinic for a refractive surgery consultation in order to reduce the need for contacts and glasses
- Med HX: Anxiety disorder
- Ocular HX: Refractive amblyopia OU with noncompliant patching and vision therapy
- Medications: Intuniv

Exam Findings

Preoperative Examination

Habitual Glasses
OD: -8.00 -1.50 090 20/30
OS: -12.25 -2.50 060 20/40 PHNI

Manifest Refraction:
OD: -7.50 -2.00 092 20/25
OS: -12.25 -2.50 060 20/40 PHNI

Cyclo Refraction:
OD: -7.50 -2.00 092 20/30++
OS: -11.75 -2.50 060 20/40- PHNI

Slit Lamp examination:
OD: white and quiet conjunctiva, Tr-1+ superior SPK, deep and quiet AC, round pupil, clear lens, retina attached 360.
OS: white and quiet conjunctiva, Tr-1+ superior SPK, deep and quiet AC, round pupil, clear lens, retina attached 360 with CR scars along inferior arcade.

Goldmann: 13 mmHg/14 mmHg

Plan: The patient was determined to be a good candidate for T-ICL due to adequate AC depth and presenting manifest

Day of T-ICL Surgery

Cell Count:
OD: 3263
OS: 3338

Anterior Chamber Depth
OD: 3.16 mm
OS: 3.21 mm

Lens Implanted:
OD: TMICL 12.6 -10.50/+2.0/180 (Visian® Toric ICL™)
OS: TMICL 12.6 -15.00/+2.0/150 (Visian® Toric ICL™)

Diagnostic Imaging

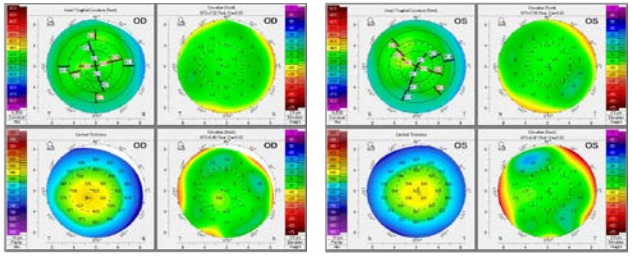


Figure 1: Pentacam corneal topography of the right and left eye taken at the patient's consultation.

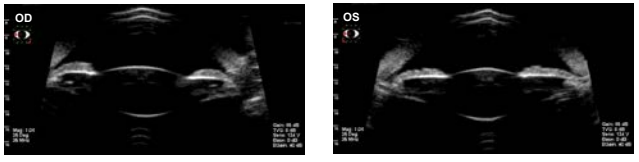


Figure 2: Ultrasound biomicroscopy (UBM) scan of the right and left eye. Scan used to determine appropriate lens sizing.

Figure 3: Lens calculations illustrating appropriate alignment of the toric implantable collamer lens for the right and left eye.

Examination	Visual Acuity	Intraocular Pressure	Slit Lamp Evaluation	Assessment & Plan
1 Day PO Exam	OD: 20/20- OS: 20/50 PH20/30	OD: 9 mmHg OS: 9 mmHg	OD: clear cornea, suture superior, tr-1+ cells, round iris, PI (patent), ICL w/ good vault. OS: clear cornea, tr-1+ cells, miotic, PI (patent), ICL w/ good vault.	Continue pred-gati TID OU and brimonidine TID OU. RTC 1 week.
1 Week PO Exam	OD: 20/20- OS: 20/25+	OD: 15 mmHg OS: 15 mmHg	OD: clear cornea, suture superior, deep and quiet, round iris, PI (patent), ICL w/ good vault. OS: clear cornea, deep and quiet, round iris, PI (patent), ICL w/ good vault.	Suture removed OD. Discontinue pred-gati OU and to use brimonidine for glare PRN. Reassurance given regarding glare. RTC 1 month.
1 Month PO Exam	OD: 20/20- OS: 20/30	OD: 14 mmHg OS: 14 mmHg	OU: clear cornea, deep and quiet, round iris, PI (patent), ICL w/ good vault.	Improved glare/halo, continue brimonidine PRN. RTC 2 months.
3 Month PO Exam	OD: 20/20- OS: 20/25-	OD: 19 mmHg OS: 20 mmHg	OU: clear cornea, deep and quiet, round iris, PI (patent), ICL w/ good vault, retina attached 360	Happy with vision, artificial tears as needed. RTC 3 months.
6 month PO Exam	OD: 20/20 OS: 20/25	OD: 20 mmHg OS: 20 mmHg	OU: clear cornea, deep and quiet, round iris, PI (patent), ICL w/ good vault.	Happy with vision. Artificial tears as needed. Annual dilated eye exam.

Table 1: Post-operative exam data evaluating visual acuity, intraocular pressure, slit lamp exam and assessment and plan.

Discussion

Refractive correction of high myopia presents a challenge when selecting an appropriate surgical procedure. While FDA guidelines currently allow up to -12.00 diopters of correction for LASIK and PRK, corneal integrity is likely to be impacted. Alternatively, ICL can treat well beyond the recommended range for keratorefractive procedures providing a high level of predictability, improved visual acuity, improved contrast sensitivity, and partial recovery of near stereopsis. Studies looking at improvement in CDVA for amblyopic eyes after ICL have shown a mean increase of 1.00 to 3.00 lines with 91.5% of eyes gaining one or more lines of visual acuity[5]. However, complications of ICL implantation should also be taken into consideration. Appropriate ICL sizing is necessary to avoid excessive or insufficient vault. Relative complications can include cataract formation (1.1%-5.9%), pigmentary glaucoma (0.4%), and endothelial cell loss (~7% loss)[2,3].

Visual Outcomes

- Toric implantable collamer lenses provided this patient with two lines of improvement compared to the pre-operative BCVA

Pre-Op Visual Acuity	6 Month Visual Acuity
OD: 20/30	OD: 20/20
OS: 20/40	OS: 20/25

Conclusion

- Traditionally, amblyopic patients have not been considered candidates for elective surgery due to fears around complications and outcomes
- On average, refractive amblyopic patients can gain 1.00 to 3.00 lines of BCVA after having refractive surgery[5,4]
- ICL is an alternative to LASIK and PRK and takes advantage of being placed closer to the nodal point
- Patients need to be thoroughly screened and educated on realistic outcomes
- **Clinical Pearls:** Refractive surgery is a promising alternative method of correction for patients with refractive amblyopia after conventional therapies have failed or for patients who are non-compliant with traditional treatment

References

1. Agca, Alper et al. "Laser in situ keratomileusis in adult patients with anisometropic amblyopia." *International journal of ophthalmology* vol. 6,3 362-9. 18 Jun. 2013, doi:10.3980/j.issn.2222-3959.2013.03.20
2. Packer M. Meta-analysis and review: effectiveness, safety, and central port design of the intraocular collamer lens. Clin Ophthalmol. 2016 Jun 9;10:1059-77. doi: 10.2147/OPTH.S111620. PMID: 27354760; PMCID: PMC4907705.
3. Parkhurst GD. A prospective comparison of phakic collamer lenses and wavefront-optimized laser-assisted in situ keratomileusis for correction of myopia. Clin Ophthalmol. 2016 Jun 29;10:1209-15. doi: 10.2147/OPTH.S106120. PMID: 27418804; PMCID: PMC4935102.
4. Singh, B., Sharma, S., Bharti, N. *et al.* Visual outcomes after refractive laser corneal surgery and phakic IOL in amblyopic eyes. *Int Ophthalmol* 40, 2827–2834 (2020). https://doi.org/10.1007/s10792-020-01466-6
5. Zhang, Jing et al. "Posterior chamber phakic intraocular lens for the correction of high myopic anisomotropic amblyopia in adults." *International journal of ophthalmology* vol. 11,11 1870-1874. 18 Nov. 2018, doi:10.18240/ijo.2018.11.21
6. Siepser S, Black S, Chester T, Medina Jr. AA, Bloomenstein M. Refractive Surgical Correction in Amblyopia Requires Careful Patient Counseling. *Primary Care Optometry News*. September 2008.https://www.healio.com/news/optometry/20120225/refractive-surgical-correction-in-amblyopia-requires-careful-patient-counseling. Accessed March 2021.

Table of Contents

Toxocariasis-associated peripheral granuloma: multimodal imaging findings

Erica Ittner, OD • Raman Bhakhri, OD • Shaun Ittiara, MD

Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

BACKGROUND

Ocular toxocariasis is a parasitic infection caused by the nematodes, *Toxocara canis* or *Toxocara cati*, which are often found in dogs and cats, respectively. The condition is of unknown prevalence, is predominantly unilateral and can appear in three different presentations: posterior pole granuloma with overlying vitritis, chronic endophthalmitis, or peripheral granuloma.

Peripheral granulomas are considered an uncommon presentation and can be mistaken for other conditions that present with elevated lesions, such as retinoblastoma. This case details a patient with a peripheral granuloma secondary to presumed-toxocariasis with the diagnosis aided by multimodal imaging.

CASE DETAILS

A 30-year-old Moroccan female presented for a comprehensive eye exam. Pertinent exam findings were a large, circular, and elevated lesion with surrounding RPE hyperplasia noted in the temporal peripheral retina OS (figure 1). RPE disruption was seen scattered throughout the peripheral retina OS.

Fluorescein angiography (FA) OS (figure 2) showed hyper-fluorescence of the lesion without any leakage, corresponding to prior RPE inflammation and atrophy, with mottled hyper-fluorescence in the retinal periphery. B-scan (figure 3) revealed a hyper-echoic elevated retinal lesion while OCT (figure 4) showed elevated hyper-reflectivity of the inner retina with posterior shadowing. Fundus auto-fluorescence (FAF) OS (figure 5) showed mild hyper-autofluorescence corresponding to the RPE disruption in the periphery while also showing hypo-autofluorescence around the lesion.

Additional questioning revealed exposure to dogs and cats as a child in Morocco. Based on the results of the multimodal testing and her history, the patient was presumptively diagnosed with Toxocariasis-related peripheral granuloma. She continues to be monitored for any re-occurrences.

FIGURE 1
Posterior pole image OS

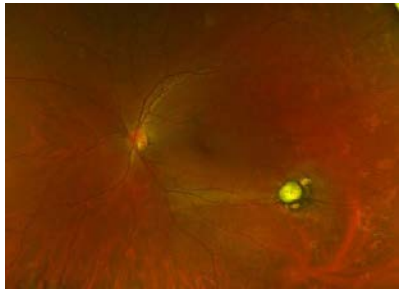


FIGURE 2
FA OS demonstrating hyper-fluorescence through lesion, without leakage

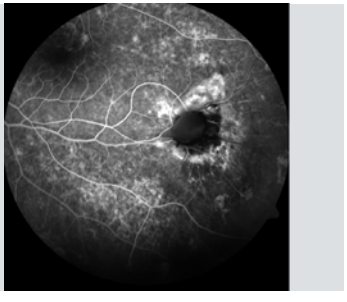


FIGURE 3
B-scan ultrasonography through granuloma OS

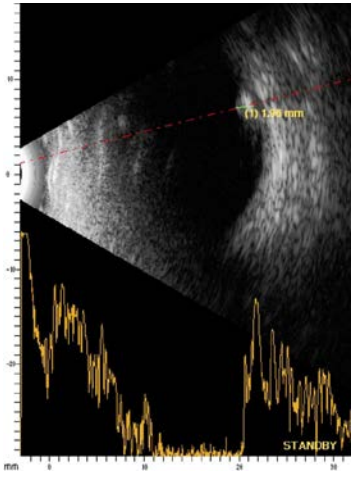
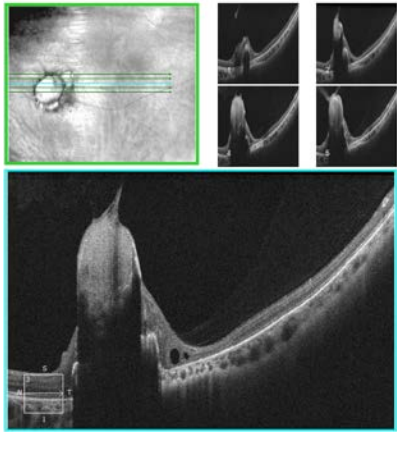


FIGURE 4
5-line raster OCT through granuloma OS



CONCLUSION

Peripheral granulomas are seen in 20-40% of patients with ocular toxocariasis and have potential to migrate. The granulomas initially present as a cloudy mass in the peripheral retina and will eventually contract to form an elevated lesion, as in our patient's case.

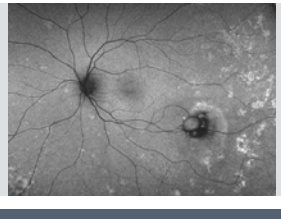
Although the patient's age of presentation likely excluded retinoblastoma, in younger patients this lesion can be mistaken for retinoblastoma. Multimodal imaging then becomes essential in making the correct diagnosis.

FAF showed hypo-autofluorescence, indicating chronicity of the lesion, making it less likely to be retinoblastoma. B-scan and FA should also be considered to differentiate the conditions. In retinoblastoma, B-scan will show calcification of the lesion while FA findings will reveal a vascular network, both of which are not seen with toxocariasis-related granulomas.

Multimodal imaging is important to adjunct the clinical examination, facilitating differentiation of the two conditions and along with pertinent history, supporting clinical diagnosis of toxocariasis-associated etiology.

References: Available upon request

FIGURE 5
FAF OS demonstrating mild hyper-fluorescence with surrounding hypo-fluorescence



CONTACT

Erica Ittner, OD • erittner@lco.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Suspected oculodermal melanocytosis-associated glaucoma in normal-tensive black teenager with bilateral scleral melanocytosis

Erica Ittner, OD • Ashley Speilburg, OD
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

BACKGROUND

Oculodermal melanocytosis (ODM), better known as nevus of Ota, is a congenital or acquired dermal melanocytic hamartoma distributed along the maxillary and ophthalmic branches of the trigeminal nerve. The condition falls within a spectrum of facial melanocytosis ranging from dermis to ocular tissue involvement, most often occurring unilaterally and most found in individuals of Asian descent. The two most insidious ophthalmic complications of the melanocytic spectrum are development of glaucoma, occurring in up to 10% of individuals, and transformation of hyperpigmented lesions into ocular melanoma, also uncommon. This case report highlights a presentation of suspected bilateral melanocytosis-associated glaucoma, to increase awareness of the potential association between ODM and development of glaucoma.

REPORT

A 16-year-old black teenager with bilateral scleral melanocytosis presented with glaucomatous optic nerve appearance, retinal nerve fiber layer (RNFL) thinning and presence of correlating visual field defects. IOP was repeatedly normotensive at several visits, ranging from 11-17 mmHg. The anterior chamber angles were open, demonstrated dense iris processes and heavy pigment, particularly inferiorly.

Differential diagnosis:
JOAG
Pigmentary glaucoma
Traumatic glaucoma
Steroid-induced glaucoma
Uveitic glaucoma
Physiological cupping

Differentials include other varieties of glaucoma, however, were considered less likely. JOAG is associated with elevated IOP, often >40 mmHg. This patient has several untreated IOP measurements <20 mmHg. As a young, myopic male with dense TM pigment, pigmentary glaucoma was also considered, but there was an absence of endothelial pigmentation and iris transillumination defects. He denied a history of trauma, steroid use and prior episodes or symptoms of inflammation making traumatic, steroid-induced and uveitis glaucoma less likely. Physiological cupping was considered due to his age and normal-tensive IOP, but the abnormal RNFL and correlating ganglion cell loss on optical coherence tomography made this less likely. The presence of ODM, suspicion of glaucoma, and anomalous angle made ODM-associated glaucoma the most likely diagnosis and tipped the scales in favor of treatment. The patient was started on latanoprost and continues to be monitored.

FIGURE 1A AND 1B:
Bilateral scleral melanocytosis

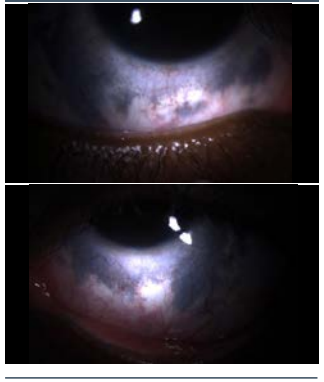


FIGURE 2A AND 2B:
Glaucomatous optic nerve appearance OD/OS

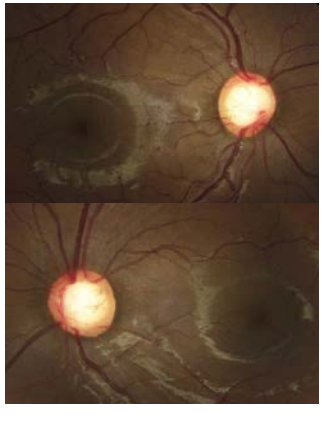


FIGURE 3A AND 3B:
Zeiss Cirrus Panomap reports demonstrating RNFL and GC thinning OD/OS

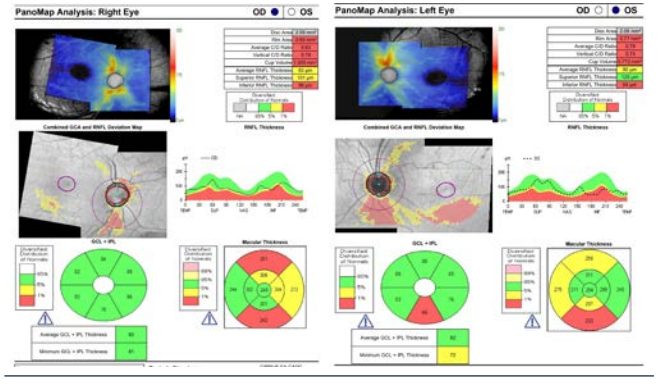
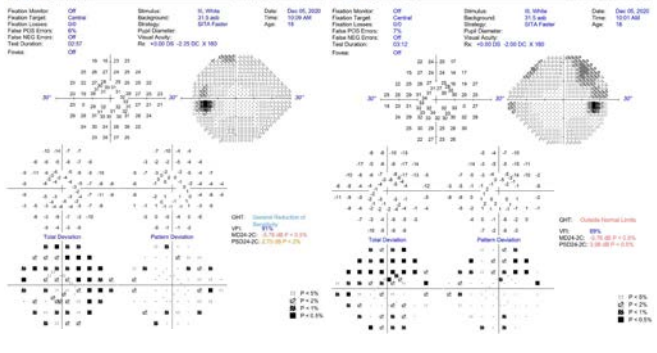


FIGURE 4A AND 4B:
24-2C HVF SITA Faster results demonstrating correlating field defects to RNFL & GC thinning



CONCLUSION

This atypical case of bilateral glaucomatous optic disc appearance in a young patient without elevated intraocular pressure is an important reminder to eye care professionals to be familiar with potential acquired complications within the ODM spectrum. ODM-associated glaucoma is rare, particularly bilaterally, however should be considered when an ODM patient presents with suspected glaucoma that does not correlate well with other glaucoma etiology.

REFERENCES

Foulks G, Shields MB. Glaucoma in oculodermal melanocytosis. Ann Ophthalmol 1977;1299-1304.

Araie M, et al. Oculodermal melanocytosis. J Glaucoma 2002;11:454-457.

Ichhpujani P, Singh RB. Pediatric genetic diseases causing glaucoma. J Pediatr Genet 2014;3:209-218.

Chan HHL, Kono T. Nevus of Ota: clinical aspects and management. Skinmed 2003;2:89-96.

Table of Contents

CONTACT

Erica Ittner, OD
erittner@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Factors Affecting the King-Devick Test in Children aged 5 to 14 years

Valerie Kattouf, OD
Poster #191

3241 South Michigan Avenue, Chicago, Illinois 60616

[1]Valerie Kattouf, OD • [1]H. Kelly Yin, OD • [1]Yi Pang, OD, PhD • [2]Danielle Leong, OD, PhD • [3]Sherry Audycki, OD
[4]James Fanelli, OD • [5]Robert Steinmetz, OD • [2]Alexandra Talaber, OD • [1]Leonard Messner OD

1. Illinois College of Optometry, Chicago, IL
2. King-Devick technologies, Oakbrook Terrance, IL
3. Advanced Eye Center, Bedford, MA
4. Cape Fear Eye Institute, Wilmington, NC
5. Solo Eye Care, Chicago, IL

PURPOSE

The King-Devick test (KD) was established in 1983 and uses rapid number naming to assess impairments in eye movements, attention and language function. It is critical to understand what factors contribute to a child's ability to complete a vision-based performance assessment. The purpose of this study was to determine what factors have the greatest impact on performance of a of KD test in Children aged 5 to 14 years.

METHODS

This study was conducted in 5 clinical sites. All children had comprehensive eye exams. Three test cards of KD test were administered on each participant. Time to finish all three cards of KD was recorded and calculated as well as the total errors. History of concussion and mother's education were also collected. Multiple regression analyses were conducted to determine whether the following factors predicted KD test performance: age, race/ethnicity, mother's education, and history of concussion.

TABLE 1
P Values Associated with Factors Assessed in KD Testing

Factor	P value
sex	0.343
race	0.016
concussion	0.724
Parents education	0.280
Age whole	<0.0001

FIGURE 1
Descriptive Statistics

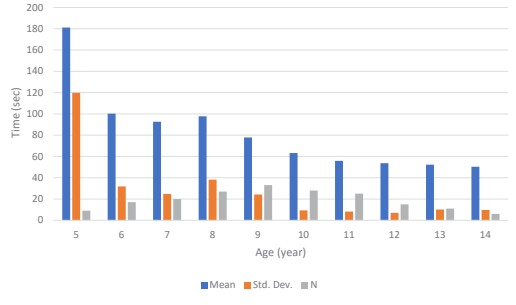


TABLE 2
Descriptive Statistics

Age Whole	Mean	Standard Deviation	N
5	181.178	119.8529	9
6	100.226	31.8200	17
7	92.655	24.7410	20
8	97.710	38.1665	27
9	77.772	24.1788	33
10	63.117	9.3209	28
11	55.850	8.1668	25
12	53.627	6.9461	15
13	52.311	10.1899	11
14	50.398	9.7789	6
Total	79.780	43.7135	191

RESULTS

A total of 659 children aged 5 to 14 years were enrolled. The mean KD time was 97.47 ± 42.86 sec. The mean KD errors were 7.16 ±11.87. Age significantly predicted KD performance in both KD time and errors (both Ps < 0.0001). KD time decreased 13.48 sec by each year for children aged 5 to 14 years. KD errors reduced 4.39 by each year. Race/ethnicity also statistically significantly predicted KD time (P=0.005) but not KD error (P = 0.35). Non-Hispanic White children had faster KD time than Black (P = 0.029) and Hispanic White children (P = 0.12). However, neither mother's education nor history of concussion predict KD test performance.

CONCLUSION

Both race and age had statistically significant impact on KD performance. Knowing which factors bear the greatest impact on KD performance will allow the practitioner to further detect issues with reading dysfunction, eye movement disorders, brain injury, and neurologic conditions.

DISCLOSURE

KD test booklets used in the study were provided by King-Devick technologies, Oakbrook Terrance, IL. Dr. Leong is an employee of King–Devick Test, LLC as a Director of Research. Dr. Talaber is an employee of King–Devick Test, LLC as a Director of Reading Solutions and Clinical Specialist. HK. Yin, Dr. Pang, Dr. Kattouf, Dr. Audycki, Dr. Fanelli, Dr. Steinmetz, and Dr. Messner report no disclosure.

QUESTIONS PLEASE CONTACT:

Valerie M. Kattouf, OD
Illinois College of Optometry
vkattouf@ico.edu
(312)949-7279

Table of Contents

Presumed Lupron-Induced Papilledema

Alyssa Lancaster, OD • Leonard Messner, OD, FAAO • Harneet Randhawa, OD, FAAO
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Lupron (leuprolide acetate) is a gonadotropin releasing hormone agonist that is used to treat prostate cancer, endometriosis, uterine fibroids, and central precocious puberty. Initial treatment involves monthly intramuscular injections limited to 6 months. This medication may induce side effects similar to women experiencing menopause, such as hot flashes, change of menstruation and weight fluctuations, as well as several ocular side effects. This case demonstrates papilledema as a rare side effect of Lupron, with near-complete resolution 3 months after discontinuation of the medication.

CASE PRESENTATION

Clinical Findings:

A 35-year-old African American female presents to the Illinois Eye Institute for an ocular health evaluation after beginning Lupron 6 months prior for uterine fibroids. She denies any blurred vision, diplopia, or tinnitus, but does report an increase in severity and frequency of headaches since beginning treatment. Her calculated body mass index is 32.50. She was seen 5 years prior for bilateral anomalous optic nerves.

Additional Testing:

Cirrus OCT: Reveals bilateral areas of peripapillary wrinkling, increased average RNFL thickness from 2015 (Table 2) and an overall inward deflection of the RPE-Bruch's complex in both eyes.

Humphrey Visual Field: No significant visual field defects, except for bilateral enlargement of the patient's blind spot.

MRI/MRV: The patient underwent an MRI and MRV with and without contrast that was deemed unremarkable except for bilateral papilledema. She deferred a lumbar puncture.

TABLE 1
Entrance testing

	OD	OS
VAcc	20/20	20/20
CVF	FTFC	FTFC
EOMs	FROM, (-) diplopia, (-) pain	FROM, (-) diplopia, (-) pain
Pupils	PERRL, (-) APD	PERRL, (-) APD

TABLE 2
Comparison of Cirrus OCT measurements of average RNFL thickness from 2016 to August 2021

	OD	OS
2016	111 microns	110 microns
May 2021	205 microns	213 microns
August 2021 - 3 months after discontinuation of Lupron	135 microns	142 microns

TABLE 3
Change of average RNFL thickness from 2016 to May 2021 and May 2021 to August 2021

	OD	OS
2016 to May 2021	94 micron increase	103 micron increase
May to August 2021	70 micron decrease	71 micron decrease

FIGURE 1
Comparison of right eye fundus photos. 2016 fundus photo (far left) of the patient's anomalous optic nerve with pseudopapilledema. May 2021 fundus photo (middle) with an acute presentation of optic nerve swelling and edema, an inferior temporal disc hemorrhage and superior peripapillary wrinkling. Three months off treatment (far right), the patient's optic nerve is returning to baseline with improvement of the nerve appearance.

FIGURE 2
Comparison of left eye fundus photos. In 2016 (far left), the patient presented with an anomalous optic nerve. Five years later (middle), the patient has acute papilledema with obscuration of the major blood vessels leaving the nerve. Three months later (far right), the patient's optic nerve is improving in appearance.

TREATMENT AND MANAGEMENT

The patient returned for a follow-up 3 months after discontinuation of the drug, and she denied any new medications or weight loss. The patient's average RNFL thickness approached baseline levels, decreasing by about 70 microns bilaterally.

DISCUSSION

Presumed Lupron-induced papilledema is reported in only 0.05% of patients that report side effects with Lupron. Of these patients, 93% are women, over 80% are age 20-39 and 71% have been on Lupron for only 1 to 6 months. Many of these cases are fully resolved within 6 months or less once the drug is discontinued with no long-term sequalae. The current mechanism of action for Lupron-induced papilledema is unknown.

CONCLUSION

There are several medications associated with inducing papilledema and therefore, careful consideration of patient's medication list is essential to determining the correct underlying etiology of drug-induced papilledema. Early detection of iatrogenic-induced papilledema is essential for preservation of vision and visual field in these patients. If drug-induced papilledema is suspected, the prescribing doctor should be contacted to discuss the possibility of discontinuing the drug to resolve the papilledema.

REFERENCES

Available upon request.

