ILLINOIS COLLEGE OF OPTOMETRY

2023 RESEARCH PRESENTATIONS

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The Spots Just Keep on Coming! Diagnosing Extramacular Adult Vitelliform Dystrophy

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INTRODUCTION

A patient with longstanding choroidal lesions is found to have new lesions and progressive chorioretinal atrophy, prompting additional workup. Additional testing reveals a diagnosis of extramacular adult vitelliform dystrophy. This case highlights the importance of appropriate diagnostic testing and genetic testing to help rule out other retinal pathologies.

CLINICAL FINDINGS

74 yo AAM present to clinic for his yearly exam.
POHx: Choroidal lesions OU, NIDDM s DR OU, cataracts OU, presbyopia OU, (-) trauma
FOHx: No glaucoma or blindness
PMHx: NIDDM, HTN, asthma, gout, DJD, papillary thyroid cancer in remission (s/p resection), CTS, systolic murmur, OSA, PTSD, B12 deficiency, HLD, diverticulosis
Meds: losartan, metoprolol, metformin, nifedipine, sildenafil, terazosin, colchicine, levothyroxine, aspirin, atorvastatin, allopurinol, albuterol, trazodone, paroxetine HCL, cholecalciferol, cyanocobalamin, folic acid, multivitamin
Allergies: Shellfish, Lisinopril, Niacin, Enalapril, Clindamycin, Cephalexin

Clinical Exam		
	OD	OS
BCVA	20/20	20/20-2
SLE	1+ MGD Lens: 2+ NS, ACC in Vax, PCC approaching VAx	1+ MGD, LL papilloma, Lens: 2+ NS, ACC in Vax, PCC approaching VAx
DFE		
C/D	0.55v/0.50h	0.40v/0.40h
ONH	NL	NL
Vessels	NL	NL
Posterior pole/ macula	New choroidal lesions and increased chorioretinal atrophy within the arcades and macula, (-) CNVM	New choroidal lesions and increased chorioretinal atrophy within the arcades and macula, (-) CNVM
Periphery	NL	NL

Imaging and Labs		
	OD	OS
OCT Macula	subfoveal deposit and multiple deep elevated lesions	subfoveal deposit and multiple deep elevated lesions, area of CR atrophy superiorly
FANG	Choroidal lesions with blocked fluorescence, focal areas of hyperfluorescence ST arcade	Choroidal lesions with blocked fluorescence, focal areas of hyperfluorescence ST arcade, chorioretinal scar with surrounding hyperfluorescence
FAF	CR atrophy with hypofluorescence ST, hyperfluorescent choroidal lesions	CR atrophy with hypofluorescence ST, hyperfluorescent choroidal lesions, temporal hyperfluorescence with surround hypofluorescence
Labs: PTH, TB QuantiFERON, Syphilis panel, ACE, Serum Lysozyme (all normal)		

Referral: Inherited retinal disease specialist evaluation with possible ERG and genetic testing

DIFFERENTIAL DIAGNOSES

Adult vitelliform dystrophy, multifocal choroiditis, old polypoidal chorioretinopathy, trauma, thyroid cancer, ocular histoplasmosis

- Systemic h/o papillary thyroid cancer was present, although patient had a resection and radioactive iodine treatment in 2002, thus making it unlikely that findings were correlated with thyroid cancer
- Although genetic testing was unremarkable, consultation with inherited retina specialist confirmed a diagnosis most consistent with a variant of adult vitelliform dystrophy

FIGURE 1
OD Optos Image

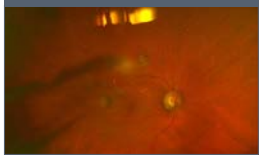


FIGURE 2
OS Optos Image

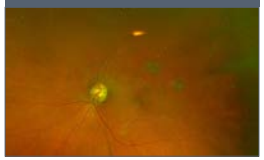


FIGURE 3
OD FANG Late Phase

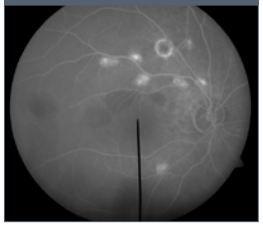


FIGURE 4
OS FANG Late Phase

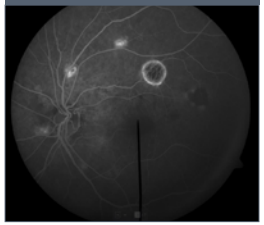


FIGURE 5
OD OCT Mac ST arcade showing deep elevated lesion

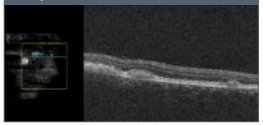
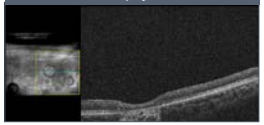