CONTACT

Alyssa Lancaster, O.D. • alancaster@ico.edu

Table of Contents

Pott's Puffy Tumor with Orbital Cellulitis in an Adult

Michelle Lee, OD, FAAO
Jesse Brown VA Medical Center, Chicago, IL

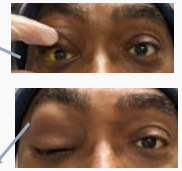
INTRODUCTION: 62 yo African American Male

- Chief complaint: R eyelid swelling x 1 week, acute worsening over the previous 24 hours
- Past Medical History: HTN, HLD, allergic rhinitis
- Allergies: IV contrast media

	OD	OS
BCVA	20/20	20/20
Pupils	PERRL	PERRL
EOM's	FROM	FROM
CVF's	FTFC	FTFC
External	See photo	NL
Ant Seg	NL	NL
IOP	25 mmHg	18 mmHg
Lens	1+ NS	1+ NS
Optic Nerve	0.55/0.55	0.55/0.55
Macula	NL	NL
Periphery	NL	NL
Ishihara	14/14	14/14

Figure 1: Clinical photos

R hypoglobus



R eyelid closure with superior periorbital bony mass

(+) tenderness and erythema to palpation

Differential Diagnosis

- Preseptal vs. orbital cellulitis
- Orbital mucocele
- Orbital mass: neoplastic vs other

Results from Imaging Studies (STAT):

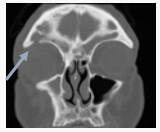


Figure 2

CT Orbit w/o contrast

- Focal erosion of R superior orbital wall/inferior frontal sinus
- Preseptal and orbital cellulitis with a subperiosteal abscess and osteomyelitis of the frontal bone

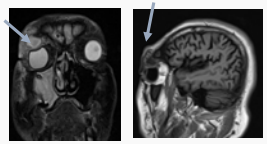


Figure 3

MRI Orbit w/o contrast

- Space-occupying lesion in the right superior orbit (2x2x1.5 cm) with inferior displacement of the globe
- Sinusitis involving bilateral frontal and ethmoid sinuses as well as right maxillary sinus
- No evidence of intracranial spread

Diagnosis: Pott's puffy tumor

Diagnosis and Management:

Assessment: Pott's puffy tumor with orbital cellulitis and a subperiosteal abscess

Plan:

- Same- day admission to initiate IV antibiotics (cefepime, flagyl, vancomycin)
- Urgent evaluation by ENT and oculoplastic ophthalmology service for surgical planning
  - Right anterior orbitotomy with drainage of subperiosteal abscess
  - Cultures sent confirming susceptibility: gram positive rods (*s. epidermidis, s. capitis, prevotella oris)*
  - Subsequent sinus surgery by ENT
    - Right maxillary antrostomy, right anterior ethmoidectomy, right frontal sinusotomy

Outcome:

- Stable BCVA 20/20 OD, OS
- Absence of orbital mass with ability to open eyelid, residual ptosis OD
- IOP symmetric: 18mmHg OD, OS
- Stable pupils, EOM's, CVF's, color vision OD, OS
- Stable dilated fundus exam OD, OS

Figure 4: Clinical photo after treatment

DISCUSSION

What is it?

Forehead swelling from osteomyelitis of the frontal bone and a subperiosteal abscess

- NOT a true tumor!
- RARE, especially in the post-antibiotic era

Etiology:

- Complication of frontal sinusitis (most common)
- Trauma
- Less frequently: dental infections, insect bite, intranasal drug use

1) Hematogenous spread: Frontal sinus infection → bony necrosis and fistula → collection of pus below the skin
2) Direct extension: Open wound to forehead becomes infected

Symptoms

- Headache
- Nausea/vomiting
- Fever
- Mental status change
- Focal neurologic signs (aphasia, paresia, etc.)

Who Gets It?

- Young population (age 6-15)
- Immunocompromised population
- Higher incidence in developing countries
- Rare in adults (54 cases found with search)
  - Males more common (3.5 : 1)

Diagnosing:

- Imaging
  - CT: better visualization of bone
  - MRI: higher soft tissue resolution for detecting orbital or intracranial involvement
- Cultures: often polymicrobial

Complications:

Orbital Spread

Systematic review of 42 cases with orbital involvement (29%)[3]

- 98% eyelid and/or periorbital edema
  - 15% had postseptal + preseptal cellulitis
- 24% proptosis
- 12% EOM restriction
- 2.5% diplopia
- 2.5% visual acuity loss

- 85% preseptal cellulitis
- 7% preseptal + orbital cellulitis
- 3% preseptal cellulitis + orbital abscess
- 5% orbital cellulitis + subperiosteal abscess

Intracranial Spread

Potentially LIFE THREATENING!

1) Erosion of the posterior wall of the frontal sinus
2) Septic emboli through the diploic vein

Management :

- Urgent initiation of broad-spectrum IV antibiotics
- Prompt surgical intervention to drain abscess, possible debridement of infected bone, drain sinuses

CONCLUSION

- Pott's puff tumor is rare, but may involve the orbit and can have potentially life-threatening intracranial complications
  - Prompt diagnosis and aggressive treatment are vital!
- A multi-disciplinary approach should be used to manage the systemic and ocular disease

CONTACT:
Michelle Lee, OD, FAAO
Michelle.lee8@va.gov

Table of Contents

Meibomian Gland Atrophy and Tortuosity in Children During COVID-19 Pandemic

Xiang Jun Liu, BSc; Chi Na Moua, BSc; Denise Alexopoulos, OD, FAAO; Lindsay A. Sicks, OD, FAAO, FIACLE, FSLS; Yi Pang, MD, OD, PhD, FAAO
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

The COVID-19 pandemic has forced society into working and learning in a digital environment. This included children learning virtually that often lasted a typical 7-8 hour school day. In addition, screen time did not end after school, but continued throughout the day for homework and leisure in children. With increased screen time, the blink rate decreases from 12 blinks per minute to 3 blinks per minute[1]. Dry eye disease has not been studied a great deal in the pediatric population and may often be misdiagnosed as trauma, an infection, or irritation[2]. The purpose of this study was to evaluate meibomian gland (MG) atrophy and tortuosity in children aged 5 to <16 years. In addition, the relationship between children's screen time and their level of meibomian gland atrophy was examined. It is important to raise awareness in clinicians to look for signs and symptoms of dry eyes in the pediatric population in order to take preventative measures of this chronic condition.

METHODS

A total of 40 children, ranging in age from 5 to <16 years old, presenting to the Illinois Eye Institute between September and November 2020 were recruited for this study. All children received a comprehensive eye exam and informed consent was obtained for participation. Tear film parameters were collected with the Keratograph 5M (Oculus), including non-invasive tear film break-up time (NI-TBUT) and tear meniscus height (TMH)[3]. The upper and lower eyelids were everted and the meibomian glands were imaged. MG atrophy was assessed by two masked graders using the validated 4-point Arita scale [4]. Tortuosity of the MGs was evaluated by two masked graders using the 5-point Halleran tortuosity scale[5]. Both children and their parents were surveyed on the children's electronic screen time. Controlling for age, gender, race, and ethnicity, partial correlation was performed to determine the association between MG atrophy and reported electronic screen time.

TABLE 1
Subject demographics (n=40)

	n (%)
Gender	
Female	24 (60)
Male	16 (40)
Race	
African American	19 (47.5)
Hispanic or Latino	7 (17.5)
Asian	9 (22.5)
Caucasian	4 (10)
Other	1 (0.025)
Age (yrs)	
5 to <9	13 (32.5)
9 to <16	27 (67.5)

TABLE 2
Average Meibography scale (n=34)

Meibography scale	Right Upper Lid	Right Lower Lid	Left Upper Lid	Left Lower Lid
Mean (SD)	1.19 (0.66)	1.43 (0.78)	1.19 (0.66)	1.35 (0.92)
Normal (%, Scale=0)	5.9%	0%	0%	11.8%
Mild or Moderate MGD (%, Scale between >0 and 2)	76.5%	55.9%	82.4%	64.7%
Severe MGD (%, Scale =>2 or higher)	17.6%	44.1%	18.0%	35.3%

TABLE 3
Average Tortuosity scale (n=34)
(0= 0%, 1=1-25%, 2=26-50%, 3=51-75%, 4=76% up, count bend more than 45 degree or multiple bends)

Tortuosity scale	Right Upper Lid	Right Lower Lid	Left Upper Lid	Left Lower Lid
Mean (SD)	3 (0.80)	1.7 (0.90)	2.9 (0.83)	1.4 (0.79)
Normal (%, scale=0)	0%	8.8%	0%	11.8%
Mild-Moderate (%, scale: 1 or 2)	32.4%	76.5%	21.2%	82.4%
Severe (%, scale: 3, 4)	67.6%	14.7%	78.8%	5.9%

FIGURE 1. Arita 4-point Meiboscale [4]

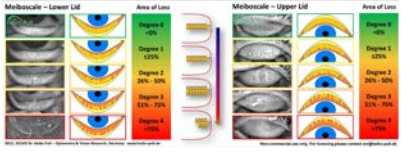


FIGURE 2. Halleran 5-point Meibography Tortuosity Scale [5]

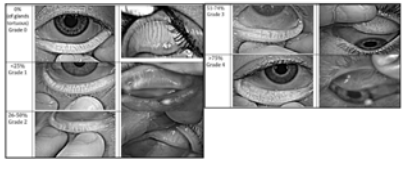


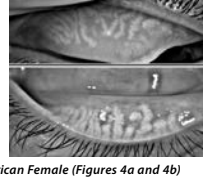
FIGURE 3A.
Right upper and lower lid (RUL meibo scale =1.5, T scale=2; RLL meibo scale=3, T scale=1)

FIGURE 3B.
Left upper and lower lid (LUL meibo scale=2.5, T scale=3; LLL meibo scale=2.5, T scale=3)

Subject 8: 11 yo African American Female (Figures 3a and 3b)

FIGURE 4A.
Right upper and lower lid (RUL meibo scale=2.5, T scale=4; RLL meibo scale=2, T scale=2)

FIGURE 4B.
Left upper and lower lid (LUL meibo scale=2.5, T scale=3; LLL meibo scale=2.5, T scale=2)



Subject 19: 10 yo African American Female (Figures 4a and 4b)

FIGURE 5A.
Right upper and lower lid (RUL meibo scale=0.5, T scale=2; RLL meibo scale=1, T scale=0)

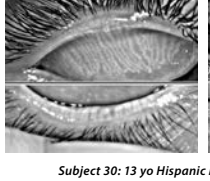


FIGURE 5B.
Left upper and lower lid (LUL meibo scale=3, T scale=1; LLL meibo scale=3, T scale=1)

Subject 30: 13 yo Hispanic Male (Figures 5a and 5b)

RESULTS

Among forty children recruited into the study, 16 were males and 24 were females (mean age 10.3 years, range 5.7 to 15.3 years). Mean tear meniscus height was 0.78mm and 0.68mm, OD and OS respectively. Mean NI-TBUT was 10.97s and 13.39s, OD and OS, respectively. MG dropout scores were statistically significantly correlated between OD and OS (r=0.70, p<0.0001). Atrophy of greater than 1/3 of the MGs (Arita score 2 or 3) was presented in: 41.2% of upper eyelids OD, 50% of lower eyelids OD, 38.2% of upper eyelids OS, and 44.1% of lower eyelids OS. MG tortuosity was present in >25% of glands (Halleran score 2 or higher) in: 100% of upper eyelids OD, 61.8% of lower eyelids OD, 90.9% of upper eyelids OS, 50% of lower eyelids OS. MG atrophy scores were correlated with MG tortuosity in the upper eyelids (r=0.55, p=0.01) but not in the lower eyelids. No association was found between MG atrophy and screen time.

CONCLUSION

- Significant MG atrophy and tortuosity were identified in a high percentage of children aged 5 to 15 years during the COVID-19 pandemic.
- Although there was no association found between MG atrophy and screen time in our study, MG atrophy in young patients is not a normal finding. Eye care practitioners should consider evaluating MG appearance more routinely in children during annual eye exams before they precipitate into significant damage and highly bothersome symptoms. Further studies of MG parameters in children could help practitioners manage dry eye in this population.

FINANCIAL SUPPORT

Research Resource Committee of Illinois College of Optometry

SOURCES

1. Patel S, Henderson R, Bradley L, Galloway B, Hunter L. Effect of visual display unit use on blink rate and tear stability. *Optometry and Vision Science*, 1991.68(11), 888–892.
2. Alves M, Dias AC, Rocha EM. Dry Eye in childhood: Epidemiological and clinical aspects. *The Ocular Surface*. 2008;6(1):44-51.
3. Wise RJ, Sobel RK, Allen RC. Meibography: A review of techniques and technologies. *Saudi Journal of Ophthalmology*. 2012;26(4):349–56.
4. Arita R, Itoh K, Inoue K, Amano S. Noncontact infrared meibography to document age-related changes of the meibomian glands in a normal population. *Ophthalmology* 2008;115(5):911–5.
5. Halleran C, Kwan J, Hom M, Harthan J. Agreement in Reading Centre Grading of Meibomian Gland Tortuosity and Atrophy, Poster. American Academy of Optometry 2016 Annual Meeting. Anaheim, CA.

CONTACT

Xiang Jun(Jenny) Liu, BSc - xliu@eyedoc.ico.edu
Chi Na Moua, BSc - cmoua@eyedoc.ico.edu
Yi Pang MD, OD, PhD, FAAO - ypang@ico.edu
Lindsay Sicks, OD, FAAO, FIACLE, FSLS - lsicks@ico.edu
Denise Alexopoulos, OD, FAAO - dalexopoulos@ico.edu

Table of Contents

Hybrid Multifocal Contact Lens and Atropine Combination Therapy for Myopia Management

Michelle K. Man, OD, FAAO, FSLS
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Myopia is a growing global epidemic, associated with increased risk for myopic macular degeneration, retinal detachment, cataracts, and glaucoma, which can lead to visual impairment. Several management options to slow down myopic progression have been investigated, including soft multifocal contact lenses, atropine eye drops, and more recently, combination therapy with both. However, there are limited options for patients with refractive errors that fall outside the typical soft contact lens parameter range. This case discusses fitting a distance-center multifocal hybrid contact lens design for myopia management, with adjunct atropine therapy due to higher than average axial lengths.

CASE REPORT

A 16-year-old Hispanic male was referred for myopia management. His spherical refractive error in each eye had been increasing by about -0.50 to -1.00D per year for the last four years.

Manifest Refraction at Initial Visit:
OD: -12.75 -2.25 x180 VA 20/25
OS: -12.50 -2.00 x180 VA 20/25

Pertinent Exam Measurements:

	OD	OS
HVID	11.5 mm	11.5 mm
Pupil Size	Bright 4.5 mm, Dim 6 mm	Bright 4.5 mm, Dim 6 mm
Axial Length	29.17 mm	28.99 mm

Topography maps were obtained confirming regular WTR astigmatism in each eye (Figure 1). Corneal astigmatism approximately matched refractive cylinder making him a good candidate for spherical GP lens optics. Center-distance multifocal hybrid contact lenses were designed empirically (Figure 2).

RESULTS

Final Contact Lens Parameters:

	Brand	Design	Power	Add	BC	Dia	OZ	Skirt
OD	SynergEyes Duette Progressive	Center distance	-11.50	+3.00	8.1	14.5	4.0	Medium
OS	SynergEyes Duette Progressive	Center distance	-10.50	+3.00	8.1	14.5	4.0	Medium

FIGURE 1
Topography maps showing OD Flat K 41.3D @88°, Steep K 44.1D @92° and OS Flat K 41.5D @100.5°, Steep K 43.7D @79.5°.

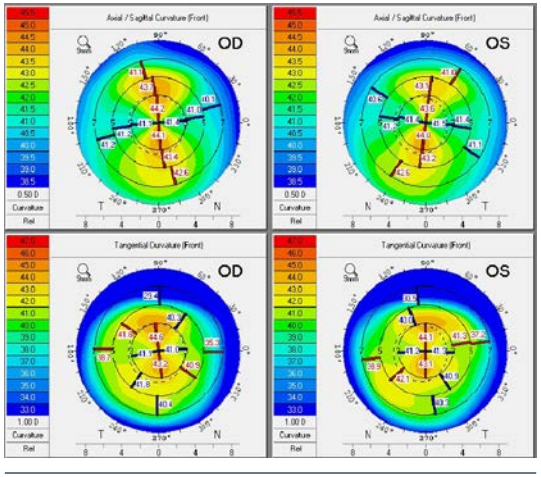
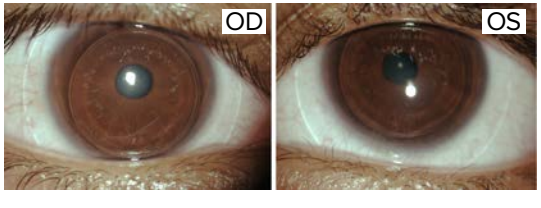


FIGURE 2
The patient was fit into multifocal hybrid contact lenses with good comfort, vision, and fit OU.



The patient was able to tolerate a +3.00 add power, with distance and near visual acuities of 20/20 in each eye. At the dispense visit, the patient and parent inquired about additional therapy to slow down myopic progression. Due to the additional risk factor of increased axial length, atropine 0.025% 1 gtt QHS OU was initiated.

At the six-month and one-year follow ups, after full-time wear of hybrid multifocal contact lenses along with daily atropine therapy, the patient's refractive error remained stable. His axial length measurements at six-months (OD 29.31 mm, OS 29.11 mm) and one-year (OD 29.34 mm, OS 29.12 mm) were minimally increased but consistent with age-expected norms. He reported good vision and comfort with the contact lenses, and denied side effects from the atropine therapy, confirmed with stable near testing.

CONCLUSION

Hybrid multifocal contact lenses have not been well-studied in the management of myopic progression. However, in cases where patients are not good candidates for traditional soft multifocal contact lenses, distance-center multifocal hybrid designs should be considered. In addition, axial length measurements can be useful when formulating treatment plans and determining when adjunct therapy may be indicated. Combination therapy with soft bifocal contact lenses and atropine have been previously reported. Although they showed that the addition of atropine was well-tolerated with limited visual side-effects, more studies need to be done to explore the efficacy of combination therapy.

REFERENCES

Walline JJ, Lindsley KB, Vedula SS, Cotter SA, Mutti DO, Ng SM, Twelker JD. Interventions to slow progression of myopia in children. Cochrane Database Syst Rev. 2020 Jan 13;1(1):CD004916. doi: 10.1002/14651858.CD004916.pub4. PMID: 31930781; PMCID: PMC6984636.

Walline JJ, Gaume Giannoni A, Sinnott LT, Chandler MA, Huang J, Mutti DO, Jones-Jordan LA, Berntsen DA; BLINK Study Group. A Randomized Trial of Soft Multifocal Contact Lenses for Myopia Control: Baseline Data and Methods. Optom Vis Sci. 2017 Sep;94(9):856-866. doi: 10.1097/OPX.0000000000001106. PMID: 28737608; PMCID: PMC5607949.

Yam JC, Jiang Y, Tang SM, Law AKP, Chan JJ, Wong E, Ko ST, Young AL, Tham CC, Chen LJ, Pang CP. Low-Concentration Atropine for Myopia Progression (LAMP) Study: A Randomized, Double-Blinded, Placebo-Controlled Trial of 0.05%, 0.025%, and 0.01% Atropine Eye Drops in Myopia Control. Ophthalmology. 2019 Jan;126(1):113-124. doi: 10.1016/j.ophtha.2018.05.029. Epub 2018 Jul 6. PMID: 30514630.

Huang J, Mutti DO, Jones-Jordan LA, Walline JJ. Bifocal & Atropine in Myopia Study: Baseline Data and Methods. Optom Vis Sci. 2019 May;96(5):335-344. doi: 10.1097/OPX.0000000000001378. PMID: 31046016; PMCID: PMC6501814.

Hou W, Norton TT, Hyman L, Gwiazda J; COMET Group. Axial Elongation in Myopic Children and its Association With Myopia Progression in the Correction of Myopia Evaluation Trial. Eye Contact Lens. 2018 Jul;44(4):248-259. doi: 10.1097/ICL.0000000000000505. PMID: 29923883; PMCID: PMC6013843.

Acknowledgements
SynergEyes donated a pair of hybrid contact lenses for the patient

CONTACT

Michelle K. Man, OD, FAAO, FSLS
michman@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Early Onset Hydroxychloroquine Maculopathy

Mallory McLaughlin, OD, FAAO • Demetra Arianas, B.S., B.A.
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

PURPOSE

Examine the development of hydroxychloroquine maculopathy that onset prior to the recommended five-year screening period.

Review the importance of regular screening for hydroxychloroquine maculopathy.

Challenge the clinician to consider adjusting their screening protocol for patients with risk factors for toxicity.

HISTORY

A 74-year-old African American female presented to clinic after being lost to follow up for nearly two years.

Ocular History:

- Low-risk glaucoma suspect OU
- Non-visually significant cataracts OU
- Hydroxychloroquine use without maculopathy OU

Systemic History:

- Systemic lupus erythematosus
  - Taking 5.88mg/kg/day real weight of hydroxychloroquine x 4 years
  - Recently decreased the dose to 2.99mg/kg/day one month prior to her examination.
- No known renal disease or history of tamoxifen use.

EXAMINATION

Best corrected visual acuity was 20/20 OD and OS. Entrance testing was unremarkable in both eyes. Slit lamp examination was unremarkable in both eyes.

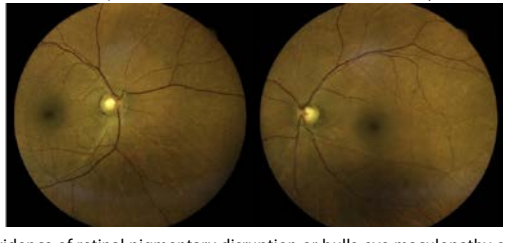


Figure 1 - No evidence of retinal pigmentary disruption or bulls-eye maculopathy on dilated fundus examination. (Figure 1)

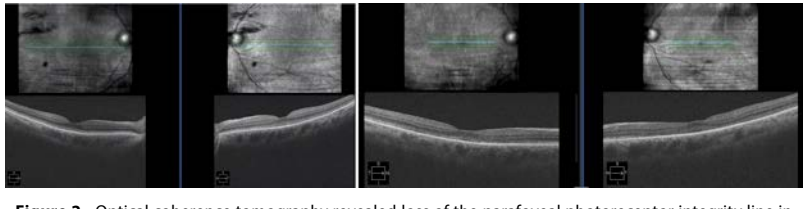


Figure 2 - Optical coherence tomography revealed loss of the parafoveal photoreceptor integrity line in each eye in 2020 (right) compared to previous imaging from 2018 (left).

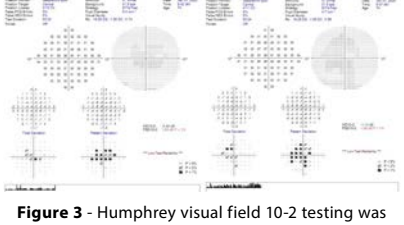


Figure 3 - Humphrey visual field 10-2 testing was unreliable but had central defects in both eyes.

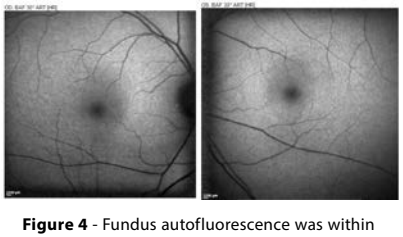


Figure 4 - Fundus autofluorescence was within normal limits in both eyes.

RESULTS

Cessation of HCQ was recommended to patient's rheumatologist.

No further maculopathy or decrease in vision was observed one month after cessation. Patient was then lost to follow up.

CONCLUSION

Although the risk of HCQ maculopathy is low within five years of the start of treatment, this case emphasizes the increased risk of developing early toxicity when prescribed higher than the recommended daily dose for real weight.

Calculation of daily dosage should be considered when determining screening schedule.

Patients who are prescribed more than 5.0mg/kg daily dose or have other risk factors for HCQ maculopathy should be screened sooner than the recommended five-year screening timeline.

References available upon request

CONTACT INFORMATION

Mallory McLaughlin, OD, FAAO
mmclaughlin@ico.edu • www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Can the 1-week Post-operative Exam be Deferred for Patients without Intraoperative Complications and Unremarkable 1-day Post-operative Exam?

Mallory McLaughlin, OD, FAAO • Tenley Bands • Kristina Shpountova • Savannah Winkel • Patricia Salazar, OD • Danielle Piser, OD, FAAO
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

PURPOSE

This study aims to determine the rate of complications at the 1-week and 1-month post-operative (PO) exams in patients without intraoperative complications and unremarkable 1-day PO visits.

If the rate of complications at the 1-week PO visit is unremarkable, it may be reasonable to defer the 1-week PO visit.

METHODS

1. A list was obtained of the 506 patients who met the following inclusion criteria:
   a. Underwent cataract surgery with one of five Illinois Eye Institute (IEI) affiliated surgeon between February 1, 2019 and February 1, 2020.
   b. Completed 1-day, 1-week, and 1-month PO exams at IEI within the following time frame:
      a. 1-day PO exactly 1 day after surgery
      b. 1-week PO within 5-10 days after surgery
      c. 1-month PO within 3-6 weeks after surgery
   c. Did not undergo concurrent glaucoma surgery
   d. Any age, race, or sex
2. Complications associated with cataract extraction surgery at 1-week and 1-month PO exams were collected and analyzed.
3. Patients were excluded from the study using specific exclusion criteria (See Table 1).

RESULTS

103 eyes met specific inclusion criteria to participate in the study ***(See Figures 1A- 1E)***.

TABLE 1.
Exclusion criteria

If present intra-operatively:
- Lens subluxation and/or dropped nucleus

If present at 1-day PO:
- IOP> 22mmhg
- Central corneal edema
- (+) Seidel sign
- PHVA < pre-operative
- Macular edema
- Retinal detachment

If performing cataract surgery on second eye of same patient:
- Presence of any exclusion criteria during surgery of first eye

FIGURE 1.
Distribution of Included Patient Population

FIGURE 1A.
The distribution is consistent with overall IEI patient population, with majority reported as African American

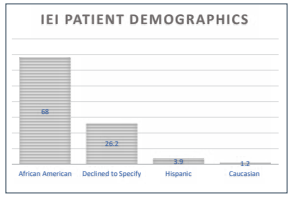


FIGURE 1B.
Age of included patients ranged from 20 to 99 years old

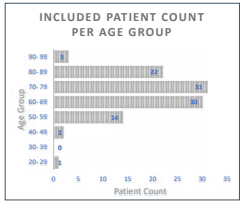


FIGURE 1C.
Left and right eyes are equivalently represented

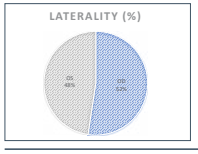


FIGURE 1D.
32 out of 103 patients included have diabetes

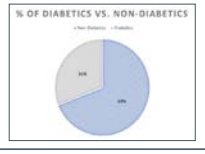


FIGURE 1E.
The list of medical record numbers had a total of 506 patients. Of the 506 patients, 103 were included and 403 were excluded

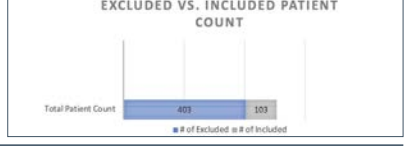


TABLE 2.
Rate of complications by age group

Age Group	Number of Complications	% of Complications
20- 29	1 out of 6	16.7
30- 39	0 out of 0	0.0
40- 49	0 out of 12	0.0
50- 59	5 out of 84	6.0
60- 69	3 out of 180	1.7
70- 79	5 out of 186	2.7
80- 89	1 out of 132	0.8
90- 99	0 out of 18	0.0
Chi-Square Test	**Chi- square**	**12.338**
	p- value	**0.055**

TABLE 3.
Rate of complications in diabetic patients are compared to non-diabetic patients at both the 1-week PO and 1-month PO. Rate of total complications is compared at 1-week PO and 1-month PO.

Complications	% of Complications at 1-week po				% of Complications at 1-month po			
	Diabetic Patients	Non-Diabetic Patients	Fisher-exact P Value	Total Complications	Diabetic Patients	Non-Diabetic Patients	Fisher-exact P value	Total Complications
IOP > 22mmHg	3.1	0.0	0.3107	1.0	6.3	0.0	0.0944	1.9
AC Rxn > 1-day po	3.1	1.4	0.5269	1.9	0.0	0.0	1.0000	0.0
Central K Edema	6.3	4.2	0.6448	4.9	6.3	1.4	0.0227	2.9
AC Rxn > 1-week po	0.0	0.0	1.0000	0.0	6.3	0.0	0.0944	1.9
PHVA < pre-op VA	3.1	0.0	0.3107	1.0	0.0	1.4	1.0000	1.0
Macular Edema	0.0	0.0	1.0000	0.0	3.1	2.8	0.5863	2.9

There was no difference in the total rate of complications at 1-week and 1-month PO (p>0.05).

Each individual complication observed at the 1-month PO was statistically significant for correlation with the 1-week PO (p<0.05).

There was no statistically significant difference in the rate of complication by age group (p>0.05).

Rate of complications in diabetics is greater than non-diabetics at both the 1-week and 1-month PO, but the rate of overall complications is still not statistically significant (p>0.05).

CONCLUSION

The 1-week post-operative visit can be deferred for patients without intraoperative complications and unremarkable 1-day post-operative visits.
- This idea can be applied to patients with or without diabetes and of any age group.
- The same exclusion criteria used in the study should also be applied to determine patient inclusion.
- It is medically necessary for patients that experience any of the exclusion criteria to return for follow-up care at the 1-week post-operative appointment.

The need for eye care and cataract surgery are expanding. Limiting the 1-week PO visit will streamline patient care and allow the allocation of resources to patients who are in most need of care.

CONTACT INFORMATION

Mallory McLaughlin, OD, FAAO
mmclaughlin@ico.edu • www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Oculomotor Nerve Palsy With Pupillary Involvement Caused By Herpes Zoster Ophthalmicus

Negar Sohbati, O.D.; Christina Morettin, O.D., FAAO
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Herpes zoster occurs as a reactivation of the latent varicella zoster virus, which otherwise remains dormant in the trigeminal ganglion. Once reactivated, it can affect any of the three branches of the trigeminal nerve. The ophthalmic division is affected in 7-15% of cases, resulting in herpes zoster ophthalmicus (HZO). In rare cases, patients will present with neurologic complications associated with HZO. Of these complications an oculomotor nerve (CN III) palsy with pupillary involvement is among the rarest. With only a handful of isolated case reports in the literature, there is no true consensus on the underlying etiology.

CASE PRESENTATION

An 81 year-old African American female presented to the urgent eye care clinic with a chief complaint of a "left droopy eyelid" (Figure 1). She had a history of left sided HZO which was diagnosed by her primary care physician 2 days prior to the onset of her left droopy eyelid. She was taking 1g of valacyclovir TID, by mouth.

CLINICAL FINDINGS

Table 1 summarizes her entering visual acuity and CVF, showing decreased visual acuity in her left eye. Pupil testing was significant for a minimally reactive, mid-dilated left pupil (Table 2). Her EOMs showed restricted elevation and adduction in the left eye only. Examination findings revealed a maculo-papular rash of the CN V1 dermatome consistent with HZO (Figures 1&2) and a complete left sided CN III palsy with pupil involvement (Figure 2). Hutchinson sign was not observed. Anterior and posterior segment examination was unremarkable with no signs of corneal involvement or ocular inflammation. She was referred to the local emergency department for a neurology consult with MRI and MRA. The MRI and MRA revealed unremarkable findings with no evidence of an aneurysm or mass (Figure 3a/3b). Blood work results were also unremarkable. It was ultimately determined that the HZO induced her CNIII palsy with pupil involvement. A 10-day course of 1g valacyclovir was completed, and no additional treatment was warranted.

TABLE 1
Entering visual acuity and confrontation visual fields

	OD	OS
VA(sc)	20/25 PHNI	20/60 PH 20/40
CVF	FTFC	FTFC
Rx	Plano – 1.50 x 015	Plano – 2.50 x 170

TABLE 2
Pupil testing revealing a minimally reactive, mid-dilated left pupil

	OD	OS
Bright	2.5 mm	5 mm
Dim	5mm	5 mm
APD	(-) APD	(-) APD on reverse

FIGURE 1
Resolving maculo-papular rash involving the CN V1 dermatome. Complete left sided ptosis.

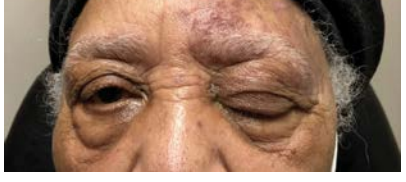
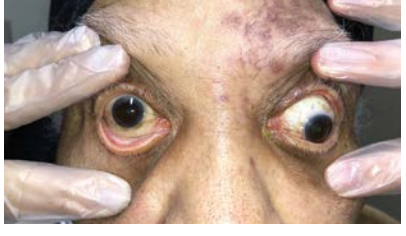


FIGURE 2
Left eye sitting down and out, with a mid-dilated, non-reactive pupil on the left side.



DIAGNOSIS AND DISCUSSION

A posterior communicating artery aneurysm, or a space-occupying lesion of the brain is of utmost importance to rule out for an acute CN III palsy with pupil involvement. However, we must be aware of other potential pathological causes, including HZO. Although pupil involvement is rare, it has been shown that CN III is the most common nerve to be affected secondary to HZO. Ophthalmoplegia can occur anywhere from 2 to 42 days after the onset of the HZO rash. Complete resolution ranges from 2 weeks to 1.5 years, with few cases showing residual ptosis and/or limited ocular motility even past 1.5 years. Treatments beyond oral antivirals, such as intravenous antivirals or oral steroids, have not been found to have any additional benefits on these patients.

FIGURE 3A - MRI
Sagittal cut, T1 weighted image showing unremarkable findings.

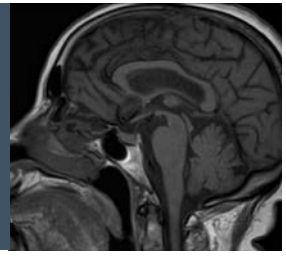
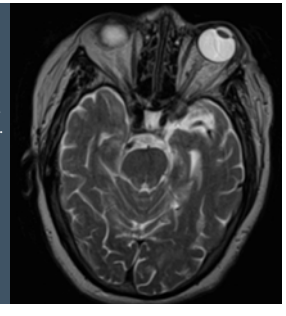


FIGURE 3B - MRI
Axial cut, T2 weighted image with gadolinium. Motion artifact seen; otherwise no aneurysm, mass or other abnormalities noted.



MANAGEMENT

No further treatment, beyond the 10-day oral course of valcyclovir, was indicated in our patient. Consultations with neurology and infectious disease were completed and confirmed management. Improvement in her ptosis, and complete resolution of diplopia was reported at 3 months.

CONCLUSION

It is important to follow the standard of care for pupil involved CN III palsies and ensure MRI and MRA imaging is completed in a timely manner to rule out life-threatening etiologies of an aneurysm at the posterior communicating artery or a space occupying lesion of the brain. However, we must be aware of other causes, such as HZO. For a pupil involved CN III palsy owing to HZO, treatment is limited to 1g oral valacyclovir with close observation. Practitioners should be educating patients over the age of 50 on the FDA approved vaccine, Shingrix, to reduce the incidence of herpes zoster and potential complications associated with it.

REFERENCES

1. Center for Biologics Evaluation, Research. SHINGRIX. Fda.gov. Published February 8, 2021. Accessed September 13, 2021. https://www.fda.gov/vaccines-blood-biologics/vaccines/shingrix
2. Edgerton AE. Herpes zoster ophthalmicus: Report of cases and review of literature. *Arch Ophthal.* 1945;34(2):114.
3. Harthan JS, Borgman CJ. Herpes zoster ophthalmicus-induced oculomotor nerve palsy. *J Optom.* 2013;6(1):60-65.
4. Quisling SV, Shah VA, Lee HK, et al. Magnetic resonance imaging of third cranial nerve palsy and trigeminal sensory loss caused by herpes zoster. *J Neuroophthalmol.* 2006;26(1):47-48.
5. Sanjay S, Chan EW, Gopal L, Hegde SR, Chang BC-M. Complete unilateral ophthalmoplegia in herpes zoster ophthalmicus. *J Neuroophthalmol.* 2009;29(4):325-337.
6. Zheng C, Sy LS, Tanenbaum H, et al. Text-based identification of herpes zoster ophthalmicus with ocular involvement in the electronic health record: A population-based study. *Open Forum Infect Dis.* 2021;8(2):ofaa652.

CONTACT

Christina Morettin, O.D., FAAO
CMorettin@ico.edu
www.ico.edu

Table of Contents

Junctional Scotoma Secondary to Chordoma

Pedram Pourhosseini , O.D. and Christina Morettin, O.D., FAAO
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Chordoma is a rare primary bone tumor that arises from the cellular remnants of the notochord. Malignant transformation of these cellular remnants often occurs in the third and fourth decades of life and has a predilection for the skull base. This case aims to review junctional scotoma pattern of visual field loss and present a rare case of junctional scotoma secondary to chordoma.

CASE PRESENTATION

A 40-year-old Hispanic female presented for sudden onset painless loss of vision in the left eye. Patient's past ocular history was unremarkable and denied experiencing any symptoms of pain on eye movement, paresthesia of extremities or any other visual complaints.

PERTINENT FINDINGS

TABLE 1
Entering visual acuity and confrontation visual fields

	OD	OS
VAcc	20/20	CF1'- PH NI
EOMs	FROM, (-) pain	FROM, (-) pain
CVF	FTFC	unable to see fingers
Pupils	PERRL, (-) APD	PERRL, 2+ APD

Anterior Segment and Dilated Fundus Evaluation
Unremarkable OD, OS

Imaging Studies
- Cirrus OCT of optic nerve and macula
  - At presentation (Figure 1)
  - At the three month follow up (Figure 2)
- 24-2 HVF III
  - At presentation (Figure 3)
  - At the three month follow up (Figure 4)
- MRI (Figure 5)

Junctional scotoma
Lesions at the junction of the optic nerve and optic chiasm may produce a characteristic visual field defect. A mass compression of the ipsilateral optic nerve, results in a central scotoma. The fibers from the inferonasal retina of the contralateral eye within the chiasm, may loop anteriorly for a short distance in the ipsilateral optic nerve (known as Wilbrand's knee). Involvement of Wilbrand's knee produces a superotemporal scotoma in the contralateral eye. The combination of ipsilateral central scotoma and contralateral superotemporal scotoma is known as a junctional scotoma.

FIGURE 1: PanoMap of RNFL and GCC at presentation OD and OS

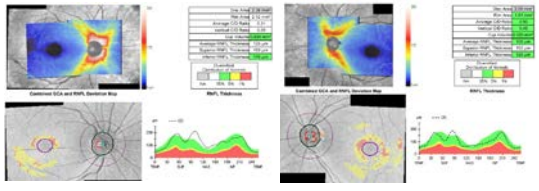


FIGURE 2: PanoMap of RNFL and GCC at 3-month follow-up OD and OS

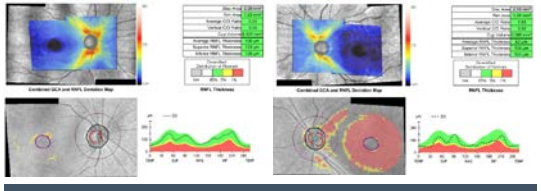


FIGURE 3: HVF 24-2 size III at presentation OD and OS

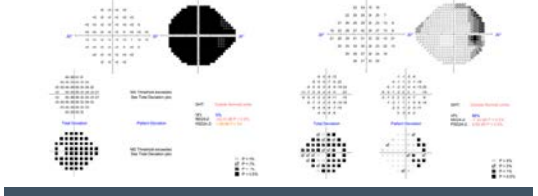


FIGURE 4: HVF 24-2 size III at 3-month follow up OD and OS

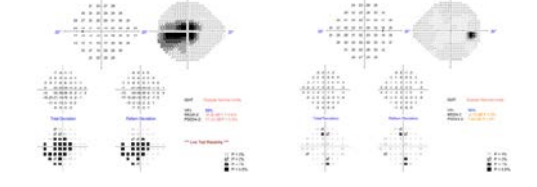


FIGURE 5A
T1 MRI Axial Cut without contrast

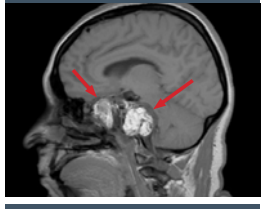


FIGURE 5B
T2 MRI Coronal Cut without contrast

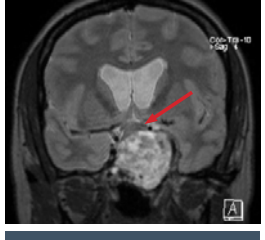
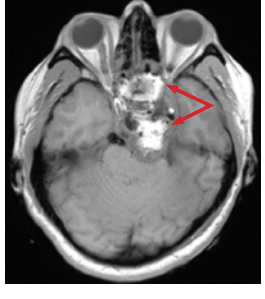


FIGURE 5C
Flair MRI Sagittal Cut with contrast



DIAGNOSIS AND MANAGEMENT

MRI of the brain and orbit with and without gadolinium revealed a large skull-based mass (7.2cm x 4.2cm) compressing the optic chiasm and causing superior displacement of the prechiasmal segment bilaterally. The biopsy of the mass later confirmed it to be a chordoma. The patient was then referred to neurology for further evaluation and mass resection. The majority of the tumor was removed through a transsphenoidal approach followed by high dose proton radiation therapy.

CONCLUSION

Optic neuritis is the most common underlying etiology amongst patients with similar demographics and presenting visual complaints. However, it's important to also consider other etiologies such as compressive and traumatic optic neuropathies. Pattern of visual field loss determined by Humphrey visual field testing, pattern of ganglion cell complex and retinal nerve fiber loss on optic nerve OCT and most importantly MRI of the brain and orbit with and without gadolinium can be helpful tools in determining the exact etiology of painless loss of vision. Chordomas, although rare, can be a cause of acute unilateral vision loss owing to compressive etiology at the optic chiasm.

REFERENCES

- Foroozan R. Chiasmal syndromes. Curr Opin Ophthalmol. 2003 Dec;14(6):325-31. doi: 10.1097/00055735-200312000-00002. PMID: 14615635.
- Milea D, LeHoang P. An unusual junctional scotoma. Surv Ophthalmol. 2002 Nov-Dec;47(6):594-7. doi: 10.1016/s0039-6257(02)00351-x. PMID: 12504743.
- Chugh R, Tawbi H, Lucas DR, Biermann JS, Schuetze SM, Baker LH. Chordoma: the nonsarcoma primary bone tumor. Oncologist. 2007 Nov;12(11):1344-50. doi: 10.1634/theoncologist.12-11-1344. PMID: 18055855.
- Ferraresi V, Nuzzo C, Zoccali C, Marandino F, Vidiri A, Salducca N, Zeuli M, Giannarelli D, Cognetti F, Biagini R. Chordoma: clinical characteristics, management and prognosis of a case series of 25 patients. BMC Cancer. 2010 Jan 28;10:22. doi: 10.1186/1471-2407-10-22. PMID: 20109225; PMCID: PMC2828414.

CONTACT

Pedram Pourhosseini OD
ppourhosseini@mcw.edu
www.ico.edu

Table of Contents

Managing Visual Field Defects in a Patient Taking Vigabatrin with a Right Homonymous Hemianopia from a Hemispherectomy

Olivia Nichols OD • Leonard Messner OD, FAAO • Mary Flynn Roberts OD, FAAO • Harneet Randhawa OD, FAAO • Raman Bhakhri OD, FAAO
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Vigabatrin is an antiepileptic medication that inhibits GABA transaminase increasing GABA concentrations. GABAc receptors are 10 times more sensitive to GABA and are found in ganglion cells, Müller cells, photoreceptors, axon terminal, bipolar cells, and amacrine cells within the retina. The increase in GABA concentration leads to an osmotic imbalance causing cell death. This ultimately leads to retinal toxicity and visual field (VF) loss in 25-50% of patients. This case covers how to identify and monitor retinal toxicity and visual field defects secondary to vigabatrin in a patient with confounding visual field and optical coherence tomography (OCT) defects from a right homonymous hemianopia due to a left hemispherectomy.

CASE PRESENTATION

A 21-year-old Hispanic female presents to clinic with the complaint of progression of VF loss in her right eye for two months. The patient reports she feels her VF loss has progressed "further along the midline". She has a past ocular history pertinent for a right homonymous hemianopia and past medical history pertinent for Rasmussen encephalitis, a chronic, progressive inflammation and atrophy of one cerebral hemisphere. The patient was treated with a left hemispherectomy in 2011. She is taking three antiepileptic medications: vigabatrin 1500mg BID since 2014, topiramate 25mg BID and lacosamide 200mg BID.

DIAGNOSIS

The diagnosis for our patient is a right homonymous hemianopia secondary to a left hemispherectomy in the presence of vigabatrin use without retinal toxicity. The electroretinogram (ERG) assesses photoreceptors, bipolar, and Müller cells which are the affected retinal cells in vigabatrin use. Retinal toxicity secondary to vigabatrin use typically presents on ERG as a reduction in cone b-wave amplitude. The normal ERG in our patient leads us to our diagnosis. Deterioration of the optic nerve and ganglion cell layer does not impact the ERG results.

FIGURE 1
Entrance testing

	OD	OS
VAsc	20/25-2	20/30-2
CVF	Abnormal Temporal Field	Abnormal Nasal Field
EOM	FROM	FROM
Pupils	Equal, Round, Reactive to Light No RAPD	Equal, Round, Reactive to Light No RAPD

FIGURE 2 & 3
Posterior pole photos with bow tie atrophy of the optic nerve OD and temporal pallor of the optic nerve with superior myelinated nerve fiber layer OS. No membranous retinal appearance or macular RPE disruption OD, OS.

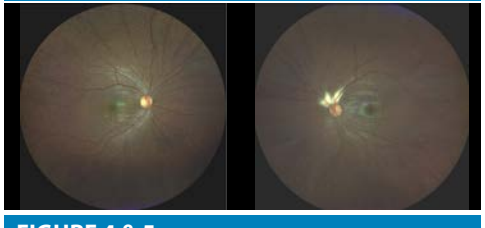


FIGURE 4 & 5
OCT showing RNFL thinning OD, OS as well as homonymous GCC thinning due to retro chiasmal visual pathway loss.

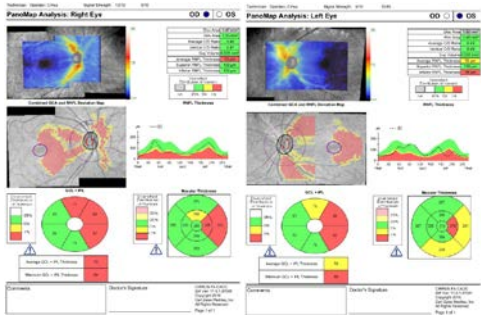


FIGURE 6 & 7
24-2 HVF with right homonymous hemianopia secondary to the left hemispherectomy

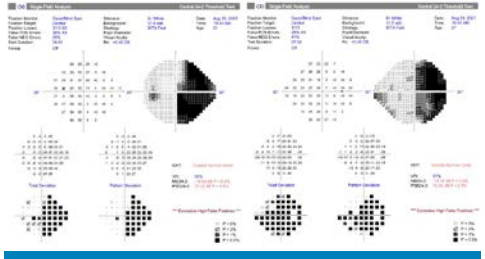
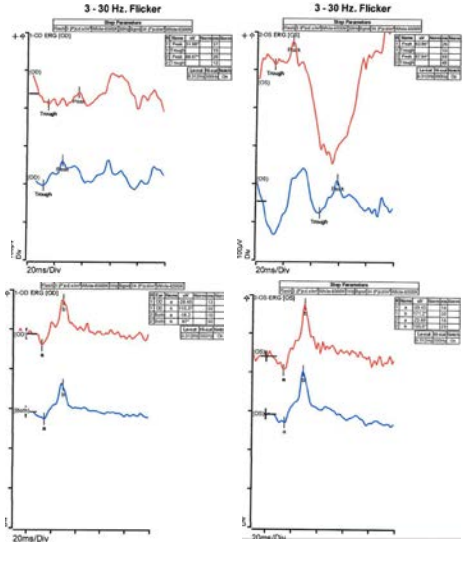


FIGURE 8 -11
Normal photopic full-field ERG and 30 Hz flicker OD, OS



DISCUSSION

Retinal toxicity and VF defects can occur at any dose of vigabatrin, but there is a strong correlation at the maximum dose of 3 grams. VF loss is usually detected 5-6 years after initiating treatment but can occur as early as 6 months and is not recovered after the patient discontinues the medication. VF loss secondary to vigabatrin is typically bilateral, peripheral nasal constrictions with the temporal and macular fields significantly less affected. On fundus examination, retinal toxicity appears as inverse optic atrophy, macular RPE disruption, and membranous retinal appearance. Comprehensive eye examinations and VF testing should occur prior to the initiation of vigabatrin to establish a baseline. Follow up examinations should occur every 3-6 months to assess the fundus, VF, OCT, and ERG. If there is retinal toxicity secondary to vigabatrin, the prescribing doctor may reduce the dose and continue to closely monitor for progression or discontinue the medication.

CONCLUSION

Multimodal, serial imaging is important when assessing patients with confounding VF and OCT defects. Additionally, ERG testing can be an important objective test to demonstrate retinal toxicity. Obtaining both objective and subjective measurements allow doctors to better educate patients on the cause of their visual field loss.

REFERENCES

Available upon request

CONTACT

Olivia Nichols OD
ONichols@ico.edu
www.ico.edu

Table of Contents

Marcus-Gunn Jaw Winking Phenomenon

Jeress Pendleton, OD
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

ABSTRACT

The mother of a 30-month African American male reported to clinic with concerns of eyelid drooping since birth. Examination revealed a unilateral upper eyelid ptosis with isoametropic meridional amblyopia. In this case report, we will review the etiology, clinical presentation and management of Marcus-Gunn Phenomenon as well as the ocular complications that could result.

CASE HISTORY

A 30-month African American male presented with right upper eyelid drooping that intermittently twitched and fluttered since birth. This was the patient's first comprehensive eye exam and the mother denies any eye turns, discharge or redness. The patient had no known drug allergies and was not taking any medications. Mother reported full term pregnancy. The patient was meeting all developmental milestones.

Systemic health conditions:
- Heart arrhythmia
- Denied limb/muscle weakness – pertinent negative

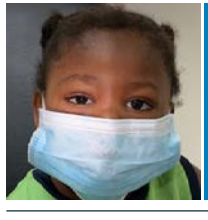


FIGURE 1A
Right upper eyelid ptosis in primary gaze. Ptosis not obstructing the visual axis. Normal corneal hirschberg reflex noted OD/OS.

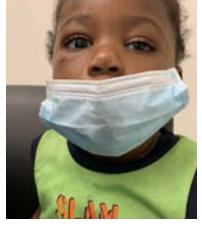


FIGURE 1B
Right upper eyelid ptosis improved with contraction of the muscles of mastication – patient opened mouth, smiled and chewed.

CASE PRESENTATION

Pertinent Exam Findings

Examination	OD	OS
VA sc, Cardiff Cards	20/40	20/40
Pupils	PERRL (-)APD	PERRL (-)APD
EOMs	FROM	FROM
Confrontations	Grossly full	Grossly full
Kappa	+0.50mm	+0.50mm
Dry Retinoscopy	+1.50 -2.50 x 005	+1.50 -3.00 x 170
Bruckner	Equal/red reflex	Equal/red reflex
IOP	Soft/equal	Soft/equal
SLE	2+ RUL ptosis	Normal
Wet Retinoscopy	+1.00 - 4.50 x 015	+0.50 - 5.50 x 170
DFE	0.45 h/v c/d, flat and intact posterior pole	0.45 h/v c/d, flat and intact posterior pole

Patient's Refractions

	OD	OS
Dry Retinoscopy	+1.50 - 2.50 x 005	+1.50 - 3.00 x 170
Wet Retinoscopy	+1.00 - 4.50 x 015	+0.50 - 5.50 x 170
Rx	Plano – 1.50 x 015	Plano – 2.50 x 170

Refractive Amblyopia Risk Factors

	Anisometropia	Isoametropia
Hypermetropia	>1D	>5D
Astigmatism	>1.5D	>2.5D
Myopia	>3D	>8D

DIAGNOSIS AND MANAGEMENT

Differential Diagnoses

- Marcus-Gunn Jaw Winking Phenomenon – Leading Diagnosis. Aberrant regeneration between the Trigeminal (V3) and Oculomotor nerves. Ptosis improved with mastication.
- Marin Amat Syndrome. Aberrant regeneration between the Trigeminal (V3) and Facial nerves. Eyelid closure with mastication.
- Horner's Syndrome. Disruption to the oculo-sympathetic nervous system pathway. Small ptosis with ipsilateral miosis, anhydrosis and heterochromia.
- Myasthenia Gravis. Autoimmune disorder at the skeletal muscle neuromuscular junction. Muscle/limb weakness with difficulty swallowing or speaking and fatigue.
- Cranial Nerve III Palsy. Due to aneurysm, ischemia, trauma or neoplasm. Large ptosis with mydriasis and extra-ocular muscle restriction.

Diagnosis

The patient was diagnosed with Marcus-Gunn Jaw Winking Phenomenon, Isoametropic Refractive Meridional Amblyopia OU – suspect and Hypermetropia OU.

Treatment and Management

The patient was prescribed a new spectacle prescription for full time wear with polycarbonate lenses. A Miraflex frame was recommended to help aid in patient compliance and spectacle durability. Currently, the patient is considered an amblyopia suspect due to borderline reduced visual acuity with significant astigmatism OU. As the patient matures, more reliable visual acuity can be measured. The patient will return to clinic in 3 months to reassess the vision, refraction and ptosis. It's important to monitor the ptosis closely to check for deprivation amblyopia.

DISCUSSION AND CONCLUSION

Marcus-Gunn is equal male/female predilection and makes up about 2-13% of congenital ptosis causes. The condition is almost exclusively unilateral, but can be bilateral in nature. CHARGE syndrome, cleft palate and olfactory abnormalities are common associated systemic conditions. The involved nerves include the Mandibular branch of the Trigeminal and the Superior branch of the Oculomotor. When the lateral and medial pterygoid muscles are contracted (via smiling, chewing, yawning, etc) the levator is activated and the upper eyelid is retracted. The ptotic lid can induce unilateral astigmatism due to the tight apposition on the ocular surface. Surgical intervention for Marcus-Gunn is warranted if there is obstruction of the visual axis and/or vertical strabismus. The procedure involves unilateral levator excision with bilateral frontalis suspension. Surgery was not recommended for this patient given the patient's age, absence of strabismus and clear visual axis.

ACKNOWLEDGEMENTS AND REFERENCES

A sincere thank you to Dr. Alaina Bandstra and Dr. Christine Allison for their support and recommendations with this case report and presentation.