FIGURE 6
OS OCT MAC ST arcade showing chorioretinal atrophy



DISCUSSION

Adult vitelliform typically presents with foveal involvement, however 1/3 of patients can have extrafoveal involvement which can make diagnosis more difficult. Extramacular adult vitelliform dystrophy, as its name suggests, typically is diagnosed after the age of 40. Patients may have a mutation in PRPH2, BEST1, IMPG1, IMPG2, and/or HTRA1 genes. However, less than 25% of patients are found to have known genetic markers. The patient was heterozygous for ABCA4, PCARE, MERTK, PDE6A. In this condition, the RPE is affected, causing deposition of lipofuscin within the RPE or between RPE and Buch's membrane, leading to RPE degeneration and photoreceptor loss. In addition, CNVM may develop. EOG and full field ERG results are typically normal in these patients, as this is a localized retinal pathology. Visual prognosis with extramacular adult vitelliform dystrophy can vary depending on the lesions' location. Of those that have visible macular changes, only 10% have vision ≤20/200 Patients have a 50% chance of vision loss over the age of 70 due to chorioretinal atrophy and CNVM.

MANAGEMENT

Genetic testing can be an important factor in disease diagnosis and prognosis. Although genetic testing did not define this patient's phenotype, clinical findings for this patient were consistent with a diagnosis of extramacular adult vitelliform dystrophy. Genetic testing is typically low yield for this condition. Patient was counseled on potential inheritance in his offspring. There is no treatment for this condition, aside from treating complications such as CNVM. Due to the lack of presence of CNVM the patient will continue to be monitored on a 6-month basis with DFE and will be receiving genetic counseling.

CONCLUSION

In patients with chorioretinal lesions, it is important to perform appropriate diagnostic testing. It is also important to consider inherited retinal disease and genetic testing when the cause of such lesions cannot be determined. Consideration of the full clinical picture and history is important with diagnosis and management. In our patient longitudinal evaluation provided important clues to his underlying diagnosis. In patients with extramacular adult vitelliform dystrophy the risk for vision loss is always present and they must be closely monitored for any complications.

References: Available upon request

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Monocular Visual Field Defect as a Presenting Sign in Conversion Disorder

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INTRODUCTION

Conversion disorder, also known as functional neurological symptom disorder, must be considered as a probable diagnosis in cases of reduction in visual acuity that cannot be attributed to a pathological origin. Patients suffering from this psychiatric disorder present with non-organic changes in vision due to changes in higher-order cortical processing caused by emotional stress. All ancillary testing yields normal results, but the patient exhibits bilateral and symmetric reduction in vision. Conversion disorder often presents with a normal visual field, occasionally as a constricted or tubular field defect. This patient presented with a monocular central defect, which is rare in the absence of retinal or optic nerve pathology.

CLINICAL FINDINGS

The 13-year-old patient presents with equal and reduced vision OU. The patient has anxiety and depression and recently underwent parental divorce. Refractive evaluation revealed mild myopic astigmatism bilaterally, with no improvement in visual acuity. Binocular vision testing, color vision assessments, and dilated fundus exam (DFE) revealed no abnormalities. Optical coherence tomography (OCT) scans of the macula and optic nerve were unremarkable OU. Additionally, the electroretinogram (ERG) and visual evoked potentials (VEP) showed normal findings. However, Humphrey visual field (HVF) testing demonstrated repeatable focal central depression in the right eye, while the left eye exhibited normal results.

TABLE 1
Visual Acuity and Additional Testing

	OD	OS
May 2023	20/50	20/50
August 2023	20/30-2	20/30
Pupils	PERRL, (-) APD	PERRL, (-) APD
EOMs	FROM	FROM
CVF	FTFC	FTFC

FIGURE 1
Unremarkable posterior segment

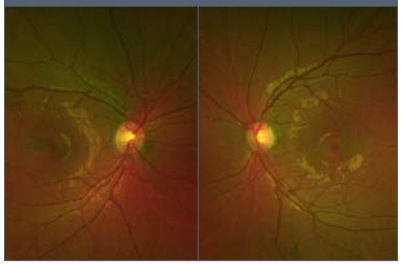


FIGURE 2
Unremarkable OCT of optic nerve and macula

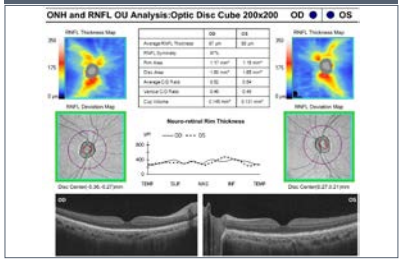


FIGURE 3
HVF 24-2 June 2023 showing repeatable monocular central visual field defect