1. Adam J Cohen, M. (2021, July 20). Ptosis (Blepharoptosis) in Adults Differential Diagnoses. Retrieved from https://emedicine.medscape.com/article/1212082-differential
2. Bagheri, N. N., & Wajda, B. N. (2017). The Wills eye manual: Office and emergency room diagnosis and treatment of eye disease. Philadelphia, PA: Wolters Kluwer.
3. David, D., Chiavaroli, V., Lanci, M., Sabatini, L., Greco, S., Carinci, S., . . . Valerio, S. D. (2020, December 20). Neonatal diagnosis of Marcus Gunn jaw-winking syndrome. Retrieved from https://onlinelibrary.wiley.com/doi/10.1002/ccr3.3664
4. Gandhi, N., MD. (2010, July 20). Congenital Ptosis. Retrieved September 21, 2021, from https://webeye.ophth.uiowa.edu/eyeforum/cases-i/case114/JawWink.html
5. Malhotra, A. (2013, July 18). Marin-Amat syndrome: A case of acquired facial synkinesis. BMJ Case Reports. Retrieved September 18, 2021, from https://casereports.bmj.com/content/2013/bcr-2013-010030.
6. "Marcus Gunn PHENOMENON." NORD (National Organization for Rare Disorders), 2003, rarediseases.org/rare-diseases/marcus-gunn-phenomenon/.
7. Senthilkumar, V. A. (2021, February 14). Marcus Gunn Jaw Winking Syndrome. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK559058/
8. What is Ptosis? Droopy Eyelid Causes, Correction, Treatment, Surgery and Everything to Know. (2020). Dream. https://dreamplasticsurgery.com/ptosis-droopy-eyelid-causes-treatment-surgery/
9. Ziga, N., Biscevic, A., Pjano, M. A., & Pidro, A. (2019, August). Marcus Gunn Jaw-Winking Syndrome: A Case Report. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6853731/

CONTACT

Jeress Pendleton, O.D. • jpendleton@ico.edu

Table of Contents

Treatment of Central Serous Chorioretinopathy with Topical NSAIDs in a Phakic Patient: A Case Comparison

Janette Pérez, OD • Harneet Randhawa, OD, FAAO • Seenu Hariprasad, MD
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Central Serous Chorioretinopathy (CSCR) is a common form of retinopathy characterized by a sub-foveal neurosensory retinal detachment. The condition is more commonly seen in males and within the 3rd and 6th decades of life. Central vision loss and distortion are the principle visual complaints. The retinopathy can be classified based on the recurrent nature and chronicity of the presentation. This is a case comparison of two phakic patients presenting with CSCR. Patient A is monitored while Patient B is treated with a topical non-steroidal anti-inflammatory drug (NSAID).

CASE PRESENTATION

Patient A, a 26 year-old Asian male, complains of new onset flashes of light and distortions in the central vision OS that follow the gaze. Reports progressive worsening of symptoms since their onset 6 days ago. See Figure 1A for clinical testing results. OCT imaging revealed a central sub-retinal fluid, see Figure 2A.

Patient B, a 51 year-old Hispanic male, complains of a floater described as a black spot in the central vision OD at moves with the gaze x 1 week. See Figure 1B for clinical testing results. OCT imaging revealed central sub-retinal fluid, see Figure 2B.

Patient A is monitored while Patient B is treated with a topical non-steroidal anti-Inflammatory drug (NSAID). Further investigation was conducted to determine the mechanism by which NSAIDs are suitable for the management of CSCR, a condition without an inflammatory-based pathophysiology. A pharmacological review of NSAIDs demonstrates their status as viable medications for the treatment of some retinal pathologies in phakic patients.

FIGURE 1A
Patient A clinical findings at presentation.

OD		OS
20/20	**Visual Acuity**	20/30, PH 20/20 EV
ERRL (-)RAPD	**Pupils**	ERRL (-)RAPD
FTFC	**CVF**	FTFC, difficulty focusing on fixation target
FROM	**EOMs**	FROM
Normal	**Amsler Grid**	Distorted centrally in 4mmx4mm region
• (-) Shafer's sign • Flat and evenly pigmented fovea • (+) foveal reflex	**DFE**	• (-) Shafer's sign • Blister-like appearance of fovea/parafoveal area • (-) foveal reflex
271µm	**Central Subfield Thickness (Cirrus OCT)**	**496 µm**

FIGURE 1B
Patient B clinical findings at presentation.

OD		OS
20/20	**Visual Acuity**	20/20-1
ERRL (-)RAPD	**Pupils**	ERRL (-)RAPD
FTFC	**CVF**	FTFC
FROM	**EOMs**	FROM
• (-) Shafer's sign • (+) CSCR, no heme • Crowded disc	**DFE**	• (-) Shafer's sign • Flat and evenly pigmented fovea • Crowded disc
327 µm	**Central Subfield Thickness (Cirrus OCT)**	**274 µm**

FIGURE 2A
Patient A. Cirrus Mac OCT. Sub-foveal neurosensory retinal detachment with focal pigmented epithelial detachment.

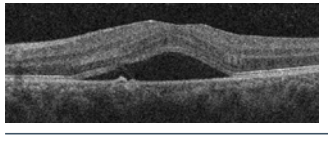


FIGURE 2B
Patient B. Cirrus Mac OCT. Shallow neurosensory detachment within the fovea with small PED and thickened choroidal vascular layer. Irregularly thick RPE layer under serous detachment.

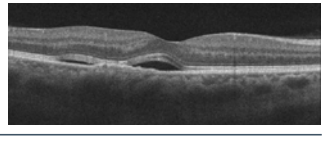


FIGURE 3A
Patient A, 2 month follow up. Cirrus Mac OCT. Macular architecture and foveal contour intact, sensory retina fully attached. Residual focal RPE irregularity nasal to fovea.

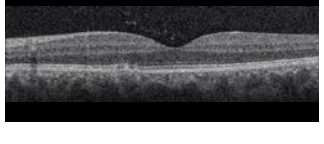
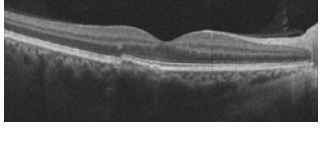


FIGURE 3B
Patient B, 3 month follow up. Cirrus Mac OCT. Macular neurosensory retinal is attached. Segment of RPE irregularity nasal to fovea distorting inner retinal layer organization.



TREATMENT AND MANAGEMENT

Patient A was diagnosed with an acute CSCR OS following testing with Cirrus OCT and ophthalmoscopic evaluation. Management involved monitoring the vision with a weekly Amsler Grid assessment. A follow up visit was scheduled for 8 weeks after the initial presentation. Patient B was diagnosed with a chronic CSCR OD following similar testing during a consultation with the retinal ophthalmologist. Management involved the initiation of bromfenac 0.09% QD OD. A follow up visit was scheduled for 12 weeks after initial consultation with the retinal specialist.

Patient A and Patient B reported resolution of the central scotoma and distortion at 7 weeks and 4 weeks after their initial encounter, respectively. OCT imaging at follow up visits reveals resolution of neurosensory retinal detachment in both cases. See Figures 3A and 3B.

DISCUSSION

A macular neurosensory retinal detachment that is accompanied by focal pigmented epithelial detachments (PEDs) must be differentiated from various conditions that can be associated with maculopathy. CSCR is a common retinopathy without a proven pathophysiologic mechanism.

A systemic hypercortisolism state has been attributed to the condition as cortisol induces hyperpermeability of choroidal capillaries via mineralocorticoid receptor activity within the choroidal vasculature (Figure 4). Focal changes to the choroidal endothelial cells prompt an increase in cytokine activity which induces an inflammatory cascade. Neighboring endothelial cells undergo morphologic changes leading to further vasodilation due to cyclooxygenase-2 (COX-II). NSAIDs, particularly those with COX-II inhibitory mechanisms (Figure 5), have allowed for significantly faster resolution of subretinal fluid in patients with CSCR and have shown the capability of penetrating to the posterior pole.

FIGURE 4
Mineralocorticoid receptor and cortisol activity within the choroid vasculature leads to vasodilation.

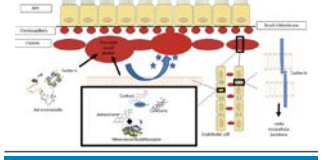
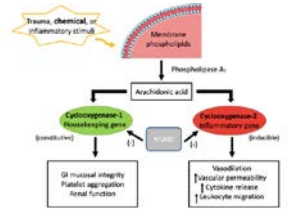


FIGURE 5
The role of NSAIDs in the arachidonic acid pathway will have an inhibitory effect on cyclooxygenase-I and cyclooxygenase-II.



CONCLUSION

Topical NSAIDs should be considered as a treatment option for patients with acute CSCR, including phakic patients. In particular, bromfenac or nepafenac should be prescribed given the evidence of good ocular penetration, excellent safety profile, and good bioavailability to the uveal and retinal tissue. The optometrist should determine disease classification and rely on persistent anatomical findings to determine the chronicity of the condition. A retinal consultation should be strongly considered when there is a question of choroidal neovascular membrane formation.

REFERENCES

Available upon request.

CONTACT

Janette Pérez, OD • **jperez**@ico.edu

Table of Contents

Impact of COVID-19 Vaccine on Mental Health in Ophthalmic Personnel and Students

Connor Robbs, B.S.[1]; Yi Pang, Ph.D.[1], O.D.; Meng Li Ph.D.[2]; Jingyun Wang Ph.D.[3]

Illinois College of Optometry, Chicago, IL[1], University of Colorado Denver, Denver, CO[2], State University of New York College of Optometry, New York, NY[3]

3241 South Michigan Avenue, Chicago, Illinois 60616

PURPOSE

- Previously, we reported that **COVID-19 significantly impacted mental health** of ophthalmic personnel and students.
- The **purpose** of this study was to determine whether C**OVID-19 vaccines would protect eye care professionals, staff, and optometry students** from mental health disorders including **depression, anxiety, and stress**.

METHODS

- This was a **cross-sectional, survey-based, region-stratified** study.
- The first survey was sent to **ophthalmologists, optometrists, ophthalmic staff, and optometry students** from June 23 to July 8, 20201.
- From **January 21, 2021 to February 2, 2021, second survey with 18 identical questions** as the first survey was sent to the individuals (n=1869) who participated in our first mental health study and were voluntarily providing their email address.
- The following **characteristics** were collected: demographics, stress level, symptoms for depression, anxiety, psychological stress using validated scales, and personal vaccine status.
- To study the association between vaccination status and mental health disorders including stress, depression, and anxiety, **Pearson's chi-square was performed.**

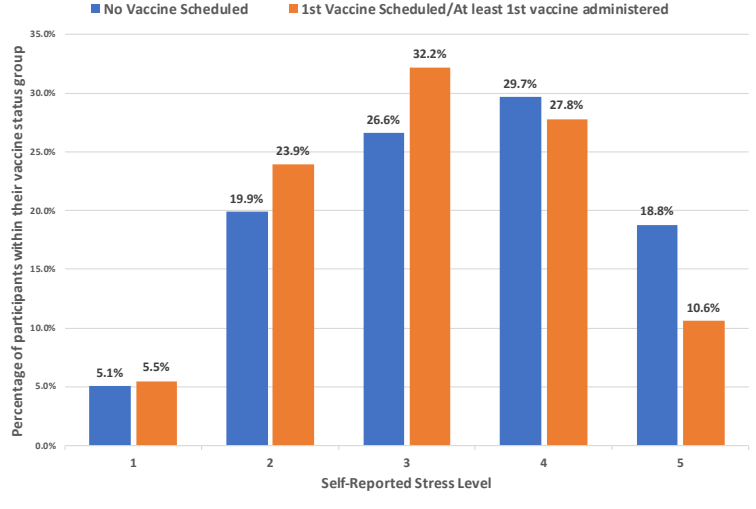
RESULTS

- A total of **824 individuals** (73.1% female and 25.0% male) across the USA and Canada responded to the second survey with the **response rate of 44.09%**.
- There were **482 (58.5%) participants** that had at least 1 of 2 vaccines, **84 (10.2%)** had the first vaccine scheduled, and **257 (31.2%)** did not have the first vaccine scheduled.
- A total of **43 ophthalmologists, 107 optometrists, 441 optometry students, and 226 optometric staff** participated in the survey.
- **Anxiety and depression symptom scores were lower** in participants with vaccination than in the ones without vaccination, but **no significant association was identified between vaccination and depression or anxiety** (P>0.05 for both).
- *Table 1 and Figure 1*

TABLE 1
Demographic characteristics of the participants (n = 824)

CHARACTERISTIC	N (%)
GENDER	
Female	602 (73.1)
Male	206 (25.0)
Non-binary	3 (0.4)
Trans non-binary	1 (0.1)
Identity not listed	6 (0.7)
Decline to specify	4 (0.5)
Missing	2 (0.2)
RACE	
White	519 (63.0)
Black	31 (3.8)
Asian	213 (25.8)
American Indian/Alaska native	1 (0.1)
Native Hawaiian or Other Pacific Islander	5 (0.6)
More than one race	26 (3.2)
Decline to specify	23 (2.8)
Missing	4 (0.5)
ETHNICITY	
Hispanic/Latino	50 (6.1)
Non-Hispanic/Latino	719 (87.3)
Decline to specify	48 (5.8)
Missing	5 (0.6)
OCCUPATION	
Ophthalmologist	43 (5.3)
Optometrist	107 (13.1)
Optometry Student	441 (54.0)
Optometric Staff	226 (27.7)
VACCINATION STATUS	
Received 1st or 2nd dose of vaccine	1604 (75.5)
1st vaccine scheduled, but have not received	130 (6.1)
Unvaccinated and not scheduled to receive	139 (6.5)
VACCINATION STATUS CORRELATIONS	
Change in Stress	P= .016, X^2=19.646
Change in Anxiety	P= .227, X^2=3.059
Change in Depression	P= .476, X^2=17.968

FIGURE 1 - Vaccine Status and Stress Level



CONCLUSION

- We found that the **COVID-19 vaccination was significantly associated with lower stress level in ophthalmic personnel and students.**
- Eye care personnel and students **without vaccination were 2.08 times more likely to have the highest stress level** than ones who were vaccinated.
- This study shows the **benefit of vaccination** on **certain components of mental health** in ophthalmic personnel and students.

REFERENCES

1. Pang, Yi, et al. "Risk Factors for Mental Health Symptoms during the COVID-19 Pandemic in Ophthalmic Personnel and Students in USA (& Canada): a Cross-Sectional Survey Study." *In press BMC Psychiatry.*

CONTACT

Connor Robbs, BS
CRobbs@eyedoc.ico.edu

Yi Pang, Ph.D
ypang@ico.edu
www.ico.edu

Table of Contents

Even-Number Measurement Bias with Goldmann Applanation Tonometry in Glaucoma Patients and Glaucoma Suspects

[1]Alina Shahid, BSc, [1]Kosha Patel, MSc, BSc, [1]Ramanjot Kingra, BSc, [1]Anne Rozwat, OD, [1,2]Daniel Roberts, OD, PhD

[1]Illinois Eye Institute, Illinois College of Optometry, Department of Clinical Education, Chicago, IL [2]University of Illinois at Chicago, School of Medicine, Department of Ophthalmology and Visual Sciences, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Intraocular pressure (IOP) assessment is a fundamental component of an ocular examination, and its accurate measurement is critical in the management of glaucoma. The "gold standard" for IOP measurement is Goldmann applanation tonometry (GAT). Previous studies have shown that even-number measurement bias may be common with this method due to the 2 mm Hg IOP gradation on the standard GAT drum wheel (Figure 1). To determine whether this bias may persist during the examination of patients for which IOP measurement is more critical, we explored IOP values among patients who were known to the examiner to carry a glaucoma diagnosis or suspicion for glaucoma. We hypothesized that the tendency for even-number measurement bias may be less demonstrable among these types of patients compared to patients without a glaucoma-related diagnosis.

METHODS

IOP readings were collected retrospectively from a random sample of records belonging to patients examined at the Illinois Eye Institute in Chicago, Illinois, USA over a 6-year period. The first visits of these patients during the sampling period were utilized and the right eye data was used for analyses. Records of selected patients were reviewed to confirm classifications at time of measurement according to the diagnosis of glaucoma suspect without ocular hypertension, glaucoma suspect with ocular hypertension, low tension glaucoma taking medications, and high-tension glaucoma taking medications. For comparison, the distribution of IOP measurements among a sample of normal control subjects without suspicion for glaucoma was also analyzed.

FIGURE 1

Goldmann applanation tonometry drum wheel, illustrating the 2 mm Hg increment scale that may predispose IOP measurements to an even-number predilection.

FIGURE 2

Distribution of GAT IOP measurements in subjects for whom there was no suspicion for glaucoma. Red "x's" highlight the propensity for even-numbered measurements.

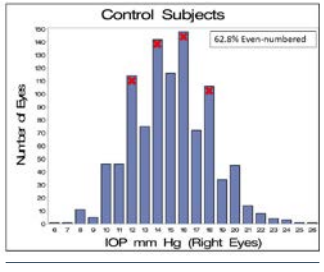


FIGURE 3

Distribution of GAT IOP measurements in glaucoma suspects without overt ocular hypertension (A), glaucoma suspects with overt ocular hypertension (B), high-tension glaucoma patients taking IOP-lowering medications (C), and low-tension glaucoma patients taking IOP-lowering medications. Red "x's" highlight the propensity for even-numbered measurements.

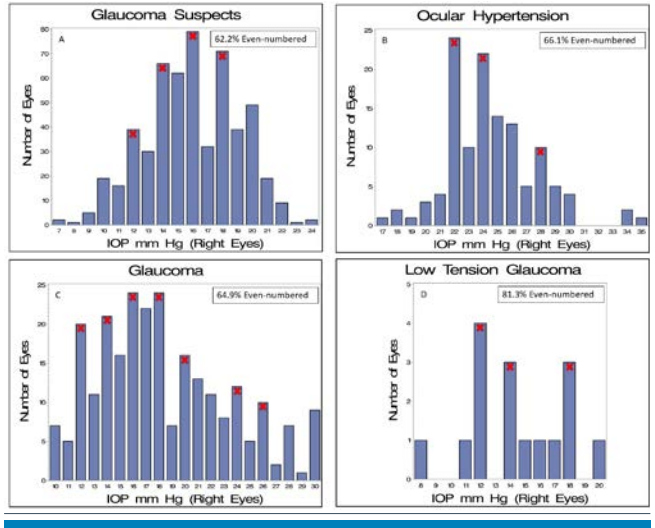


TABLE 1 - EVEN-NUMBER vs ODD-NUMBER TENDENCY USING GAT

Subjects	[‡]Age ± SD	[§]IOP ± SD	African American Race	Female Gender	[†]IOP Digit Proportion Even / Odd	P-value
Controls (N=995)	49.4 ± 16.7	15.2 ± 3.1	84.8%	66.2%	*62.8% / 37.2%	<0.0001
Glaucoma Suspects (N=547)	66.0 ± 14.3	19.4 ± 8.5	81.0%	60.5%	*62.2% / 37.8%	<0.0001
Ocular Hypertension (N=121)	61.7 ± 13.8	24.6 ± 3.1	88.4%	62.0%	*66.1% / 33.9%	<0.001
Glaucoma (N=285)	59.1 ± 13.9	16.1 ± 3.8	90.9%	55.4%	*64.9% / 35.1%	<0.0001
Normal Tension (N=16)	71.2 ± 12.6	14.4 ± 3.2	75.0%	62.5%	*81.3% / 18.7%	<0.01

Abbreviations: IOP, intraocular pressure; N, number of subjects; SD, standard deviation
[‡]Mean age, denoted in years
[§]Mean IOP, denoted in mm Hg
[†]Right eyes used in analysis

RESULTS

An even-numbered IOP preference was present among each group studied (Table 1). For the control group (N=995), the even/odd IOP digit proportions were 62.8%/37.2% (P<0.0001, Figure 2). The even-number bias persisted among the other groups regardless of classification (Figure 3), with specific even/odd IOP distributions being 62.2%/37.8% for glaucoma suspects (N=547, P<0.0001), 66.1%/33.9% for ocular hypertensives (N=121, P<0.001), 64.9%/35.1% for high-tension glaucoma patients (N=285, P<0.0001), and 81.3%/18.7% for low-tension glaucoma patients (N=16, P<0.01).

CONCLUSIONS

In addition to patients without a glaucoma-related diagnosis, even-number measurement bias using GAT may persist when examining patients who are known to have glaucoma or a suspicion for glaucoma. This bias may reduce the accuracy of IOP measurement in patients and potentially could adversely affect clinical decision making. Clinicians and researchers should be aware of this type of even-number bias and how this can impact clinical care and investigations involving IOP analysis.

REFERENCES

1. Aziz, K., & Friedman, D. S. (2018). Tonometers-which one should I use? Eye (London, England), 32(5), 931–937.
2. Heijl, A. (2002). Reduction of intraocular pressure and glaucoma progression. Archives of Ophthalmology, 120(10), 1268–1279.
3. Hollows FC, Graham PA. (1966). Intra-ocular pressure, glaucoma, and glaucoma suspects in a defined population. British Journal of Ophthalmology, 50, 570–586.
4. Rozwat, A., & Roberts, D. K. (2020). Even-number measurement bias with Goldmann applanation tonometry. Journal of Glaucoma, 29(2), 124–126.

CONTACT

Alina Shahid, BSc
AliShahid@eyedoc.ico.edu
www.ico.edu

Table of Contents

Intracranial Dolichoectasia Involving the Visual Pathway in a Patient with Normal Tension Glaucoma

Claire Rocken, O.D.
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

BACKGROUND

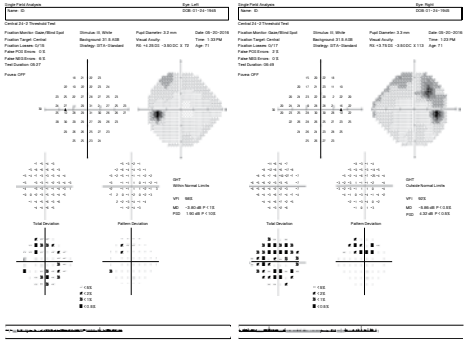
The term dolicoechtasia means dilated and elongated. It describes vessels that are elongated, distended and tortuous. This case discusses the role of dolichoectasia in a patient treated for NTG. With NTG patients in general, it is always important to rule out comorbidities and factors contributing to degeneration of the optic nerve, as these can cause vision and life-threatening issues for your patient.

BASELINE FINDINGS

- **Patient demographics:** 76-year-old African American male
- **Past medical hx:** COPD, DM
- **Past ocular hx:**
  - DM without retinopathy OU
  - cataracts OU
  - NTG OU
- **Ocular meds:** latanoprost qbedtime OU, patient reports good compliance
- **Allergies:** IV contrast media

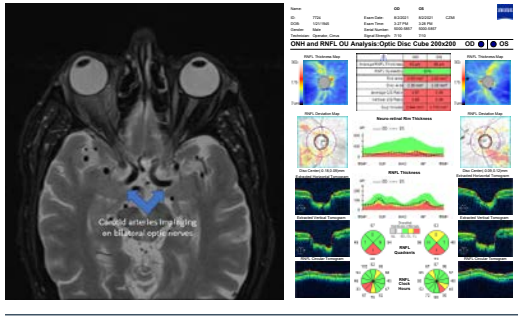
INITIAL PRESENTATION

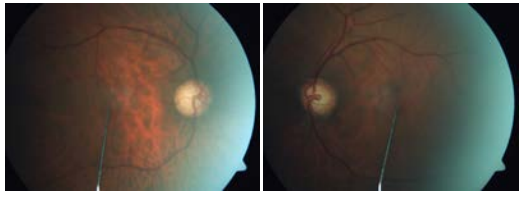
- Chief complaint: presented for a glaucoma follow up with no ocular complaints
- VA's: 20/25+ OD, 20/20 OS
- Pupils, EOM's normal, CVF normal
- HVF: superior temporal scotoma OD, OS that respected vertical midline
- Ishihara color vision 12/12 OD, 12/12 OS
- IOP's 12mmHg /13mmHg



FOLLOW UP VISIT

- MRI without contrast was ordered to rule out chiasmal pathology
- MRI of orbits without contrast: "tortuosity of the vessels of circle of Willis, including the vertebrobasilar arteries, both distal internal carotid arteries as well as the proximal branches of the anterior, middle and posterior cerebral arteries. These vessels appear to abut portions of the prechiasmatic segments of the optic nerve bilaterally, slightly worse on the right. The segments of the anterior cerebral arteries abut the anterior aspect of the optic chiasm, again slightly worse on the right. No gross displacement of the optic chiasm by the vessels."
- IOP's: 17 mmHg /17 mmHg
- Fundus exam
  - Vessels, macula and periphery clear and within normal limits
  - Nerves: 0.9 V/0/9 H OD, bare inferior and superior rim, 0.85/0.85 OS, bare inferior temporal rim, no pallor seen OU
  - Fundus photos taken
- OCT
  - OD: AT of 63, red inferior quadrant, and green elsewhere
  - OS: Red inferior quadrant, yellow superior and green elsewhere





TREATMENT AND MANAGEMENT

In NTG, control of IOP is still the mainstay of managing NTG patients, but consideration must be given to other factors especially factors the influence the perfusion of the optic nerve head. (Shields et al). This patient has NTG likely caused, or exacerbated by the distension of the vessels in the circle of Willis abutting the optic nerves. Neuro ophthalmology was consulted to consider the need for surgical intervention, but due to the relative stability of fields, it was determined no surgical intervention was necessary at this time. Given inadequate IOP in patient with NTG and comorbidity of dolichoectasia, brimonidine BID OU was added. Patient is to be monitored closely with fields, OCT's and IOP checks to determine the need for additional drops, or surgical intervention.

DISCUSSION/ CONCLUSION

Dolichoectatic arteries have weakening in vessel walls and cause the artery to elongate and distend. (Saber and Jones et al.) Cranial nerves are susceptible to neurovascular compression from dolichoectatic vessels. (Elmalem and Purvin et al). Dolichoectasia contributes to NTG, and NTG masquerades (Micieli and Margolin et al) and patients with NTG have been found to have a higher prevalence of tortuous and abnormal carotid arteries (Ogata and Imaizumi et al). Compression of the optic nerve by a normal, tortuous or dolichoectatic artery may result in optic neuropathy that resembles glaucoma (Micieli and Margolin et al). In this case, the patient has NTG/ NTG masquerader caused by the distension of the dolichoectatic carotid artery. Distension causing compression of the optic nerves has likely caused glaucomatous cupping in the absence of elevated pressure. For most patients with dolichoectatic intracranial arteries, conservative management is appropriate. Usually progression is slow and visual field loss is not disabling. Sometimes, surgical intervention may reverse visual loss and prevent further deterioration. (Purvin and Kawaski et al)

REFERENCES

- Department of Ophthalmology and Visual Science. "Normal-Tension Glaucoma: Is It Different from Primary... : Current Opinion in Ophthalmology." *LWW*, https://journals.lww.com/co-ophthalmology/Abstract/2008/03000/Normal_tension_glaucoma__is_it_different_from.2.aspx.
- Elmalem, Valerie I., and Valerie A. Purvin. "Does DOLICHOECTASIA of the Carotid Artery Cause OPTIC NEUROPATHY?" *Journal of Neuro-Ophthalmology*, vol. 38, no. 3, 2018, pp. 368–374., doi:10.1097/wno.0000000000000653.
- Jones, Jeremy. "Dolichoectasia: Radiology Reference Article." *Radiopaedia Blog RSS*, radiopaedia.org/articles/dolichoectasia-1?lang=us.
- Micieli, Jonathan A., and Edward A. Margolin. "Optic Disc Cupping Due TO DOLICHOECTATIC Internal Carotid Artery Optic Nerve Compression." *Journal of Neuro-Ophthalmology*, Publish Ahead of Print, 2020, doi:10.1097/wno.0000000000001113.
- Ogata, N. "Optic Nerve Compression by Normal Carotid Artery in Patients with Normal Tension Glaucoma." *British Journal of Ophthalmology*, vol. 89, no. 2, 2005, pp. 174–179., doi:10.1136/bjo.2004.047035.
- Purvin, V. "Dolichoectatic arterial compression of the anterior visual pathways: neuro-ophthalmic features and the clinical course." *J Neurol Neurosurg Psychiatry*, 2004.

CONTACT

Claire Rocken, O.D. • crocken@ico.edu • www.ico.edu

Table of Contents

Identifying Disparities Among Confirmed COVID-19 Cases within the IEI Patient Population

Patricia Salazar, OD and Christina Morettin, OD, FAAO
Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

PURPOSE

Urban areas were the epicenter of the COVID-19 pandemic. A previous query in 2020 identified 22 zip codes that accounted for over 75% of office visits within Chicago's Illinois Eye Institute (IEI)1. The proximity to which many individuals live in urban areas makes them particularly vulnerable to the spread of the virus. Additionally, factors such as income, gender, and race also influence one's risk for testing positive for COVID-19. The purpose of this study was to identify the number of positive COVID-19 cases by zip code in an urban Chicago eye clinic and assess the socioeconomic factors behind why some areas are more affected by the virus than others.

METHODS

- Between March 1, 2020 and May 31, 2020, twenty-two zip codes within the IEI population were identified as areas most highly affected by the COVID-19 pandemic and cross-referenced with zip codes and median incomes throughout Chicago.
- Beginning June 1, 2020, patients were asked a series of screening questions prior to and upon arrival at the IEI. A query of all office visits from June 1, 2020 to April 1, 2021 was performed to identify the number of patients who tested positive for COVID-19.
- Descriptive statistics were used to delineate the patient population upon re-opening at the IEI and compared to the Chicago population at large.
- Study results conducted by the Poverty Lab and University of Chicago2, and data presented by the Chicago Department of Public Health (CDPH)3 were gathered to illustrate how income tiers are correlated with health disparities among Chicagoans.

RESULTS

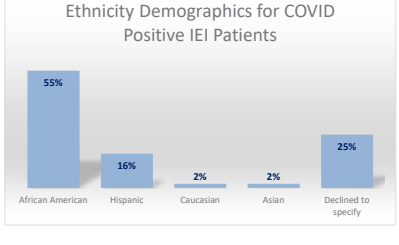
- A total of 695 IEI patients reported a positive history of COVID-19 (see Table 1). The overall percentage of self-reported confirmed COVID-19 cases within the IEI was 3.34% (n=695/20806).
- See Table 2 for demographic information on the IEI population who tested positive for COVID-19 compared to the general IEI population.
- Over half of the IEI's COVID-19 positive patient population (55%) reported as being African American (n=366/662, see Figure 1).
- Over one-third of IEI patients that reported a history of positive COVID-19 were age 60 or older (n=266/695, see Figure 2).

TABLE 1

	Chicago COVID (+) Patients		IEI COVID (+) Patients		Total IEI Patients	
	Number	Percent	Number	Percent	Number	Percent
Gender						
Male	11,017	47%	212	31%	7532	36%
Female	11,638	50%	450	65%	13267	64%
Undifferentiated			33	4%	7	<0.001%
Age						
> 60 years of age	5,523	24%	266	38%	8722	37%
50-59 years of age	4,177	18%	176	25%	3510	15%
40-49 years of age	4,426	19%	90	13%	2169	9%
30-39 years of age	3,970	17%	61	9%	1518	6%
20-29 years of age	3,623	16%	42	6%	1679	7%
<20 years of age	1,485	6%	60	9%	5812	25%
Ethnicity						
African American	7,940	34%	366	55%	12175	59%
Hispanic	7,615	33%	104	16%	1936	9%
Caucasian	973	4%	14	2%	766	4%
Asian	113	0.50%	11	2%	628	3%
Declined to specify	5,976	26%	167	25%	5301	25%

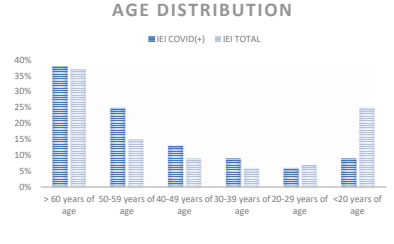
Demographics for patients with confirmed COVID-19 in Chicago from March 1, 2020 to May 31, 2020 vs patients within the IEI with a history of positive COVID-19 from June 1, 2020 to April 1, 2021. In both instances, African Americans have been disproportionately more affected by COVID-19 than the general Chicago population.

FIGURE 1. ETHNICITY DISTRIBUTION AMONG COVID+ IEI PATIENTS



The majority of patients reported as African American. This is consistent with the overall IEI patient population.

FIGURE 2. AGE DISTRIBUTION AMONG COVID+ IEI PATIENTS



This distribution is consistent with the overall IEI population, with highest in the 60+ age group.

DISCUSSION

Patients at the IEI with a history of COVID-19 were more likely to be African American and over 60 years of age. Income data previously gathered for IEI patients showed an average median household income of $38,368 compared to the median income of $70,760 per household in Chicago1.

Household impact surveys conducted by the Rustandy Center affiliated with the University of Chicago found the COVID-19 crisis has impacted Americans unequally depending on income, gender, and race. 42% of non-white workers making $45,000 to $75,000 reported losing income (compared to 26% of white workers within the same income bracket)2.

In addition to a higher housing density, lower-income households may also find it more difficult to social distance, with family members working in environments that do not allow working from home or where taking public transportation is unavoidable1. This socio-economic disparity consistently places IEI patients and other low-income households at an increased risk for income loss or instability, increased stress, and a higher risk of dying from COVID-19 than higher-income households.

CONCLUSION

Elderly individuals and those of African American ethnicity had the highest incidence of positive COVID-19 cases. While underlying conditions in part drive inequities between black and white individuals, these disproportions reflect their quality of life.

An increase in COVID-19 vaccination rates has resulted in an overall decrease in COVID-related deaths in Chicago, but the disparity between black and white Americans illustrates the impact that income and race-ethnicity groups have in response to a pandemic.

REFERENCES

1. Salazar P, Harthan J, Morettin C, Newman T, Chaglasian M. Identifying Confirmed COVID-19 Cases Among IEI Patient Population by Zip Code. AAO Poster, October 2020.
2.https://www.chicagobooth.edu/research/rustandy/blog/2020/how-are-americans-coping-with-the-covid19-crisis-7-key-findings

CONTACT INFORMATION

Patricia A. Salazar, OD
psalazar@ico.edu
www.ico.edu

Table of Contents

Meibomian Gland Atrophy and Dry Eye Symptoms in Children During COVID-19 Pandemic

Lindsay A. Sicks, OD, FAAO, FIACLE, FSLS; Chi Na Moua, BSc; Xiang Jun Liu, BSc; Denise Alexopoulos, OD, FAAO; Yi Pang, MD, OD, PhD, FAAO
Illinois College of Optometry, Chicago, IL
3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

The COVID-19 pandemic has increased electronic screen time for schoolwork and leisure in children. With increased screen time, the blink rate decreases from 12 blinks per minute to 3 blinks per minute, which can affect the integrity of the ocular surface[1]. Dry eye disease has not been extensively studied in the pediatric population and can be misdiagnosed as trauma, infection, or irritation[2].

The purpose of this study was to evaluate meibomian gland (MG) atrophy in children ages 5-16 using infrared meibomian gland imaging (meibography) and a modified, pediatric-friendly Ocular Surface Disease Index (OSDI)-type dry eye symptom survey.

METHODS

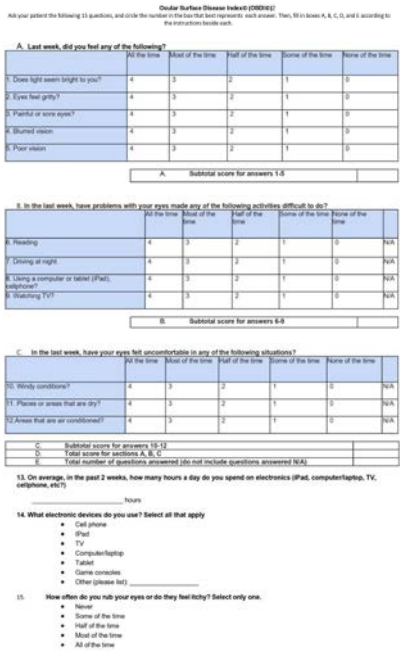
A total of 40 children, ranging in age from 5 to <16 years old, presenting to the Illinois Eye Institute between September and November 2020 were recruited for this study. All children received a comprehensive eye exam the same day as the study. Informed consent was obtained for participation. See Tables 1-3 for demographic makeup of subjects.

Tear film parameters were collected with the Keratograph 5M (Oculus, Wetzlar, Germany), including non-invasive tear film break-up time (NI-TBUT) and tear meniscus height (TMH)[3]. The upper and lower eyelids were everted and the meibomian glands were imaged. MG atrophy was assessed by two masked graders using the validated 4-point Arita scale[4]. MG tortuosity was evaluated by two masked graders using the 5-point Halleran tortuosity scale[5].

A modified OSDI survey was administered to the patient (see Figure 1; original OSDI is ©2004, Allergan, Irvine, CA). Both children and their parents were then surveyed on the child's electronic screen time.

Controlling for age, gender, race, and ethnicity, partial correlation was performed to determine the association between MG atrophy and the modified OSDI scores that represent severity of dry eye symptoms.

Figure 1: Modified OSDI Survey Instrument



Ocular Surface Disease Index® (OSDI®)

Ask your patient the following 15 questions, and circle the number in the box that best represents each answer. Then, fill in boxes A, B, C, D, and E according to the instructions beside each.

A. Last week, did you feel any of the following?

	All the time	Most of the time	Half of the time	Some of the time	None of the time
1. Does light seem bright to you?	4	3	2	1	0
2. Eyes feel gritty?	4	3	2	1	0
3. Painful or sore eyes?	4	3	2	1	0
4. Blurred vision	4	3	2	1	0
5. Poor vision	4	3	2	1	0

A. Subtotal score for answers 1-5

B. In the last week, have problems with your eyes made any of the following activities difficult to do?

	All the time	Most of the time	Half of the time	Some of the time	None of the time	
6. Reading	4	3	2	1	0	N/A
7. Driving at night	4	3	2	1	0	N/A
8. Using a computer or tablet (iPad), cellphone?	4	3	2	1	0	N/A
9. Watching TV?	4	3	2	1	0	N/A

B. Subtotal score for answers 6-9

C. In the last week, have your eyes felt uncomfortable in any of the following situations?

	All the time	Most of the time	Half of the time	Some of the time	None of the time	
10. Windy conditions?	4	3	2	1	0	N/A
11. Places or areas that are dry?	4	3	2	1	0	N/A
12.Areas that are air conditioned?	4	3	2	1	0	N/A

C: Subtotal score for answers 10-12
D: Total score for sections A, B, C
E: Total number of questions answered (do not include questions answered N/A)

13. On average, in the past 2 weeks, how many hours a day do you spend on electronics (iPad, computer/laptop, TV, cellphone, etc?)

_____ hours

14. What electronic devices do you use? Select all that apply
- Cell phone
- iPad
- TV
- Computer/laptop
- Tablet
- Game consoles
- Other (please list) _____

15. How often do you rub your eyes or do they feel itchy? Select only one.
- Never
- Some of the time
- Half of the time
- Most of the time
- All of the time

Questions 1 and 8 were modified to be more pediatric-friendly and relevant to children. Question 1 was changed from "Eyes that are sensitive to light?" to "Does light seem bright to you?" and Question 8 was changed from "Working with a computer or bank machine (ATM)" to "Using a computer, tablet (iPad) or cell phone?" Question 7 (driving) was clarified, if needed, during survey administration to focus more on riding in a car at night versus driving the car.

Tables: 1-3: Subject Demographics

Gender	n (%)
Male	24 (60)
Female	16 (40)

Race/Ethnicity	n (%)
African American	19 (47.5)
Hispanic or Latino	7 (17.5)
Asian	9 (22.5)
Caucasian	4 (10)
Other	1 (2.5)

Age (years)	n (%)
5 to <9	13 (32.5)
>9 to <16	27 (67.5)

RESULTS

Among the forty children recruited into the study, 16 were males and 24 were females (mean age 10.3 years, range 5.7 to 15.3 years). A normal modified OSDI score (<13) was found in 50% (20/40) of children. The scores were mild in 17.5% (7/40), moderate in 12.5% (5/40), and severe in 20% (8/20) of children. The minimum score was 0 and the maximum score was 70.68. The average score was 20.98 with a standard deviation of 19.55.

Modified OSDI scores were statistically significantly correlated to MG atrophy in the left eye (r=0.47, p=0.16) but not the right eye (r=0.30, p=0.125).

No association was found between MG tortuosity and modified OSDI score.

No association was found between modified OSDI score and screen time.

CONCLUSIONS

The modified OSDI findings in this study were more elevated than in previous studies of OSDI on children. This may be attributable to the modified nature of our survey instrument or other changes in children's activities or health status occurring during the COVID-19 pandemic.

The modified OSDI findings correlated to the degree of MG atrophy noted on meibography (Keratograph 5M) evaluation OS, but not OD.

Eye care practitioners should consider evaluating dry eye symptoms and meibography in children. Validated tests, scales, and surveys specific to the pediatric population are lacking. Further studies, including validation of pediatric surveys and analysis of MG morphology, could help practitioners more effectively identify and proactively manage pediatric dry eye.

REFERENCES

1. Patel S, Henderson R, Bradley L, Galloway B, Hunter L. Effect of visual display unit use on blink rate and tear stability. *Optometry and Vision Science,* 1991.68(11), 888–892.
2. Alves M, Dias AC, Rocha EM. Dry Eye in childhood: Epidemiological and clinical aspects. *The Ocular Surface.* 2008;6(1):44-51.
3. Wise RJ, Sobel RK, Allen RC. Meibography: A review of techniques and technologies. *Saudi Journal of Ophthalmology.* 2012;26(4):349–56.
4. Arita R, Itoh K, Inoue K, Amano S. Noncontact infrared meibography to document age-related changes of the meibomian glands in a normal population. *Ophthalmology.* 2008;115(5):911–5.
5. Halleran C, Kwan J, Hom M, Harthan J. Agreement in Reading Center Grading of Meibomian Gland Tortuosity and Atrophy, Poster. American Academy of Optometry Annual Meeting. 2016. Anaheim, CA.

ACKNOWLEDGMENTS

This research was supported by a Research Resource Committee (RRC) grant from Illinois College of Optometry.

CONTACT

Lindsay A. Sicks, OD
lsicks@ico.edu
www.ico.edu

Table of Contents

Higher Order Expectations: When Quantity does not equal Quality in Post-LASIK Ectasia

William Skoog O.D., Stephanie Fromstein O.D., FAAO

Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Laser-assisted in situ keratomileusis (LASIK) is a common refractive surgery that is relatively safe and effective. Patients pursue LASIK because they are tired of depending on their glasses and/or contact lenses for clear vision. Most patients that get LASIK end up with a good outcome and are happy with their vision. However, there are a percentage of patients that end up unhappy. This can be due to complications such as post-LASIK ectasia which can decrease corrected acuity and induce higher order aberrations. This case report describes a patient who presented for distorted vision following LASIK many years ago. He has tried multiple soft contact lenses without success. Despite excellent uncorrected acuity, he is unhappy with the quality of his vision likely due to higher order aberrations. He was successfully fit into Blanchard Onefit A scleral contact lenses to improve the quality of his vision.

CASE REPORT

A 53-year-old Asian Male presented with a chief complaint of distorted and blurry vision at distance and near without correction. He had a positive medical history for hypertension and a positive ocular history for LASIK OU in the late 1990's.

Entering uncorrected distance acuities were 20/20-2 OD and 20/25 OS. Uncorrected near acuities were 20/40 OD, OS. Patient commented that all the letters were distorted. Keratometry readings were 42.00/46.20 @ 94.4 OD and 41.60/41.80 @ 157.2 OS. Tomography revealed post-LASIK, irregular astigmatism, superior ectasia OD and post-LASIK, irregular astigmatism, inferior nasal ectasia OS. Slit lamp examination showed LASIK scars OU. Dilated fundus exam was unremarkable.

DIAGNOSIS AND DISCUSSION

Post-LASIK ectasia is characterized by anterior corneal steepening and decrease in corneal thickness after LASIK, often with the loss of corrected distance visual acuity. It is seen in 0.03 - 0.9% of patient's following LASIK. Despite excellent acuity, patient was unhappy with uncorrected vision – likely secondary to higher order aberrations; post-LASIK ectasia has a higher order aberration profile similar to that of keratoconus, showing an increase in coma more than spherical or trefoil. Scleral contact lenses have been shown to decrease the amount of higher order aberrations in patients with post-LASIK ectasia. Fitting our patient in a scleral contact lens had a significant impact on the quality of his vision despite a minimal impact on the quantity. Patient also elected to trial the same lens in a multifocal design, which he found the be less disruptive to his vision than his pre-existing higher order aberrations.

FIGURES 1A AND B

Tomography of the right and left corneas showing a post-LASIK pattern with areas of corneal steepening superior OD and inferior/inferior nasal OS.

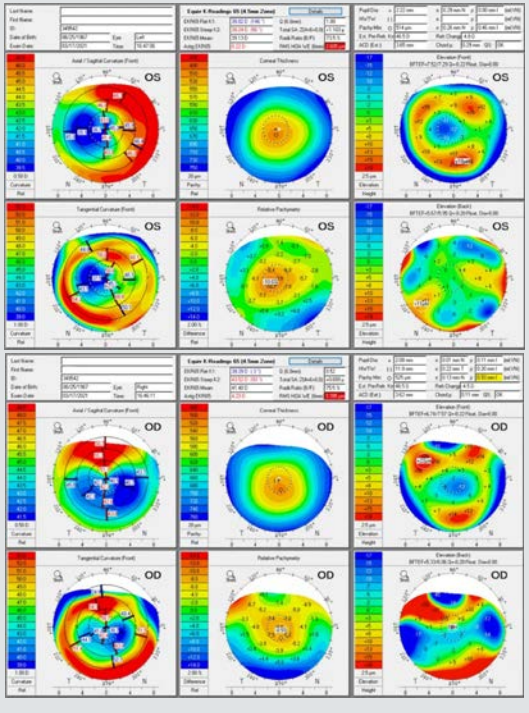


TABLE 1
Parameters of Blanchard Onefit A Scleral Contact Lenses

	OD	OS
Power	-7.50 sphere	-8.50 sphere
Base Curve	7.20mm	7.10mm
Diameter	14.70mm	14.70mm
PC	Standard/ flat 1	Standard/flat 1
VA	20/20	20/20

TREATMENT/ MANAGEMENT

Patient was fit into a Blanchard Onefit A (selected based on patient's HVID) scleral contact lens to improve the quality of his vision. Current management includes interchangeable wear of DVO and multifocal scleral contact lenses with good comfort and high patient satisfaction. The multifocal design in the Onefit scleral contact lens is a simultaneous vision, near-centered aspheric multifocal system. It combines a distance lens profile for the dominant eye and a near lens profile for the non-dominant eye.

CONCLUSION

In post-LASIK ectasia patients, quality of vision may be significantly impacted by higher order aberrations even if acuity is minimally impacted. 20/20 may not be 20/happy - management of more subtle impacts of aberration can lead to a huge increase in patient satisfaction.

REFERENCES

a. Naoyuki Maeda, Tomoya Nakagawa, Ryo Kosaki, Shizuka Koh, Makoto Saika, Takashi Fujikado, Kohji Nishida; Higher-Order Aberrations of Anterior and Posterior Corneal Surfaces in Patients With Keratectasia After LASIK. Invest. Ophthalmol. Vis. Sci. 2014;55(6):3905-3911. doi: https://doi.org/10.1167/iovs.14-14391.
b. Bohac M, Koncarevic M, Pasalic A, et al. Incidence and clinical characteristics of post LASIK ectasia: a review of over 30,000 LASIK cases. Semin Ophthalmol. 2018;33:869–877. doi:10.1080/08820538.2018.1539183
c. Randleman JB, Russell B, Ward MA, Thompson KP, Stulting RD. Risk factors and prognosis for corneal ectasia after LASIK. Ophthalmology. 2003;110:267–275. doi:10.1016/S0161-6420(02)01727-X
d. Ong HS, Farook M, Tan BBC, Williams GP, Santhiago MR, Mehta JS. Corneal Ectasia Risk And Percentage Tissue Altered In Myopic Patients Presenting For Refractive Surgery. Clin Ophthalmol. 2019;13:2003-2015. Published 2019 Oct 14. doi:10.2147/OPTH.S215144
e. Kumar M, Shetty R, Lalgudi VG, Khamar P, Vincent SJ, Atchison DA. The effect of scleral lenses on vision, refraction and aberrations in post-LASIK ectasia, keratoconus and pellucid marginal degeneration. Ophthalmic Physiol Opt. 2021 Jul;41(4):664-672. doi: 10.1111/opo.12802. Epub 2021 Mar 26. PMID: 33769593.

CONTACT INFORMATION

William Skoog, O.D.
Wskoog@ico.edu
www.ico.edu
3241 S. Michigan Ave, Chicago, IL 60616

Table of Contents

Idiopathic Retinal Vasculitis: COVID-19?

Claire Skorseth, OD; Shelly Kim, OD
North Chicago, IL

INTRODUCTION

Monocular visual field loss: retinal abnormalities and optic neuropathies. Retinal vasculitis can have infectious and non-infectious causes such as: toxoplasmosis, TB, syphilis, CMV, HIV, lupus, Behcet's disease, sarcoid, MS, etc. COVID-19 may be among the other viruses as an infectious cause.

CASE SUMMARY

19-year-old male of European and Mexican descent presents with stable, stationary "black spot" in superior-nasal field of right eye for two months with headache:

VA sc: 20/20 OD, OS

Pupils, EOMs, color vision, red cap test- unremarkable

CVF: SN defect OD

Amsler grid: SN scotoma OD

SLE: slight iris heterochromia, OD lighter

IOP: 11 and 9 mmHg OD, OS

DFE: ONH moderate cupping, OD>OS, slight pallor OD, retina WNL

Figure 1. OD superior arcuate defect crossing vertical midline

OCT: asymmetric RNFL average thickness and C/D ratio

Figure 2. Temporal ischemic vessel with few microaneurysms

Figure 3. OD peripheral leakage and capillary non-perfusion, OS (not pictured) peripheral leakage, OU hyperflourescent optic nerve heads

Labs: PTT, prothrombin time, INR, ESR, CBC with diff, syphilis, vasculitis panel, CMV, lysozyme, ACE, RF, CRP, VZV, HSV 1 and 2 IgM/IgG, ANA, TB, HIV, hepatitis (all negative except CMV IgG (>10 U/mL))

*Tested "reactive" for COVID-19 antibodies but also vaccinated.

MRI brain: "diffuse scattered subcortical and periventricular small ill-defined increased signal intensity lesions which could represent vasculitis"

FIGURE 1
OD superior arcuate defect crossing vertical midline.

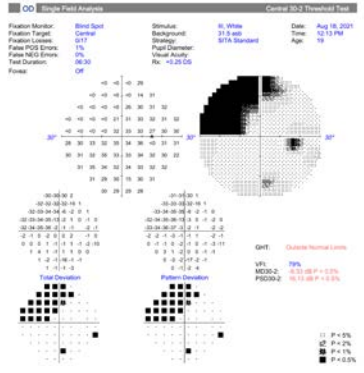


FIGURE 2
Temporal ischemic vessel with few microaneurysms.

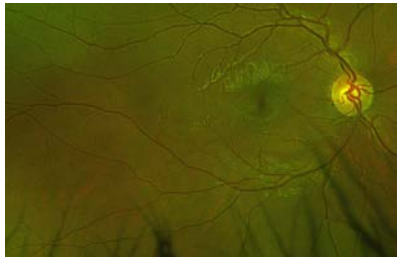


FIGURE 3
OD peripheral leakage and capillary non-perfusion, OS (not pictured) peripheral leakage, OU hyperflourescent optic nerve heads.

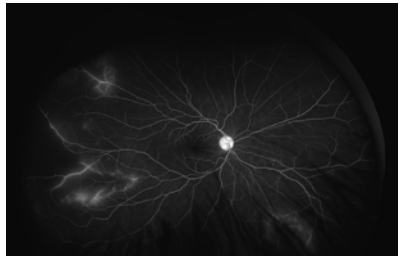
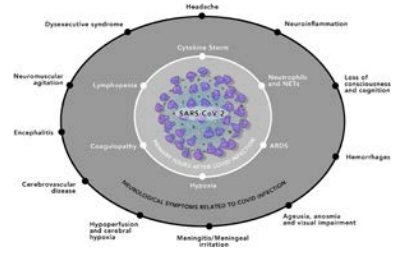


FIGURE 4
Schematic illustration of COVID-19 related symptoms by Jarrahi Abbas, et al. Licensed under CC BY 4.0.



DIAGNOSIS

Retinal Vasculitis OU with unclear etiology

TREATMENT

- Systemic treatment options include immunosuppressants, steroids, anti-TNF. Retinal treatments include anti-VEGF and surgery for complications including: macular edema, ischemia, and retinal detachments.

DISCUSSION

- COVID-19 binds to the ACE2 receptor in retinal endothelial cells.
- Endotheliitis and vasculitis occurs in both arteries and veins.
- Edema leads to thrombosis and then ischemia of the microvasculature.
- Viral RNA of COVID-19 has been found in the retina.
- Using OCT, focal hyper-reflectance in the inner retina with CWS and MA have been found.
- Brain findings include inflammation, coagulation, thrombotic microangiopathy and eventual stroke.

Figure 4. Schematic illustration of COVID-19-related symptoms by Jarrahi Abbas, et al. Licensed under CC BY 4.0.

CONCLUSIONS

- Scan the retina carefully as some findings are subtle and not expected.
- Utilize Optos and other imaging modalities as minor abnormalities can stand out.
- FA is needed to monitor the condition and the response to treatment.
- COVID-19 is another virus to consider on the list of differentials. More research is needed to uncover the systemic, long-term consequences.

References available upon request.

CONTACT INFORMATION

Claire Skorseth, O.D.
Claire.Skorseth@va.gov

Table of Contents

A Rare Bilateral Case of Diffuse Unilateral Subacute Neuroretinitis (DUSN)

LT Aidan Stubbs, OD · Lawrence Ulanski, MD – Captain James A. Lovell FHCC, North Chicago, IL

INTRODUCTION

Diffuse Unilateral Subacute Neuroretinitis is a rare parasitic retinal condition. Left untreated, it results in significant vision loss, visual field loss and optic neuritis. Treatment for this condition, includes laser retinopexy and oral albendazole. Vision prognosis is usually poor, and the goal of treatment is to prevent future progression.

CASE HISTORY

37-year-old African Male from Gambia, West Africa. Chief Complaint: At military bootcamp vision screening, recruit reported slowly progressive vision loss; right eye worse than left eye. States the blurry vision is greater at distance and started two years ago. Denies any trauma, pain, or light sensitivity.

Ocular and Medical history: Malaria 10 years ago. Denies infectious disease or current medications.

CLINICAL FINDINGS

PERTINENT CLINICAL FINDINGS		
	OD	**OS**
BCVA	20/320 PH NI	20/70- PH NI
Pupils	PERRL, (-) APD	PERRL, (-) APD
EOM	FROM, (-) pain/ diplopia	FROM, (-) pain/ diplopia
CVF	Questionable constriction 360	Questionable constriction 360
Color Ishihara	0/14	0/14
Anterior Segment	WNL	WNL
Optic disc	3+ pallor OD	1-2+ pallor temp OS
Vessels	Significant sclerotic vessel	Attenuated arterioles
Macula	RPE pigmentary changes (-) FR, generalized thinning on Mac OCT	RPE pigmentary changes (-) FR, generalized thinning on Mac OCT

DIFFERENTIAL DIAGNOSIS

1. **Optic Neuritis**
2. **Sarcoid**
3. **Syphilis**
4. **Toxic maculopathy**
5. **Stargardt's disease**

Patient diagnosed with "unspecified bilateral optic neuritis" or DUSN and referred to Retina Clinic. Retinal specialist notes small worm that moves off inferior arcade OD, no worm noted OS. Laser retinopexy for destruction of nematode performed OD. Visual prognosis poor due to significant inner retinal thinning and retinopathy, goal of laser treatment was to prevent future inflammatory retinal damage. During the laser procedure the worm was surrounded once, but escaped barrier. It was obliterated on second round with no signs of life or movement. Patient was seen two days later for follow up. Patient denied any changes to vision. Worm appeared dead OD. Visualization of the nematode is rare and the nerve pallor in the fellow eye is presumed to be due to another nematode. Patient started on albendazole 400mg daily for 30 days.

FIGURE 1 - OCT RNFL

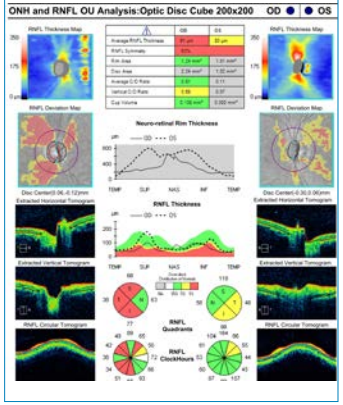


FIGURE 2A & 2B - HVF OD and OS

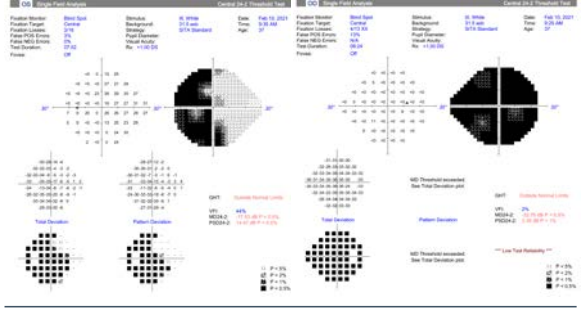


FIGURE 3
Retinal nematode Inf-Temp OD

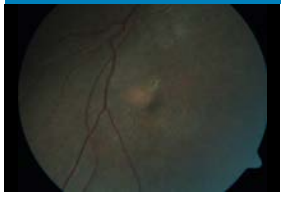


FIGURE 4
Retinal nematode surrounded by barricade laser

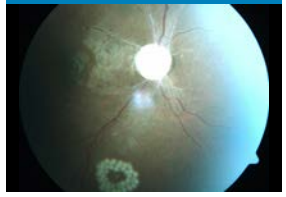


FIGURE 5
Retinal nematode escaped barricade laser

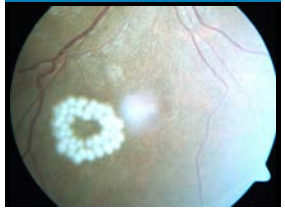
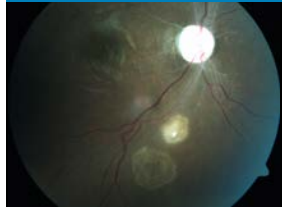


FIGURE 6
Retinal nematode obliterated, no sign of life



LAB TESTING

A variety of lab tests were completed due to patient's symptoms and general lab testing for military enlistment. While in DUSN, the lab results were of limited value but used to rule out other diseases. The infectious disease doctor included PCR testing for giardia lamblia, cryptosporidium species, and entamoeba histolytica which were all negative.

TREATMENT AND DISCUSSION

The patient was referred to an infectious disease specialist. Multiple differential diagnoses including endemic ochocerciasis, loisasis and possible other filarial worms. Other zoonotic hookworms with larvae migration to the eyes were also considered. In addition to albendazole, oral Ivermectin 150 mcg/kg was added single dose. The patient was started on Isoniazid 300 mg daily and vitamin B6 25 mg daily for 9 months for concurrent latent tuberculosis. Unfortunately, due to vision loss and field loss a not-recommended waiver was submitted for the recruit. He was medically discharged from the Navy and returned to his home country with sufficient medication.

The nematode eggs are often accidentally ingested after they have shed from animal carriers including dogs. Usually ingested by unwashed fruit or not thoroughly cooked meat. The nematode hatches and migrates slowly over months. The nematode can be in fundus for up to 3 or more years. This infection results in severe unilateral loss of peripheral and central vision secondary to retinal inflammation. While DUSN is usually unilateral, few cases including this one, of assumed bilateral DUSN have occurred.

CONCLUSION

While extremely rare, bilateral DUSN is important to diagnose as quickly as possible with anti-parasitic agents and laser if necessary. The visual prognosis is poor, but the goal of treatment is to prevent further inflammatory damage to the retina.

Bibliography: available upon request

LT Aidan C. Stubbs, OD • Aidan.Stubbs2@va.gov
Captain James A Lovell FHCC Optometry Resident

Table of Contents

Frosted Lens Occlusion and Artificial Tears in a Patient with Progressive Supranuclear Palsy

Kelsey Trast, O.D., Michelle K. Man, O.D., F.A.A.O.

Illinois Eye Institute (IEI), Chicago, Illinois

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Progressive supranuclear palsy (PSP), or Steele-Richardson-Olszewski syndrome, is a neurological condition of unknown origin, related to decreased dopamine. Early presentation is similar to Parkinson's disease; however, PSP deteriorates faster and with a worse prognosis. There is a possible association with increased tau protein (also seen in Alzheimer's disease). PSP has no known genetic or ethnic risk factors and presents in patients >40 years old.

Classic signs of PSP include gait and balance impairment, bradykinesia, gaze palsy, cognitive loss, dysarthria, and dysphagia. Patients often also experience high levels of depression. Despite gaze palsy, the vestibulo-ocular reflex (VOR) is still intact; however, suppression is difficult and the VOR can be difficult to examine due to neck rigidity. Gaze palsy may not occur until late stages, if at all, and downgaze is often affected before upgaze. Blink rate and ability are also affected and can lead to dry eye disease.

CASE REPORT

A 77-year-old white female presented to IEI's Urgent Care Clinic with new onset ocular discomfort and chronic diplopia. The patient had difficulty speaking, and her husband answered questions regarding her medical history. The diplopia began in 1999 and was believed to be secondary to suspected PSP, closely monitored by a neurologist. Her last eye exam was two years ago after bilateral cataract extraction, and she received glasses with 10BI prism (Figure 1). The prism does not alleviate her diplopia, so she typically closes one eye. Her medical history also includes hyperlipidemia and hypothyroidism, treated with Levothyroxine, Crestor, Amantadine, and Melatonin.

Initial pertinent findings include decreased VAs (20/150 OD, 20/80 OS) using Snellen naming, complete restriction of EOMs in all nine gazes, CLXT (>50pd via Hirschberg testing, Figures 1 and 2), sluggish pupils, decreased lacrimal lake, and anterior blepharitis. Tear break up time testing was not performed due to difficulty positioning the patient in the slit lamp.

RESULTS

The patient was diagnosed with dry eye disease and given samples of preservative free artificial tears to use qid OU in addition to lid scrubs qd to bid OU. A comprehensive eye exam was also scheduled, at which point a prescription with a frosted lens would be released. Until that point, it was recommended that the patient's husband purchase and apply Glad Press'N Seal® for temporary occlusion of the left eye.

The patient returned to the clinic for her comprehensive exam, reporting significant improvement in comfort with the addition of artificial tears and occlusion (Figure 3). Entering distance acuities using HOTV matching were 20/100 OD and 20/50 OS, corrected to 20/50 OD, 20/50 OS with manifest refraction. She is returning to the clinic for additional vision rehabilitation devices for near activities, as it was determined that a bifocal would not be beneficial due to the patient's inability to comfortably look through the bottom portion of a lens.

FIGURE 1
Initial presentation. Patient asked to look at the light for Hirschberg alignment testing through 10BI prism spectacles.

FIGURE 2
Initial presentation, without spectacles. Patient asked to look at the light for Hirschberg alignment testing.

FIGURE 3
Patient presentation after husband applied Glad Press'N Seal® to left lens.

DISCUSSION

Eyecare professionals may encounter patients with PSP before the patient has an accurate or complete diagnosis. If PSP is suspected, a multidisciplinary approach is necessary to rule out other conditions. Special consideration should be given when assessing the following:

- Extraocular motilities – ophthalmoplegia is common in patients with PSP, with impairments of vertical and convergent gazes most greatly affected. Downgaze is usually affected first.
- Saccades – test for slow vertical saccades, square wave jerks, or complete ophthalmoplegia. In PSP, untargeted (looking in a specified direction) saccades are typically affected before targeted (looking at a specified target). A delay in saccade initiation is highly specific for PSP, with an eventual deficit/loss of vertical gaze range.
- Blink rate – reduced lid motility is common in patient with PSP and can lead to dry eye disease or eyelid movement apraxia.

Patients with PSP may also benefit from treatments such as occlusion, mirror-prism glasses, and magnifying aids to compensate for decreased eye motility.

TAKE-AWAY POINTS

- Small interventions can have big impacts. This patient and her husband were initially hesitant to initiate patching due to cosmesis. However, the frosted lens significantly improved her quality of life.
- Consider systemic impacts on exam techniques. Speaking was very difficult for this patient, but she was able to match easily, so HOTV was an appropriate technique to gain accurate acuities.
- Remember the goal of your exam. At this point we wanted to make patient comfortable, not to fix her binocularity.

REFERENCES

1. "Progressive Supranuclear Palsy." Mayo Clinic, Mayo Foundation for Medical Education and Research, 7 Feb. 2020, www.mayoclinic.org/diseases-conditions/progressive-supranuclear-palsy/symptoms-causes/syc-20355659.
2. Golbe LI, Ohman-Strickland PA. A clinical rating scale for progressive supranuclear palsy. Brain. 2007 Jun;130(Pt 6):1552-65. doi: 10.1093/brain/awm032. Epub 2007 Apr 2. PMID: 17405767.
3. Golbe LI. Progressive supranuclear palsy. Semin Neurol. 2014 Apr;34(2):151-9. doi: 10.1055/s-0034-1381736. Epub 2014 Jun 25. PMID: 24963674.
4. Lopez G, Bayulkem K, Hallett M. Progressive supranuclear palsy (PSP): Richardson syndrome and other PSP variants. Acta Neurol Scand. 2016 Oct;134(4):242-9. doi: 10.1111/ane.12546. Epub 2016 Jan 6. PMID: 27070344; PMCID: PMC7292631.
5. Schmidt C, Herting B, Prieur S, Junghanns S, Schweitzer K, Globas C, Schöls L, Antoni S, Ferger D, Reichmann H, Wilhelm H, Berg D, Ziemssen T. Pupil diameter in darkness differentiates progressive supranuclear palsy (PSP) from other extrapyramidal syndromes. Mov Disord. 2007 Oct 31;22(14):2123-6. doi: 10.1002/mds.21721. PMID: 17853484.
6. Warren NM, Burn DJ. Progressive supranuclear palsy. Pract Neurol. 2007 Feb;7(1):16-23. PMID: 17430861.

CONTACT

Kelsey Trast, OD, ktrast@ico.edu, www.ico.edu

Table of Contents

ARVO

1 ICO PRESENTATION

Table of Contents

Correlation of adenoviral titers with severity of adenoviral conjunctivitis and viral clearance over 21 days

Morettin, Christina E.; Harthan, Jennifer S.; Huecker, Julia; Perera, Chamila D.; Than, Tammy P.; Shorter, Ellen; Whiteside, Meredith; Johnson, Spencer; Hartwick, Andrew; Margolis, Mathew; Migneco, Mary K.; Alferez, Christopher; Camp, Devon; Haertter, Len; Gordon, Mae O

INTRODUCTION

- Adenoviral conjunctivitis (Ad-Cs) is a highly contagious eye infection that has significant morbidity and economic impact. Determining return to work or school can be challenging for clinicians.
- The Reducing Adenoviral Patient Infected Days (RAPID) study is a double-masked randomized pilot study examining the safety and efficacy of a single administration of ophthalmic 5% Povidone-Iodine (PVP-I) for the treatment of Ad-Cs.

PURPOSE

- To investigate the correlation of viral titers at baseline and over 21 days with severity of signs, symptoms, and viral clearance in participants with Ad-Cs.

METHODS

Sample

- Eligibility included age ≥ 18, symptoms ≤ 4 days, and a positive AdenoPlus (Quidel, San Diego CA) point-of-care immunoassay.
- Of 212 participants screened, 56 were randomized to a single, in-office administration of either 5% povidone-iodine (PVP-I) or artificial tears (AT).

Measures

- Baseline examinations and follow-up visits at days 1-2, 4, 7, 14 and 21.
- At each visit, a masked clinician administered a symptom survey, graded clinical signs, and obtained a conjunctival swab for qPCR analysis.
- Participants rated symptoms on a scale of 0 (not bothersome) to 10 (very bothersome).
- Masked clinicians rated clinical signs of the study eye on a scale of 0 (absent) to 4 (severe).

Statistical Analysis

- Correlation (r) of viral titers with signs and symptoms over 21 days was calculated using repeated measures generalized estimating equations.
- Days to viral clearance is reported for 3 equal size tertiles of baseline viral titers: low (log qPCR <6.13), middle (log qPCR 6.13-6.78) and high (log qPCR >6.78).

RESULTS

- Twenty-five participants were qPCR positive for adenovirus and had sufficient follow-up visits.
- Higher viral titers over 21 days were correlated with:
  - Greater severity of participant reported symptoms of tearing, matting and redness (r≥0.70; p<0.02), Figure 1.
  - Greater severity of masked clinician graded signs of bulbar redness and serous discharge (r≥0.60; p<0.01), Figure 2.
  - Longer time to viral clearance (r=0.59, p=0.0075), Figure 3.
- Days to viral clearance in low, middle and high baseline viral titer tertiles were 10.3 + 5.6, 9.5 + 3.5, and 19.8 + 3.8, respectively, Figure 3.
- Incidence of subepithelial infiltrates or pseudomembranes was greater in the highest tertile (75%, 6 of 8) compared to the lowest tertile of baseline log qPCR (40%, 4 of 10, p=0.43).

FIGURE 1
Correlations between patient reported symptoms and log qPCR over 21 days.

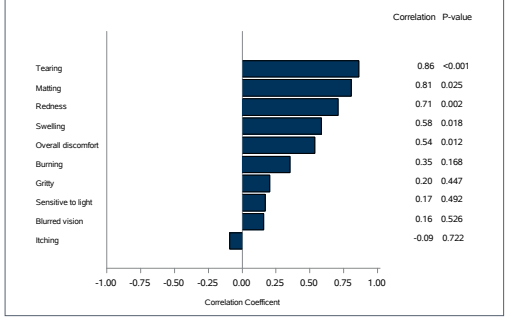


FIGURE 2
Correlations between clinician graded signs and log qPCR over 21 days.

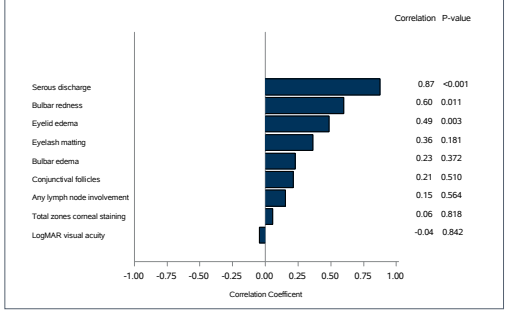
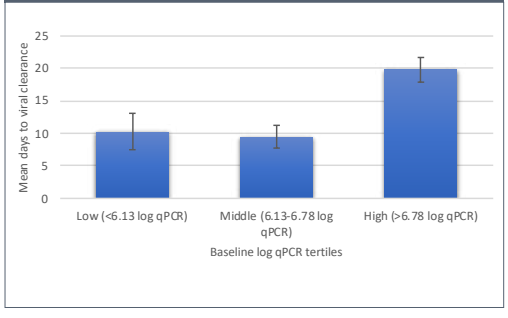


FIGURE 3
Days to viral clearance in high, middle and low baseline log qPCR tertiles.



DISCUSSION

- This is among the first reports comparing severity of signs and symptoms with longitudinal viral titers over 21 days of follow-up visits.
- Higher viral titers correlated with worse signs and symptoms and longer time to viral clearance over 21 days.
- Higher incidence of sequelae (pseudomembranes or subepithelial infiltrates) was correlated with higher baseline viral titers.

CONCLUSION

- Higher viral titers longitudinally were strongly correlated with more severe signs and symptoms.
- Higher baseline viral titers were associated with longer time to viral clearance.

SUPPORT

This work was supported by a National Eye Institute Center R34 Grant (EY023633-01A1), a National Eye Institute Center Core Grant (P30EY002687) and an unrestricted grant to the Department of Ophthalmology and Visual Sciences from Research to Prevent Blindness. DiaSorin Molecular LLC (Cypress, CA) for loaning the study a Liaison MDX Instrument and donating reagents for qPCR analysis.

CONTACT INFORMATION

Christina Morettin, O.D.
CMorettin@ico.edu
www.ico.edu

Table of Contents

HEART OF AMERICA

9 ICO PRESENTATIONS

Table of Contents

Treatment Options for Central Epithelial Defect Associated with Epidemic Keratoconjunctivitis

Megan Byer, O.D. – Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

BACKGROUND

Epidemic keratoconjunctivitis (EKC) is a highly contagious condition that is caused by the infection of subgroup D of adenoviruses 8, 19, and 37.[1] The virus has a robust capsid that enables it to withstand many adverse environments and survive long-term on hard surfaces.[1] The virus spreads via respiratory droplets and is thus highly contagious due to the aforementioned qualities.[1] EKC affects the conjunctival and corneal tissues and has the potential for causing persistent vision reduction from late complications. A full-thickness corneal epithelial defect is a rare complication of EKC. There is limited literature on effective treatment and management for this rare complication. With no current FDA-approved treatments, EKC and its visual complications can be difficult to manage. This difficulty leads to a high social and economic burden.

PRESENTATION

35-year-old African American male presented with an acute onset red eye in the right eye followed by the left eye with associated pain, tearing and reduced vision OD>OS. Initial onset was 9 days prior. Patient denied use of contact lenses, recent trauma to the eye or potential for sexually transmitted disease.

EXAM FINDINGS

Visual acuity was 20/50 in the right eye and 20/25 in the left eye. Entrance testing was within normal limits.

OD	Exam Findings	OS
(+) Preauricular node	Adnexa	(-) preauricular node
Protective ptosis, (+) serous discharge	Lids and Lashes	(+) serous discharge
2+ diffuse chemosis, 2+ diffuse injection, 2+ UL and LL follicles, (+) Pseudomembrane LL	Conjunctiva & Sclera	2+ diffuse chemosis, 2+ diffuse injection, 2+ UL and LL follicles
Large central epithelial defect (-) SEI	Cornea	Clear (-) epithelial defect (-) SEI
Deep and quiet	Anterior chamber	Deep and quiet
Clear	Lens	Clear
WNL	Posterior Segment	WNL

FIGURE 1
Central epithelial defect of the right eye

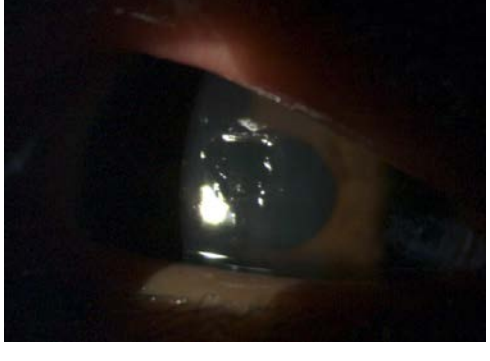
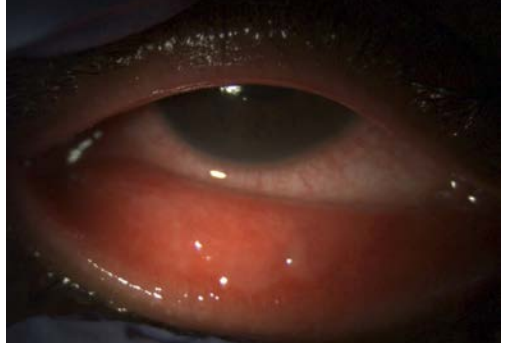


FIGURE 2
Pseudomembrane of the right lower lid



DIAGNOSIS

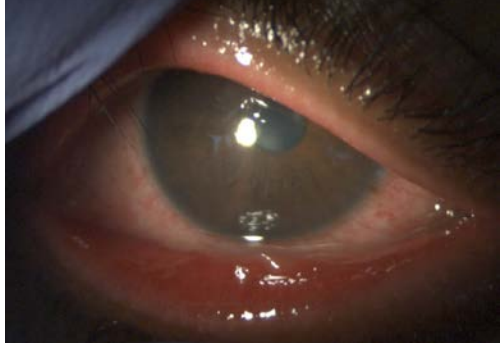
EKC was diagnosed in this patient based on clinical examination. Common ocular signs of EKC include conjunctival hyperemia, follicular conjunctivitis, chemosis, epiphora, and pseudomembrane formation.[2] Late complications consist of SEIs that can affect vision.[2] Rarely, EKC can cause full-thickness central epithelial defects.[3] The mechanism is not well understood although a recent case series suggests that this complication is associated more with adenovirus type 8.3 In this case series, the causative agent was identified using polymerase chain reaction (PCR).3 PCR was not available in this case for serotype identification. Another case series suggests that steroids could have a contribution to the pathophysiology.[2] Further research is needed to fully understand the cause of epithelial defect associated with EKC.

TREATMENT

There is no FDA-approved treatment for EKC. Many existing therapies aid in either reducing viral load or inflammatory sequelae.[1] When approaching treatment in this case of epithelial defect with concurrent EKC infection, one must manage the proper healing of corneal epithelium as well as the active infection. Pseudomembrane peel should be performed daily as needed to help reduce viral load on the ocular surface. Povidone-Iodine irrigation can aid in reducing viral shedding and viral load if initiated early in the disease process, however, should be avoided in this case. Povidone-Iodine is toxic to the corneal epithelium and could cause further corneal epithelium damage.[1] The use of bandage contact lens to assist in corneal epithelium healing should be used with caution. A recent case series shows evidence of dramatic epithelial defect healing after eliminating topical steroid use and initiating bandage contact lens use with preservative free antibiotics and artificial tears.[2] The case series had only 3 cases and further research into the subject is required.

The patient was treated with erythromycin 0.3% ointment three times a day in the right eye, preservative free artificial tears every hour in both eyes and oral vitamin C 1000mg once daily. The patient was followed daily and bandage contact lens use would be initiated if there was evidence of persistent epithelial defect. The patient's epithelial defect however, closed within 3 days without the use of bandage contact lens.

FIGURE 3
3 days after initiation of treatment showing full epithelial closure



CONCLUSION

There is no current treatment guideline for epithelial defect associated with EKC. Managing epithelial closure with either topical bland ointment and artificial tears or bandage contact lens could show promising results but further research into the subject is required. Close follow up is essential in ensuring proper healing of central epithelial defect while also managing infection.

REFERENCES

1. Labib B, Minhas B and Chigbu D. Management of Adenoviral Keratoconjunctivitis: Challenges and Solutions. Clin Ophthal 2020: (14) 837-52.
2. Orucoglu F and Ayoglu I. Corneal Epithelial Defect in Adenoviral Conjunctivitis during Treatment with Corticosteroids. J Clin Case Rep 2014, 4:10 DOI: 10.1472/2165-7920.10000429.
3. Lee Y, et al. Human adenovirus type 8 epidemic keratoconjunctivitis with large corneal epithelial full-layer detachment: an endemic outbreak with uncommon manifestation. Clin Ophthal 2015: (9) 953-57.

CONTACT INFORMATION

Megan Byer, O.D. - MeByer@ico.edu

Table of Contents

Herpes Stromal Keratitis

Gabriella Finger, OD – Resident, Captain James A. Lovell FHCC

ABSTRACT

The Herpes virus family can have a number of ocular manifestations and is easy to initially misdiagnose. Close analysis of signs and symptoms is necessary so that that effective treatment and management is performed and visually devastating outcomes are prevented

CASE REPORT

64 year old white male presented to clinic with OS lid swelling and white discharge. Denied any ocular pain or light sensitivity. One week prior had been diagnosed by outside ER with a left eye abrasion and was prescribed ciprofloxacin q2h x 3 days. Patient reported treatment didn't work. No significant medical or ocular history

DISCUSSION

Herpes in the eye is typically due to either herpes simplex type one or varicella zoster. When treating this condition pay close attention to the cornea layer affected and if there is any accompanying anterior chamber reaction.

Epithelial keratitis presents with epithelial defects that often take the shape of the classic epithelial dendrite appearance. This finding is due to the presence of active replicating virus. Viral particles can also settle in the stroma and endothelium. Both can lead to corneal swelling and opacities however, close attention should be paid to the presence of an anterior chamber reaction and IOP. In the case of stromal keratitis there is minimal anterior chamber reaction, no keratic precipitates and intraocular pressure tends to be un-affected. Slit lamp findings also tend to show stromal swelling with intact overlying epithelium, however, epithelial damage can sometimes be present. When this occurs, the condition is considered to be neurotrophic keratitis. In the case of endothelitis aka disciform keratitis, keratic precipitates accumulate on the endothelium surrounding the lesion, with swelling of deeper tissue layers and, in some cases, IOP can be increased.

Treatment for the various manifestations of herpes keratitis requires topical and oral antivirals and, in some instances, topical steroids. When treating epithelial herpes keratitis the use of topical steroids should be avoided due the drug's ability to prolong viral shedding and delay corneal healing. Topical anti-viral formulations are considered standard of care, but these formulations are expensive or toxic to the cornea when used long term. Oral antivirals are an alternative treatment but not FDA approved. One study showed that the use of oral acyclovir reached the same therapeutic dose in the anterior chamber (Wilmhous, 2000). In the treatment for stromal keratitis without ulceration the use of topical steroid and a prophylactic oral antiviral is indicated.

In our case, the manifestation of herpes keratitis virus was not in an active form and the corneal inflammation is due to the immune response to proteins. However, active viral infection is present in stromal keratitis with ulceration and endothelial keratitis. In these cases, the oral antiviral strength should be the therapeutic dose and not the prophylactic dose. The therapeutic dose is required because active replicating virus is present (Reddy,2013).

The initiation of topical steroids is crucial but should be used cautiously due to the potential adverse effects seen in epithelial keratitis. The use of prophylactic antivirals should continue until the steroid taper is down to being dosed once a day or less (wills eye manual). The HEDS 1 study showed that the addition of topical steroids reduces scarring and promotes a better healing process. This study also showed that at least a ten-week taper of the steroid is needed for best reduction of scarring. In situations such as neurotrophic keratitis the use of steroids is not contraindicated but the consensus is to use steroids cautiously.

Treatment and management of the active infection is important however, recurrence of the virus can occur. The HEDS 2 study showed that the risk for recurrent stromal keratitis was dependent on the type of previous infection. It was seen that there was a 28% risk of recurrence in individuals with a prior episode of stromal keratitis and a 3% risk in individuals with histories of other herpetic ocular infections. The risk for recurrent epithelial keratitis is about 12-15% and the previous type of infection was not a significant influence on the risk for recurrent epithelial keratitis (Wilhelmus,1998). Other risk factors for recurrence include, history of previous herpetic infections, stress, immunocompromised status, ocular surface disease and contact lens wear. The specific duration of prophylactic use is not defined but at least one year of use is recommended to prevent recurrence according to the HEDS 2 study.

CONCLUSION

Herpes keratitis is a leading cause for permanent vision reduction if not properly treated. Close attention to the specific signs and symptoms promotes quick and effective care. As in the case mentioned above a misdiagnosis of ocular trauma prevented quicker initiation of the proper treatment. Fortunately, no significant complications occurred but this patient was educated for signs and symptoms of recurrence and the importance of monitoring ocular health.

TABLE 1 - Day One Findings

OD	Findings	OS
20/20	VA	20/25
11	IOP w/ iCare	13
Normal	Prelims	Normal
Bleph and 1-2+ injection	Anterior segment	• Anterior blepharitis • 3.8mm lesion w/ epistromal edema and vessels encroaching and edema at 6 o'clock
NONE	Treatment	Trifluridine and Vigamox alternating every hour

TABLE 2 - Follow Up Visits

Visit	VA cc OS	IOP OS	Findings OS	Treatment
Day 2	20/30	7mmHg w/ icare	No improvement	• d/c vigamox • Continue trifluridine q2h • Start Pred Acetate q6h • Start oral acyclovir 400mg 5x/day for ten day
Day 4	20/25	10mmHg w/icare	No corneal staining w/ possible trace edema	• Decreased trifluridine to five times a day • Continue acyclovir and pred acetate as directed
Day 11	20/25	12 w/ tonopen	Lesion flat, encroaching vessels resolving	• Continue 5x/day acyclovir dose then begin taking bid for one month • Continue pred acetate q6h • d/c trifluridine
Day 17	20/20	13mmHg	No edema, no staining encroaching vessels almost entirely resolved, small scar at 6 o'clock	• Continue acyclovir maintenance dose • Begin pred acetate taper; tid x 1 week, bid x 1 week, qd x 1 week • RTC for one month f/u

REFERENCES

Barron BA, Gee L, Hauck WW, Kurinij N, Dawson CR, Jones DB, Wilhelmus KR, Kaufman HE, Sugar J, Hyndiuk RA, et al. Herpetic Eye Disease Study. A controlled trial of oral acyclovir for herpes simplex stromal keratitis. Ophthalmology. 1994 Dec;101(12):1871-82. doi: 10.1016/s0161-6420(13)31155-5. PMID: 7997323.

Collum IM, McGettrick P, Akhtar J, et al. Oral acyclovir (Zovirax) in herpes simplex dendritic corneal ulceration. Br J Ophthalmol. 1986;70:435–8

Reddy, J.C., Rapuano, C.J. Current Concepts in the Management of Herpes Simplex Anterior Segment Eye Disease. Curr Ophthalmol Rep 1, 194–203 (2013). https://doi.org/10.1007/s40135-013-0024-2

Srinivasan, M., Mascarenhas, J., Rajaraman, R., Ravindran, M., Lalitha, P., O'Brien, K. S., Glidden, D. V., Ray, K. J., Oldenburg, C. E., Zegans, M. E., Whitcher, J. P., McLeod, S. D., Porco, T. C., Lietman, T. M., Acharya, N. R., & Steroids for Corneal Ulcers Trial Group (2014). The steroids for corneal ulcers trial (SCUT): secondary 12-month clinical outcomes of a randomized controlled trial. American journal of ophthalmology, 157(2), 327–333.e3. https://doi.org/10.1016/j.ajo.2013.09.025

White, M., MD. (2015, July 23). Herpes Simplex Virus Keratitis: A Treatment Guideline - 2014. Retrieved January 05, 2021, from https://www.aao.org/clinical-statement/herpes-simplex-virus-keratitis-treatment-guideline

Wilhelmus KR. The treatment of herpes simplex virus epithelial keratitis. Trans Am Ophthalmol Soc. 2000;98:505-32. PMID: 11190039; PMCID: PMC1298240

The Herpetic Eye Disease Study Group. Acyclovir for the prevention of recurrent herpes simplex virus eye disease. N Engl J Med. 1998;339:300–306.

CONTACT INFORMATION

Gabriella Finger, OD - Gabriella.Finger@va.gov

Table of Contents

Evaluation and Treatment of Corneal Fungal Ulcers

Kenny Fritz Jr, OD – Resident, Captain James A. Lovell FHCC

ABSTRACT

Fungal corneal ulcers are rare in northern latitudes. In climates that lack humidity, trauma involving vegetative matter, contact lens wear, and topical corticosteroid use play a larger role in fungal ulcer etiology. This case report examines a fungal ulcer caused by contact lens wear and topical corticosteroid use in North Chicago, IL. Risk factors, management, and treatment are discussed in depth. Given the severity of fungal ulcers and few treatment options, it is critical for optometrists to fully understand fungal ulcers to better care for patients and optimize outcomes.

CASE REPORT

57-year-old white male presented for an "eye infection" OD onset 7 days duration. Explains OD flared up after removing his scleral contact lens. Pain originally 7/10 is now 1-2/1- as the patient self-diagnosed himself and began taking moxifloxacin and lotemax each 4-5x/day OU left over from a previous "infection." Patient had a past ocular history of a fungal infection OS which required two corneal transplants, post-surgical ectasia following LASIK, and advanced glaucoma for which he takes brimonidine, dorzolamide/timolol, and latanoprost. Cataracts removed OU. Medical history remarkable for vitamin D deficiency (19.5 ng/mL), obstructive sleep apnea syndrome, and hyperbilirubinemia.

Patient's acuities 20/400 OD (sc) and 20/25 OS (cc) with all entrance testing WNL OU. Slit lamp examination shown in Figures 1-2. The ulcer was swabbed and cultured on blood and chocolate agar and lab processed. As the infection was presumed to be bacterial in nature, fortified tobramycin 15 mg/mL and fortified vancomycin 25 mg/mL co-prescribed OD alternating q30min throughout the night. Patient given atropine 1% qhs OD and told to discontinue further use of lotemax and all contact lens wear. Patient returned to clinic the following day with minimal improvement, so the treatment plan continued, and he returned the next day where the condition showed no improvement. Decision to refer to a corneal specialist, and he received a corneal transplant about two week later.

DISCUSSION

The most common causative agent of corneal ulcers, especially cases involving contact lens wear, is bacteria (specifically Pseudomonas aeruginosa).[2] Cultures are not typical because bacterial ulcers are quite responsive to treatment. Broad spectrum antibiotics are the treatment of choice, which includes fluoroquinolones (most common) as well as fortified vancomycin, and tobramycin. [1]

Less commonly seen in clinical practice are fungal corneal ulcers. These are found more so in developing countries with more humid climates (i.e. 50% of all infectious ulcers are fungal in South India).[4] The most common pathogens are Fusarium, Aspergillus, and Candida. Key risk factors include trauma involving vegetative matter, contact lens wear, topical corticosteroid use, and compromised systemic immune status. The only topical antifungal agent available for fungal ulcers is Natamycin 5% suspension, which has been shown to have poor penetration.[3] Although no new ocular antifungal drugs have been approved since the 1960s, physicians are still searching for a more effective alternative. Voriconazole is one such agent, which is thought to have superior permeability. However, studies have demonstrated no significant differences in visual acuity, scar size, and perforations compared to natamycin.[4] Overall, one-third of all corneal fungal ulcers require surgical intervention.[6] Often times a penetrating keratoplasty (PKP) is indicated to fully remove fungal hyphae from the cornea. Alternative procedures such as lamellar keratoplasty with acellular porcine corneal stroma (APCS) have been explored as a viable treatment option. During the surgery lamellar dissection was used to remove all ulcer tissues and ACPS was used to fill the stromal defect. In a study performed by Zhang et al., 47 patients with a fungal corneal ulcer received an APCS graft and there were no recurrences after a 6-month period.6

Long debated, is adjunctive steroids. Proponents argue they improve outcomes by reducing inflammation and thereby reducing scarring, while others argue they delay wound healing and worsen infections.[1] The Steroids for Corneal Ulcers Trial (SCUT) sought to settle this debate. The trial was a randomized, placebo-controlled, double-masked, multicenter clinical trial comparing prednisolone sodium phosphate, 1.0%, to placebo as adjunctive therapy for the treatment of bacterial corneal ulcers. Best corrected visual acuity at 3 months from enrollment was the primary outcome. The SCUT found no overall difference in 3-month visual acuity with the use of topical corticosteroids as adjunctive therapy. In addition, there were no major safety concerns with their use.[5]

FIGURE 1

FIGURE 2

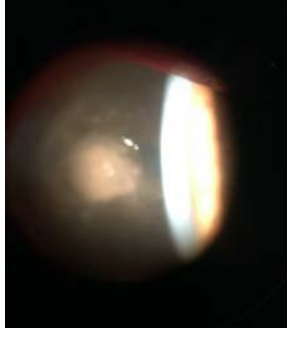


FIGURE 3

CONCLUSION

Fungal ulcers are intimidating to treat because of their threat to vision with few treatment options. After a firm diagnosis, natamycin 5% is the first line, and only, treatment available. Although steroids have their place, particularly in scar formation, great caution should be exercised to maximize safe outcomes. Thus, it's important for optometrists to be well-prepared and further educate ourselves on the newest treatment standards so we may provide patients with the best care possible. That will allow us to move our profession forward.

REFERENCES

[1]Austin A., Lietman T., Rose-Nussbaumer J. Update on the Management of Infectious Keratitis. Ophthalmology [Internet]. Sept 2017 [cited 11/20]; 124(11):1678-1689. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC 5710829/.

[2]Bennet L., Hsu H., Tai S., et al. Contact Lens Versus Non-Contact Lens-Related Corneal Ulcers at an Academic Center. Eye & Contact Lens: Science & Clinical Practice [Internet]. Sept 2019 [cited 11/20]; 45(5):301-305. Available from: https://journals.lww.com/claojournal/Fulltext/2019/09000/Contact_Lens_Versus_Non_Contact_Lens_Related.4.aspx

[3]Ou J., Acharya H., Nisha R. Epidemiology and Treatment of Fungal Corneal Ulcers. International Ophthalmology Clinics [Internet]. July 2007 [cited 11/20]; 47(3):7-16. Available from: https://journals.lww.com/internat-ophthalmology/Fulltext/2007/04730/Epidemiology_and_Treatment_of_Fungal_Corneal.4.aspx.

[4]Prajna N., Mascarenhas J., Krishnan T., et al. Comparison of Natamycin and Voriconazole for the Treatment of Fungal Keratitis [Internet]. June 2010 [cited 12/20]; 128(6):672-678. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3774126/.

[5]Srinivasan M., Mascarenhas J., Rajaraman R., et al. Corticosteroids for Bacterial Keratitis: The Steroids for Corneal Ulcers Trial (SCUT) [Internet]. Feb 2012 [cited 12/20]; 130(2):143-150. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3830549/.

[6]Zhang M.C., Liu X., Jin Y., et al. Lamellar Keratoplasty Treatment of Fungal Corneal Ulcers with Acellular Porcine Corneal Stroma [Internet]. 2015 [cited 12/20]; 15:1068-1075. Available from: https://journals.lww.com/co-ophthalmology/Fulltext/2016/05000/Corneal_cross_linking_in_the_treatment_of_corneal.11.aspx.

CONTACT INFORMATION

Kenny Fritz Jr, OD - kfritzjr@gmail.com

Table of Contents

Disrespecting the Vertical Midline

Nora Kuby, OD • Harneet Randhawa, OD, FAAO • Navjit Sanghera, OD, FAAO • Brittney Brady, OD, FAAO • Leonard Messner, OD, FAAO

Illinois Eye Institute • Chicago, Illinois

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Primary open angle glaucoma (POAG) is generally a bilateral disease, although progression is often asymmetric between the eyes. While much is still unknown about glaucoma's pathogenesis, it is widely accepted that elevated IOP and/or vascular dysregulation result in the apoptosis of retinal ganglion cells and their axons via mechanical and metabolic damage. Due to the anatomic configuration of the nerve fiber bundles, glaucomatous visual field defects classically respect the horizontal raphe. This case demonstrates the importance of ruling out neurologic pathology when a case of presumed glaucoma does not "follow the rules."

CASE HISTORY

A 39-year-old African American female presented for a surgical glaucoma consultation with complaint of left eye nasal field loss, noted suddenly when closing her right eye to apply mascara.

FIGURE 1 - Historical IOP readings

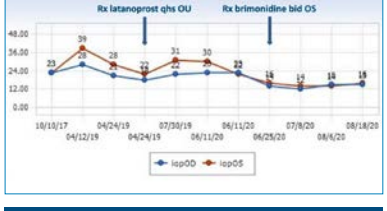


TABLE 1 - Asymmetric C/D progression

	OD	OS
October 2017	0.5/0.5	0.4/0.4
April 2019	0.5/0.5	0.75/0.75
June 2020	0.45/0.5	0.95/0.95

Her medical history was unremarkable apart from being hit by a motor vehicle on her left side while crossing the street two years prior. She experienced some left side numbness/weakness that resolved with physical therapy, but denied any direct head injury or immediate vision loss at the time.
The patient, who was being followed for POAG for the past 15 months, had a history of fluctuating IOP with intermittent spikes OS>OD, exacerbated by poor latanoprost compliance and frequently missed appointments. **(Figure 1)**. Despite improved IOP with the addition of brimonidine OS, surgical referral was made given the rapid progression of markedly asymmetric cupping OS>>OD with new-onset VF defect OS **(Table 1)**.

Table 2 displays pertinent anterior segment findings along with additional testing; **Figures 2-6** display prior year vs. current diagnostic imaging.

TABLE 2 - Anterior segment & additional testing

	OD	OS
BCVA	20/20	20/20
Pupils	PERRL, (-)APD	PERRL, 1+ APD
EDMs	FROM	FROM
CVF	FTFC	Nasal constriction
Gonio	CB 360	SS 360
Pachymetry	552 µm	537 µm
Corneal hysteresis	8.0	7.9
Exophthalmometry	18 mm	20 mm
Color vision	Normal	Defective B-Y

TABLE 3 - Risk factors for non-glaucomatous cupping

Age < 50 years
Pallor of residual rim tissue
Vertically aligned VF defects
VA worse than 20/40
Asymmetrical color vision loss
(+) RAPD
Cranial pain

DIAGNOSIS & DISCUSSION

Given the rapid progression of C/D asymmetry with corresponding severe unilateral field loss OS, differential diagnoses included: highly asymmetric POAG, compressive optic neuropathy, and traumatic optic neuropathy. While optic disc cupping is generally glaucomatous, **Table 3** lists risk factors associated with non-glaucomatous optic disc cupping, many of which our patient displayed.

Further, the left eye's nasal hemianopic defect largely respecting the vertical midline suggested neurologic origin, warranting an urgent MRI of the brain and orbits with/without contrast. MRI revealed a severely atrophic left optic nerve, but no evidence of compressive lesion **(Figure 7)**.

FIGURE 2 - OCT prior year

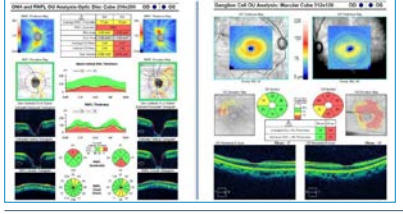


FIGURE 3 - OCT now

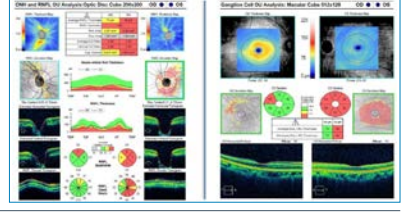
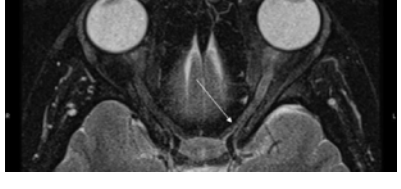


FIGURE 4 - HVF 24-2 (grayscale) prior year

FIGURE 5 - HVF 24-2 (grayscale) now

FIGURE 6 - Recent fundus photos

FIGURE 7 - MRI of orbits with/without contrast



MANAGEMENT

Having ruled out a compressive lesion, the patient was referred back for surgical glaucoma management. In addition to continuing topical medications, she underwent SLT OS for improved IOP stability, and following a good response, SLT OD as well. The patient will require lifelong close monitoring to preserve central vision in the left eye and prevent similar progression in the right eye.

CONCLUSION

In cases of presumed glaucoma with atypical presentation or disease course—especially in relatively young patients—it is essential to rule out non-glaucomatous, neurologic cause of optic nerve cupping as a differential or even concurrent diagnosis.

However, it is equally important to remember that glaucoma can progress rapidly in susceptible eyes (low corneal hysteresis; thin central corneal thickness) with poor compliance. This patient was lost to follow-up for 1.5 years following a baseline IOP reading of 23 mmHg OU, only being diagnosed and treated for POAG upon her eventual return to clinic when significant optic nerve damage had already developed.
To better gauge risk of disease conversion and determine appropriate follow-up frequency, consider measuring corneal pachymetry and hysteresis at the same visit in all eyes with IOP >21 mmHg.

REFERENCES

Available upon request.

CONTACT INFORMATION

Nora Kuby, OD
NoKuby@ico.edu
www.ico.edu

Table of Contents

Late Onset Type 3 Capsular Bag Distension Syndrome with Myopic Shift

Christina Nguyen, OD • Stephanie Fromstein, OD, FAAO - Illinois Eye Institute, Chicago, Illinois

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Capsular bag distension syndrome (CBDS) or capsular block syndrome is a complication due to accumulation of turbid fluid between the intraocular lens and the posterior capsule seen intraoperatively, early postoperatively, or late postoperatively. It is characterized by capsular distension, anterior intraocular lens displacement, and anterior chamber shallowing, or with unexpected refractive shifts. Late postoperatively, this condition can occur in the presence of posterior capsule opacification.

CASE PRESENTATION

A 41-year-old female presented with gradual reduced vision that is worse in her right eye than her left eye with and without her glasses. She has a history of cataract surgery in both of her eyes in 2017. This patient's prescription had been stable for the last three years since her cataract surgery.

PERTINENT FINDINGS & RESULTS

TABLE 1
This patient's pertinent findings before, during and after her condition had been treated. Asymmetric C/D progression

	Last CEE 1 year prior	Initial Visit	1-month Post-YAG
BCVA	20/20 OD, 20/20 OS	20/80-2 OD, 20/50 OS	20/20 OD, 20/20 OS
Refraction	-0.50-0.50x150 OD -0.50 DS OS +2.50 D Add OU	-2.00-0.25x049 OD -1.50-1.25x020 OS +2.50 Add OU	-0.75-0.50x155 OD -0.25-0.50x180 OS +2.50 D Add OU
PCIOL	Clear & centered OU	3+ PCO with a distended posterior capsule OD>OS	Clear & centered OU
Additional Testing	None	HVF 24-2 stimulus size V, macular OCT, DFE: all came back within normal range	None

FIGURE 1
Initial presentation OD showing significant posterior capsule opacification and a distended posterior capsule.

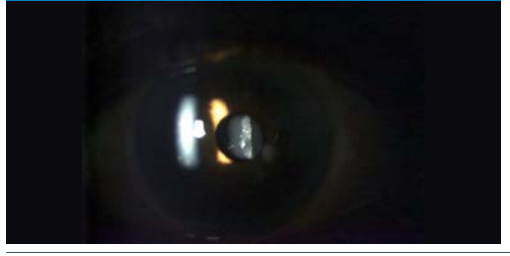


FIGURE 2
Initial presentation OS showing significant posterior capsule opacification and a distended posterior capsule.

FIGURE 3
1-month Post-YAG OD PCIOL is clear and centered.

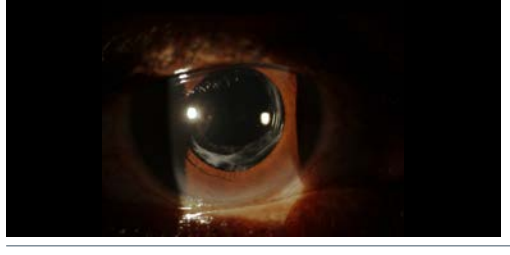


FIGURE 4
1-month Post-YAG OS PCIOL is clear and centered.

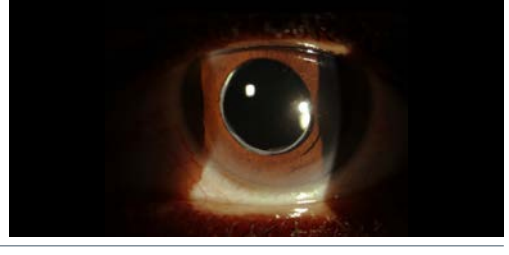


TABLE 2
Classification of different types of capsular bag distension syndrome.

Type 1 CBDS	Type 2 CBDS	Type 3 CBDS	Type 4 CBDS
Transparent liquid inside the capsular bag and transparent posterior capsule.	Homogeneous milky fluid in the capsular bag and a transparent posterior capsule.	Transparent or semitransparent liquid accumulation and posterior capsule opacification.	Homogeneous milky fluid in the capsular bag and posterior capsule opacification.

DISCUSSION

This patient has posterior capsule opacification with transparent liquid accumulation between the intraocular lens and the posterior capsule. Late onset CBDS is thought to be caused by lens epithelial cell proliferation and pseudo-metaplasia where contact between the IOL and the anterior capsule causes fluid accumulation. It rarely can be seen years later in the postoperative period with reduced vision but usually without myopic shift. This patient had a myopic shift.

This condition has been classified many ways by researchers throughout the years. At the XXXV Congress of the European Society of Cataract and Refractive Surgeons, a study categorized capsular bag distension syndrome into four subtypes (Table 2). Based on this classification, the patient has Type 3 CBDS. Nd:YAG laser anterior capsulotomy was performed in order to treat the posterior capsule opacification and drain the fluid into the vitreous. After treatment, the patient's reduced vision resolved, and her refraction shifted back to her previous prescription.

CONCLUSION

It is important to identify and appropriately treat capsular bag distension syndrome in patients who are experiencing reduced visual acuity even if their cataract surgery was done many years ago.

CONTACT INFORMATION

Christina Nguyen, OD
chnguyen@ico.edu
www.ico.edu

Table of Contents

Idiopathic Intracranial Hypertension with Concomitant Sixth Nerve Palsy in a Pediatric Patient

Pedram Pourhosseini, OD • Rahnuma Saiyed, OD, FAAO – Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Idiopathic Intracranial Hypertension (IIH) is a neurological disorder characterized by increased intracranial pressure without an identifiable intracranial mass, vascular anomaly, or infectious etiology. IIH in the pediatric population is a rare disease entity and the presenting signs and their significance can vary dramatically depending on the age of diagnosis. This case demonstrates papilledema with concurrent sixth nerve palsy secondary to IIH in a pediatric patient.

CASE PRESENTATION

A 14 year-old African-American female presented to urgent care complaining of sudden onset eye turn in the right eye and pain behind both eyes. Patient's past ocular history was unremarkable and denied experiencing any symptoms of diplopia. Patient was recently evaluated by her PCP due to recent lower back pain- she was prescribed Aleve as needed.

TABLE 1
Pertinent Findings

	OD	OS
VAcc	20/70- PH NI	20/50- PH 20/40
EOMs	1+ abduction deficit, (-) pain	FROM, (-) pain
Cover Test (distance, cc)	35 PD CRET	Ortho

TABLE 2
Dilated Fundus Exam

	OD, OS
Disc	• Complete loss of cupping • Elevated disc with obscuration of vasculature on the disc • Scattered peripapillary hemes and exudates
Vessels	• Extensive tortuosity

FIGURE 1
Esotropia in primary gaze

FIGURE 2
Subtle abduction deficit in the right gaze OD

FIGURE 3A AND B
Elevated optic nerve head along with obscuration of peripapillary and papillary vasculature OD, OS

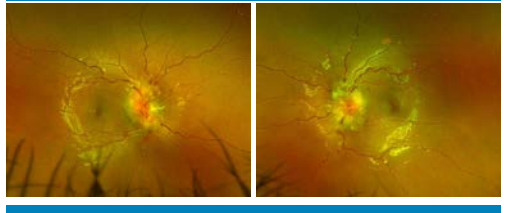
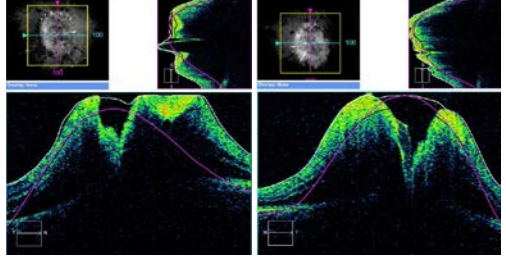


FIGURE 4A AND B
Elevated optic nerve head with preservation of the central cup, inward infliction of the RPE-Bruch's complex OD, OS



DISCUSSION

About 1/3 of children diagnosed with IIH are asymptomatic upon presentation and signs associated with the disease are found on routine examination. The remaining 2/3, who are symptomatic, present with headaches as their primary complaint. Headache associated with adult onset IIH has been described as a classic triad of:

- Daily headaches
- Worsening with Valsalva
- Diffuse non-pulsatile pain

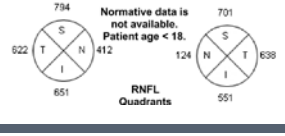
This classic presentation is only present in about 1/3 of children diagnosed with IIH. Therefore, the presence or absence of classic headaches cannot be used as a reliable screen for IIH in this age group. Papilledema has also been shown to be absent in about 20% of children diagnosed with IIH. Children with a smaller C/D ratios are more likely to have papilledema upon presentation, therefore a larger C/D ratio could be a protective feature in this age group.

Cranial nerve 6 (CN VI) palsy is the most common neurological abnormality associated with IIH. Although its prevalence has been reported to be similar between children and adult onset IIH, it has been found to be associated with a higher BMI and LP opening pressure.

TABLE 3
Neuroimaging and Lumbar Puncture (LP)

MRI	• Negative for intracranial o Intracranial mass o Intracranial hemorrhage
MRV	• Bilateral narrowing of transverse sinuses secondary to arachnoid granulation
LP Opening Pressure	• 37 cm H2O

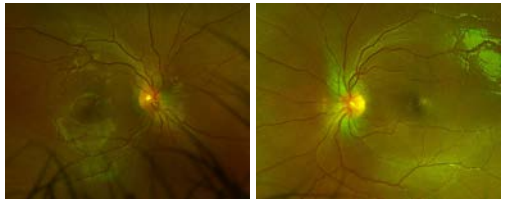
FIGURE 4C
Elevated RNFL Thickness OD, OS



TREATMENT AND MANAGEMENT

Weight loss is the mainstay of nonmedical treatment for IIH. Loss of 6% of body weight in adults has been shown to be effective in resolution of IIH. However, this goal may be different in children as they are still developing. As for medical treatment, acetazolamide is the most commonly used drug as a first line treatment followed by topiramate. Corticosteroids are used in cases of severe vision loss or when emergency surgical intervention is not immediately possible. The surgical intervention of IIH is considered as part of an acute management plan and should not replace the long term lifestyle modifications such as weight loss.

FIGURE 5A AND B
Resolved papilledema s/p treatment OD, OS



CONCLUSION

About 20% of children with IIH develop permanent visual loss or visual field deficit. The severity of papilledema at presentation is directly correlated with the visual prognosis. Accurate diagnosis and prompt initiation of treatment is the key to preservation of vision in the long run in this age group.

REFERENCES

Available upon request.

CONTACT INFORMATION

Pedram Pourhosseini OD • ppourhosseini@ico.edu

Table of Contents

Clinical Application of Optical Coherence Tomography Angiography in the Diagnosis and Management of Idiopathic Juxtafoveal Retinal Telangiectasia Type 2

Alessandra Roa, OD - Leonard Messner, OD – Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Idiopathic Juxtafoveal Retinal Telangiectasia Type 2, or MacTel 2, is a neurovascular degeneration involving Müller cells leading to the death of photoreceptors. This is a bilateral acquired condition that mainly affects 40-60-year old's. Patients will experience a slow decline of central vision that dramatically worsens in the presence of retinal neovascularization which can form chorioretinal anastomoses.

CASE PRESENTATION

43-year-old Hispanic male initially presented with complaints of blurry vision OS>OD. Exam findings lead to the diagnosis of Idiopathic Juxtafoveal Retinal Telangiectasia Type 2. This patient has been monitored for 3 years and continues to be monitored.

EXAM FINDINGS

Visual acuity at initial visit: OD: 20/25-1, OS: 20/50+2
Visual acuity three years later: OD: 20/40-2, OS: 20/50-2

RESULTS

Figure 1a, 1b, 1c: Progression of Optical Coherence Tomography Angiography of the right eye. Cut through the superficial layer shows focal dilation and alterations in macular capillary meshwork, most prominently temporally as well as expansion and irregularity of the foveal avascular zone.

i. Figure 1a: OCT-A OD year 1
ii. Figure 1b: OCT-A OD year 2
iii. Figure 1c: OCT-A OD year 3

Figure 2a, 2b, 2c: Progression of Optical Coherence Tomography Angiography of the left eye. Cut through the superficial layer shows focal dilation and alterations in macular capillary meshwork, most prominently temporally as well as expansion and irregularity of the foveal avascular zone.

i. Figure 2a: OCT-A OS year 1
ii. Figure 2b: OCT-A OS year 2
iii. Figure 2c: OCT-A OS year 3

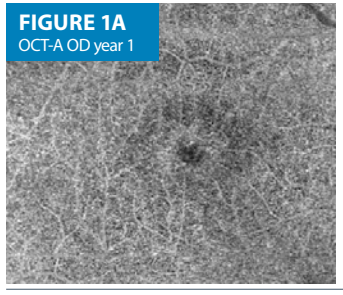


FIGURE 1A
OCT-A OD year 1

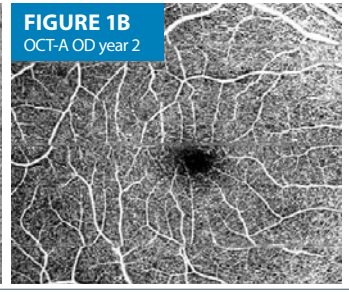


FIGURE 1B
OCT-A OD year 2

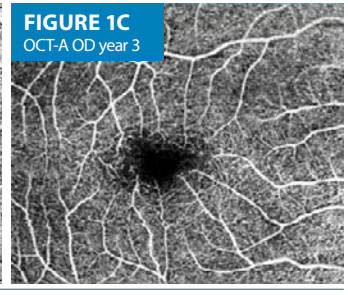


FIGURE 1C
OCT-A OD year 3

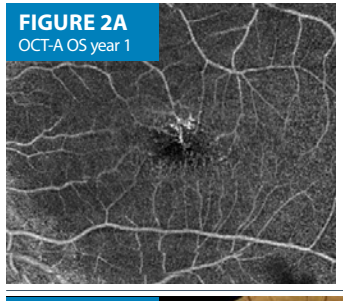


FIGURE 2A
OCT-A OS year 1

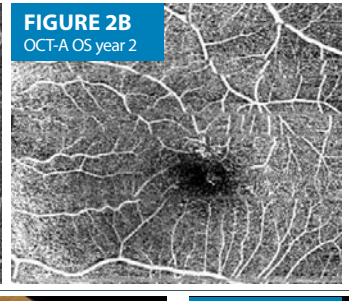


FIGURE 2B
OCT-A OS year 2

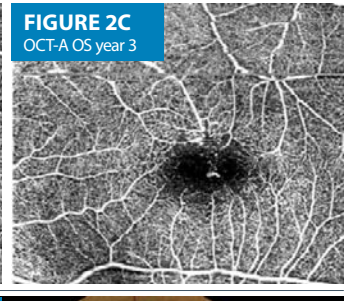


FIGURE 2C
OCT-A OS year 3

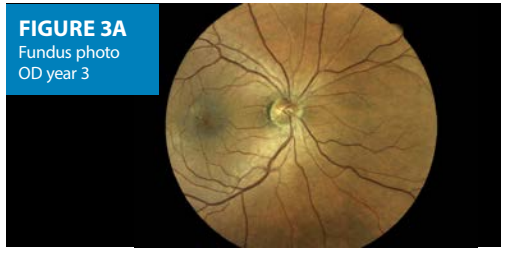


FIGURE 3A
Fundus photo
OD year 3

FIGURE 3B
Fundus photo
OS year 3

DISCUSSION

Historically the diagnosis of MacTel 2 was made by clinical observation seen on dilated fundus exam including macular gray sheen, blunted or lack of foveal reflex, telangiectatic parafoveal vessels, right-angle venules, macular crystal deposits, and patches of RPE hyperplasia (Figure 3a, b). Research suggests this condition is significantly under-diagnosed and its true prevalence is underestimated. New technology of OCT Angiography can help improve the diagnosis and management MacTel 2. OCT-A is a non-invasive method used to image the vasculature network of the retina and choroid. A critical tool to diagnose and monitor progression of retinal vascular anomalies. OCT-A will show focal dilation and alterations in macular capillary meshwork, most prominently temporally as well as expansion and irregularity of the foveal avascular zone. These retinal findings will worsen with progression of the disease. Some patients will develop more sight threatening complications such as macular neovascularization and OCT-A can be used to detect it.

CONCLUSION

There are many diagnostic tools available, but OCT Angiography is the newest technology to diagnose and assist in monitoring progression of Idiopathic Juxtafoveal Retinal Telangiectasia Type 2. Using OCT-A to help identify this condition will limit unnecessary treatments and allow proper patient education. Macular neovascularization can develop at any stage of the disease which can also be monitored used OCT-A and early intervention can be administered to preserve vision.

REFERENCES

Available upon request.

CONTACT INFORMATION

Alessandra Roa, OD
aleroa@ico.edu
www.ico.edu

Table of Contents

A Case of Unilateral Iris Neovascularization

Patricia Salazar, OD; Tricia Newman, OD, FAAO
Illinois Eye Institute • Chicago, Illinois

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Iris neovascularization is most frequently linked to diabetic retinopathy and central retinal vein occlusions but can also be a sign of underlying carotid stenosis. This is a case presentation of iris neovascularization in a patient diagnosed with Type 2 Diabetes Mellitus with no other visible signs of diabetic retinopathy. The etiology, pathophysiology and clinical presentation of iris neovascularization are discussed, as are surgical considerations prior to cataract extraction.

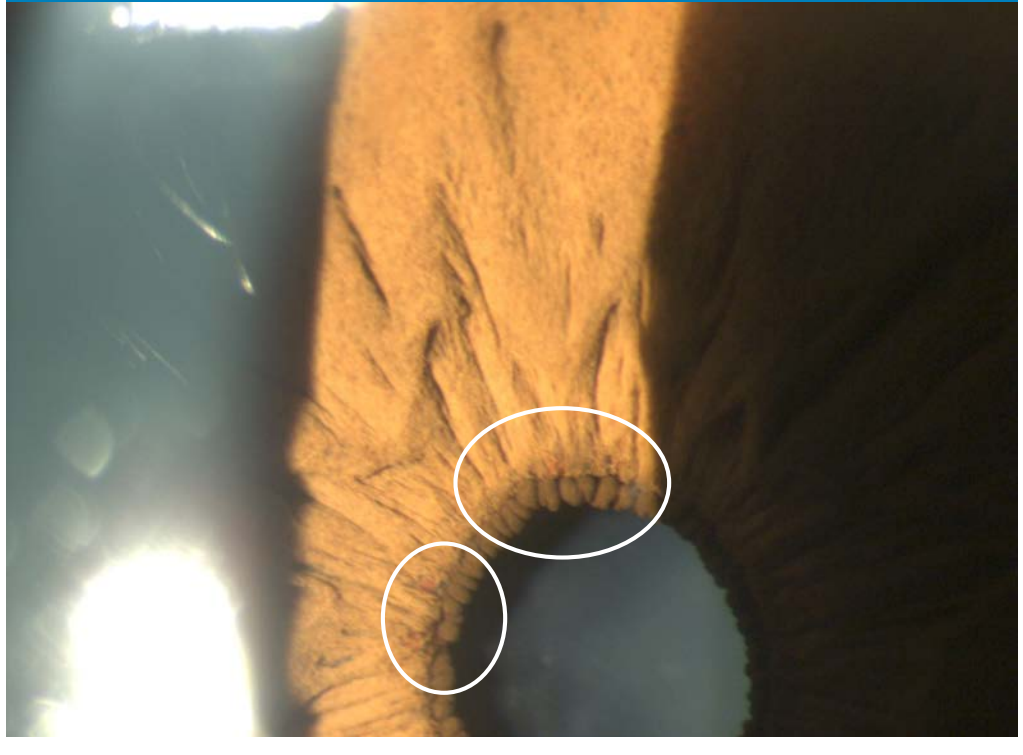
CASE REPORT

A 79-year-old African American man presented with painless decrease in vision OD>OS over the past year. As a type 2 diabetic he had a history of mild non-proliferative diabetic retinopathy and cataracts OU. His last A1C was unknown and last blood sugar reading was 90 mg/dL. Best corrected visual acuity was OD 20/25, OS 20/300 PH 20/150. Manifest refraction was remarkable for a myopic shift OS secondary to posterior subcapsular cataract development. Neovascularization of the iris (NVI) was noted at 9 o'clock in the right eye only, without gonioscopic evidence of neovascularization of the angle (NVA) OU. Intraocular pressure measured 20mmHg OU. Dilated fundus examination showed a larger C/D ratio OS>OD without neovascularization of the disc or elsewhere (NVD or NVE, respectively) in either eye. Follow-up examination one month later revealed the NVI worsened.

TABLE 1
Differential Diagnoses

Ocular Ischemic Syndrome
Diabetic Retinopathy
Central Retinal Vein Occlusion

FIGURE 1
Follow-up examination revealed neovascularization of the Iris (NVI) worsened, noted at 9 o'clock and 12 o'clock.



DISCUSSION:

Also known as rubeosis iridis, NVI is defined as blood vessel proliferation along the pupillary margin. Though its prevalence is unclear in the general population, it is known that NVI develops secondary to disease elsewhere in the eye, and as a part of a variety of systemic conditions such as diabetes, central retinal vein occlusion, and carotid artery stenosis. The presence of NVI without diabetic retinopathy should be recognized as a sign of possible underlying carotid artery stenosis and worked up for ocular ischemic syndrome (OIS) with a carotid doppler ultrasound. If left untreated, NVI can progress and occlude the angle, resulting in secondary neovascular glaucoma (NVG). In this case, unilateral NVI, despite a history of mild NPDR, was more suggestive of ocular ischemia owing to carotid stenosis than a result of diabetic retinopathy.

TREATMENT AND MANAGEMENT

The patient was referred to his primary care physician for consideration of a carotid ultrasound/cardiac workup to rule out carotid occlusive disease. He was also referred to a retinal specialist for fluorescein angiography to rule out OIS and assess the need for anti-VEGF treatment prior to cataract extraction.

CONCLUSION

Timely referral for additional testing is important in the management of NVI. When considering ocular surgery in patients with NVI, pre-surgical clearance from glaucoma and retina specialists and limit complications following any surgical procedure. Prompt diagnosis and treatment of NVI will decrease the likelihood of progression to NVG, which can be difficult to treat and can threaten vision.

CONTACT INFORMATION

Patricia Salazar, OD
psalazar@ico.edu
www.ico.edu

Table of Contents

Aggressive Idiopathic Orbital Inflammatory Syndrome with Extensive Maxillary Sinus Involvement

Negar Sohbati, O.D. & Leonard Messner, O.D., FAAO – Illinois College of Optometry, Chicago, IL

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Idiopathic orbital inflammatory syndrome (IOIS) is a benign, non-infectious, inflammatory process of the orbit. It is characterized by polymorphous lymphoid infiltrates with varying degrees of fibrosis. Magnetic resonance imaging (MRI) is critical in determining the ocular structures involved, and to classify the type of IOIS (i.e. dacryoadenitis, myositis, optic perineuritis, or simply orbital pseudotumor). IOIS is the 3rd most prevalent inflammatory orbital condition, following thyroid eye disease and lymphoproliferative disease.

CASE PRESENTATION

63 y.o AAF presented with complaints of acute onset vertical diplopia for the past 2 weeks. (+) mild pain OD. Her ocular history was significant for orbital pseudotumor of the left eye, diagnosed and treated in 2013.

CLINICAL FINDINGS

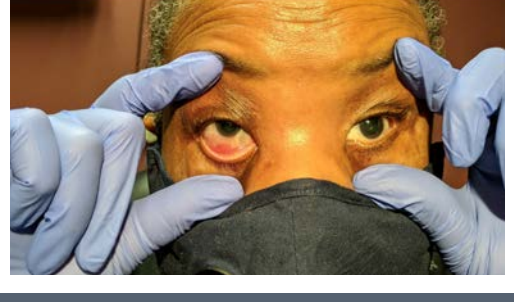
Table 1 shows a summary of her entering visual acuity, pupil testing, and CVF; all of which were unremarkable. Figure 1 outlines her motility pattern in different gazes, showing a right hypertropia which increases in down gaze. Cover test revealed a non-comitant constant right hypertropia. Slit lamp examination showed periorbital swelling (figure 1a), inferior bulbar conjunctival injection and chemosis in the right eye (figure 1b). All other structures were normal. Dilated fundus exam was unremarkable OD; however, diffuse optic nerve pallor, secondary to h/o orbital pseudotumor, was seen OS. The patient was sent for imaging, MRI with and without contrast. A multisequential, multiplanar MRI of the head was obtained. Figure 2a shows a homogenous, iso-intense mass completely filling up the right maxillary sinus as well as the inferior portion of the right orbit. The mass is highly enhanced with gadolinium. An axial cut through the orbits outlines her unilateral, right sided proptosis as well as thickening of her right lateral rectus muscle (figure 3).

TABLE 1
Unremarkable VA, pupils, and CVF OU

	OD	OS
VA (sc)	20/25 +2; PHNI	20/25+2; PHNI
Pupils	PERRL; (-) APD	PERRL; (-) APD
CVF	FTFC	FTFC

FIGURE 1A
Right hypertropia in all gazes and an infraduction deficit in down gaze. Periorbital swelling in the right eye is evident in primary gaze

FIGURE 1B
1+ injection and chemosis inferiorly in the right eye, in primary gaze



DIAGNOSIS AND DISCUSSION

IOIS typically presents unilaterally, but can be bilateral. The most common sign is periorbital swelling, followed by proptosis, EOM restriction, redness, and chemosis. Patients most commonly complain of painful diplopia, and occasionally will be symptomatic for decreased vision if the optic nerve is involved. This condition presents as a space occupying inflammation with no underlying systemic association. Involvement of the maxillary sinus is rare, but there have been a few reported cases. A CT scan is helpful to determine if the orbital floor has been compromised.

FIGURE 2A
Coronal cut through the orbits, T1 weighted image without gadolinium

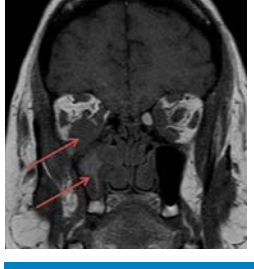


FIGURE 2B
Coronal cut through the orbits, T1 weighted image with gadolinium

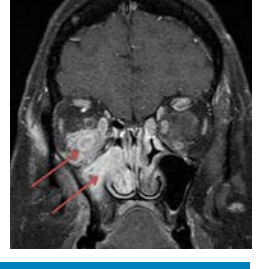
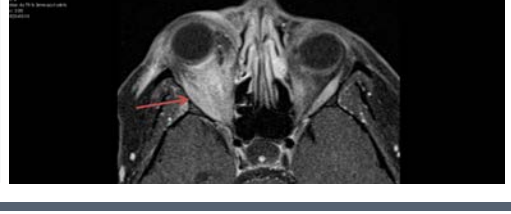


FIGURE 3
Axial cut through the orbits with gadolinium



MANAGEMENT

Oral corticosteroids are the standard of care. Given the extent of involvement of the maxillary sinus in our patient; co-management with an ENT specialist was warranted. A biopsy was done with histology findings consistent with pseudotumor. An endoscopic maxillary sinus decompression was performed resulting in complete resolution of symptoms. EOMs showed significant improvement in motility pattern, especially in down gaze (figure 4).

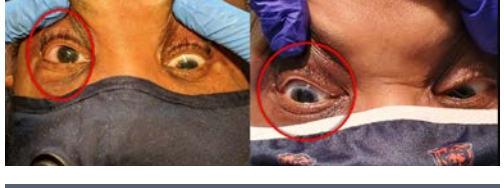
CONCLUSION

Imaging is essential in these cases of acute onset, painful diplopia. Although rare; involvement of multiple structures, past the orbit, can occur in patients with IOIS. Co-management with different specialties for surgical intervention may be indicated. Biopsies are often invasive, and thus controversial; however, in patients with significant structural involvement, biopsies are indicated.

REFERENCES

Available upon request

FIGURE 4
Significant improvement of hyperdeviation after maxillary sinus decompression



CONTACT INFORMATION

Negar Sohbati, O.D. - NSohbati@ico.edu

Table of Contents

NEUROSCIENCE

1 ICO PRESENTATION

Table of Contents

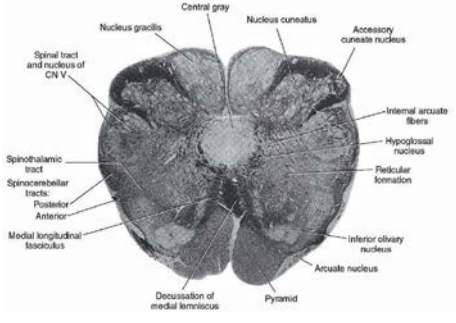
Carl Weigert: the stain and so much more

Barclay W. Bakkum
Illinois College of Optometry
Chicago, IL 60616

3241 South Michigan Avenue, Chicago, Illinois 60616

INTRODUCTION

Carl Weigert (1845-1904) is best remembered for his development of several histologic staining techniques, some of which are still being used today, although his contributions to science reached so much farther.[1] He was born in Silesian town of Münsterberg, where his parents kept an inn. Dr. Weigert became a medical physician in 1868 and served as a regimental surgeon in the Franco-Prussian War.[2]



Example of modified Weigert stain

BRESLAU

One of Weigert's first significant contributions came during the smallpox epidemic of 1871-2 in Breslau where he was an assistant in the University Medical Clinic. He published a preliminary note in which he showed he was able to stain bacteria for the very first time.[3] This advance was of the greatest importance for the subsequent work of Robert Koch, who later became a good colleague of Weigert. Koch even used Bismark brown to detect the tubercle bacillus – a stain introduced by Weigert.[4] In his completed monograph from the smallpox research[5], Weigert began to develop the theory of what would eventually be called "coagulation necrosis" (a term coined by his later mentor, Julius Cohnheim, one of the founders of German pathology) and the reparative processes ("Bioplastik") of supporting tissues. According to his younger cousin, Paul Ehrlich (with whom he had a close working relationship) this monograph contained "the points of view that guided his work for the rest of his life" (translated).[6]

While still at Breslau, Weigert was appointed privat-dozent in pathology where he worked under Cohnheim and wrote several pathologic anatomy papers. One of Weigert's observations that he published about was that when complete ureter duplication is present the ureter which emanates from the superior aspect of the kidney, inserts more inferomedially into the bladder. This is referred to as the ectopic orifice. The other ureter, emanating from the inferior aspect of the kidney, inserts into the bladder more laterally and cephalad (orthoptic). This ureter is more in keeping with normal ureteric insertion.[7] Since Robert Meyer made a similar observation in 1907, this arrangement has become known as the Weigert-Meyer Rule.

It may have been an expectation that Weigert would follow his mentor into a career of experimental pathology, but this did not really happen mainly for two reasons. Weigert had an aversion to experimenting on animals.[8] Also, he had an independent nature and believed that pathologic histology could be materially advanced by the development of better staining techniques. This became an early focus of his attention from which he would not be distracted.

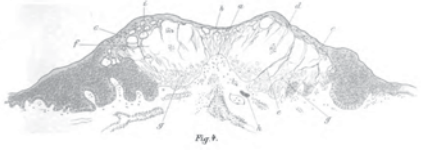


Fig. 4. Doppelt gedellte Pocke mit sehr großen peripherischen Höhlen (f), a diph thcroidcr Hauptherd, darunter die sehr schön entwickelte untere Delle. b, c, d wie in Figur 3. e Balken an eine Papillenspitze sich ansetzend. g lose Schollen am Grunde der großen Höhle, h Bakterienschlauch, i kleine Fächer dicht unter der Pockendecke. Hämatoxylin usw. Vergrößerung usw. wie Figur 3.

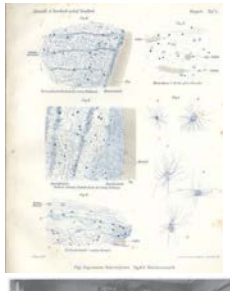
LEIPZIG

When Cohnheim accepted a professorship at Leipzig, he did so with the condition that Weigert go with him as extraordinary professor. While there in 1882, Weigert developed the first stain for myelin.[9] This was accomplished by treating the tissue with a chromium (later copper) salt mordant and staining with acid fuchsin (later hematoxylin). In 1891 he gave a more complete version of the process of the evolution of these stains over a 3 year period.[10] Subsequently, further improvements were made by others of which the most famous is the Pal-Weigert stain developed by Jakob Pál.[11] Weigert's close friend, Ludwig Edinger, maintained that being able to stain myelin had been the "starting point of a new period in science" (translated).[4] Indeed it was the basis for the understanding of the complexity of the human brain we have now. While at Leipzig, Weigert also had other important contributions to science, including improving microtome techniques, e.g., serial sectioning and writing about the pathogenesis of several diseases, including tuberculosis, which was an extension of his interest in coagulation necrosis.[12]

After Cohnheim died, Weigert was considered his logical successor. There is a consensus of opinion that this promotion was denied Weigert because he was Jewish.[1, 4, 7, 12] Also, he was very unassuming and would not be considered "politically savvy" by today's standards, so he did not force the issue. In fact, Weigert was never offered an academic position at any German university, even though there were vacancies that had opened up while he was still alive.[1]

FRANKFURT

Weigert soon resigned from his position at Leipzig and was extended a position at the small Senckenbergchen pathologisch-anatomischen Institut in Frankfurt-am-Main. There he remained for 20 years until the end of his life. It can be argued that his work in Frankfurt stamped him as one of the foremost pathologists of his time.[1] Among other things, he developed reliable stains for fibrin[13] and elastic fibers.[14] He not only devised a stain for neuroglia, but Weigert penned an extensive monograph (over 200 pages long) of his observations of these cells in normal human tissue.[15] He wrote expansively about coagulation necrosis and inflammation. This led to the idea that was later known as Weigert Law, which states that the loss or destruction of tissue results in compensatory replacement and overproduction of new tissue during the process of regeneration or repair (or both).[16] Even though Weigert introduced the use of other stains for histological use during his career, including iodine-iodide,[17] iron hematoxylin, gentian violet, acid fuchsin, and a technique for double staining connective tissues, he always saw these as a means to an end – tools for conducting his research.



Dr. Weigert's office in Frankfurt

PERSONAL

Weigert had a joyous nature, although he suffered from bouts of depression and self-doubt, especially after his not being offered the position at Leipzig.[1] He was generally well-liked and enjoyed entertaining his friends by story-telling and ventriloquy. He was an amateur mind reader and even wrote a paper about it.[18] He financially supported his parents for many years such that he had a very modest lifestyle. His work always had a high degree of craftsmanship and was the result of slow, deliberate effort. It was known among his friends that Weigert worked 17 years on the neuroglia staining method. He never published until he felt that he had diligently studied the problem from every point of view.

CONCLUSION

Weigert literally worked to the very end. On a Sunday, August 4, 1904, after having a nice day with friends, he retired to his simple room in a boarding house to read. He was found dead the following morning of a coronary thrombosis. Weigert's sudden death left much work incomplete. He had completed 5 (of 15) chapters in a book called: An Attempt at a General Pathological Morphology Based on the Normal (translated).[1] In it he was trying to formulate the results of many years of work into a great universal law applicable to both animal and plant pathology. Ehrlich, who owed so much to his cousin scientist, saw to it that Weigert's collected works were published in 1906.[19] Weigert's friend K. Leichtheim wrote in an obituary, "Weigert's death created a great stir in the medical world, such as occurs only when a great man dies. And Weigert was truly a great man; in spite of the unassuming position which he held, he was one of the most active and successful investigators among pathologists of his day. He was both master of technique and a profound thinker, and he did not hesitate to attack the most fundamental problems of life and death" (translated).[1]

REFERENCES

1. Morrison H. Carl Weigert. Ann Med Hist. 1924 Jun;6:163-77.
2. -. Carl Weigert (1845-1904). JAMA. 1964 Sep 7;189(10):769-70.
3. Weigert C. Über Bacterien in der Pockenhaut. Zentralbl med Wiss. 1871;8:609-11.
4. Sammet K. Carl Weigert (1845-1904). J Neuro. 2008;255:1439-40.
5. Weigert C. Anatomische Beiträge zur Lehre von den Pocken. Teil I: Die Pockeneffloreszenz der äusseren Haut. 1874. Teil II: Über pockenähnliche Gebilde in parenchymatösen Organen und deren Beziehung zu Bakterienkolonien. 1875. Breslau.
6. Rudolph G. Weigert, Carl. 2020. https://www.encyclopedia.com/science/dictionaries-thesauruses-pictures-and-press-releases/weigert-carl.
7. Weigert C. Über einige Bildungsfehler der Ureteren. Archiv pathol anat physiol klin. 1877;70:490-2.
8. Dunham EK, Herter CA. The collected works of Carl Weigert (book review). JAMA 1907 Feb 2; 48(5):412-415.
9. Weigert C. Über eine neue Untersuchungsmethode des Centralnervensystems. Centralbl med Wiss. 1882;20:753-7, 772-4.
10. Weigert C. Zur Markscheidenfärbung. Dtsch med Wschr. 1891;17:1184-1186.
11. Pal J. Ein Beitrag zur Nervenfärbetechnik. Med Jahrb. 1886;1:619-31.
12. Wohlrab F, Henoch U. Zum Leben und Wirken von Carl Weigert (1845-1904) in Leipzig 1878-1885. Zentralbl Allg Pathol. 1988;134(8):743-51.
13. Weigert C. Über eine neue Methode zur Färbung von Fibrin un von Microoranismen. Fortschr Med. 1887;5:228-32.
14. Weigert C. Über eine Methode zur Färbung elastischer Fasern. Zentralbl allg Pathol pathol Anat. 1898;9:289-92.
15. Weigert C. Beiträge zur Kenntnis der normalen menschlichen Neuroglia. 1895. Diesterweg:Frankfurt-am-Main.
16. Weigert C. Neue Fragestellungen in der pathologischen Anatomie. Deutsch med Wochenschr. 1896;40:635-40.
17. Bhattacharyya Kalyan B. Eminent Neuroscientists: Their Lives and Works. 1st ed. 2011. Kolkata, India: Academic Publishers.
18. Weigert C. Carl Weigert: Gesammelte Abhandlungen. 1906. Berlin: Julius Springer.
19. Sarkowski H. Springer-Verlag: History of a Scientific Publishing House. 1992. Berlin: Springer-Verlag.

CONTACT INFORMATION
Barclay W. Bakkum • bbakkum@ico.edu • www.ico.edu

Table of Contents