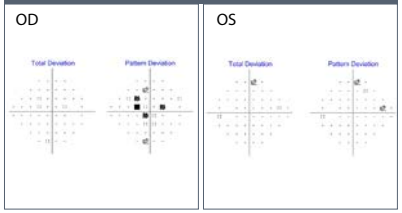


FIGURE 4
HVF 24-2 August 2023 showing resolution of monocular central visual field

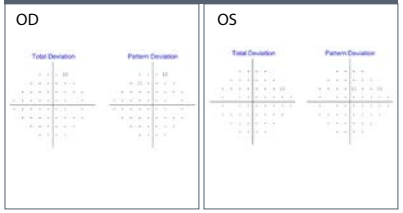


FIGURE 5
Electroretinogram (ERG) - within normal limits

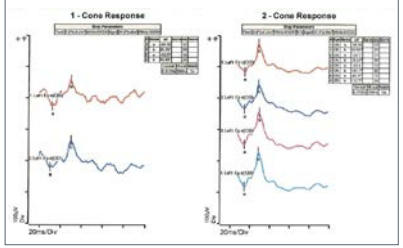
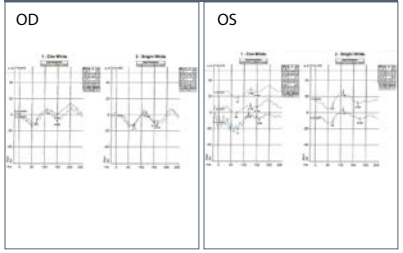


FIGURE 6
Visual Evoked Potential (VEP) - within normal limits



MANAGEMENT

As a functional neurological symptom disorder, understanding the patient's medical and social history is vital as individuals affected by this condition frequently undergo great psychological distress. The optimal approach to treating conversion disorder consists of validating the patient's reported symptoms, particularly considering the substantial psychological stress they endure. Clear communication is crucial to convey the absence of pathology, thereby highlighting the reversible nature of the symptoms. Upon follow up, this patient showed subjective and objective improvement in his vision, as well as resolution of the central depression of his right visual field.

CONCLUSION

It is important to consider conversion disorder when encountering cases of non-organic vision loss. The presentation of visual field defects associated with conversion disorder may not consistently conform to conventional patterns but warrants inclusion as a differential diagnosis. Establishing a role as an emotional support system for the patient can relieve their symptoms and reduce the pursuit of unnecessary investigation without underlying pathology. Reassuring the patient their experiences are acknowledged will reduce the inclination for further unnecessary tests or consultations. Incorporating psychotherapy into the treatment plan may offer additional benefits, as exemplified in the case of this patient who was participating in weekly therapy sessions along with treating his anxiety and depression with prescription medication.

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Symptomatic Pigmented Paravenous Retinochoroidal Atrophy: macular involvement and nyctalopia

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INTRODUCTION

Pigmented paravenous retinochoroidal atrophy (PPRCA) is rare disorder, with a possible inflammatory or hereditary etiology. It is characterized by RPE/photoreceptor degeneration, choriocapillaris atrophy, and namely, pigment accumulation around retinal veins. The condition presents bilaterally and symmetric. As the condition tends to spare the macula, most patients are asymptomatic with diagnosis being made incidentally upon examination. This case report details an atypical presentation of PPRCA, in which the patient presented with macular involvement and nyctalopia, with the diagnosis being made based on ocular history, multimodal imaging, and the results of laboratory and genetic testing.

CASE HISTORY

A 25-year-old black male presented with complaints of nyctalopia and reduced vision. His ocular history was positive for retinitis pigmentosa. His family's medical and ocular history was unremarkable. Best corrected visual acuity was 20/300 OD and 20/ 70 OS. External examination, entrance testing, slit lamp examination findings were unremarkable. IOP's were 12 mmHg OD/ OS with Goldmann applanation tonometry. Fundus examination revealed optic discs with 0.25/0.25 cup to disc ratio OD/OS with no evidence of pallor. Macular mottling was noted OU along with pigment accumulation along retinal veins. Fundus autofluorescence revealed hypo auto fluorescence with surrounding hyper auto fluorescence radiating from the posterior pole to the mid periphery. SD-OCT revealed loss of the ellipsoid zoner along with RPE atrophy. An inherited retinal disease panel was unremarkable. Lab testing including syphilis IgG, QuantiFERON Gold, ACE, serum lysozyme, CBC, and HSV titers were also unremarkable. Based on the examination findings and normal lab and genetic testing, the patient was diagnosed with PPRCA. The patient was referred for low vision rehabilitation and continues to be followed for progression with the last visit showing stable findings.

DISCUSSION

PPRCA is a rare diagnosis of exclusion as it can mimic many hereditary retinal (namely retinitis pigmentosa), infectious, and inflammatory disorders. Historically, once diagnosed, PPRCA carries a favorable prognosis due to the macula being spared with slow to no progression. However, rare cases have noted macular involvement, nyctalopia, and progression on OCT. Macular findings can include edema, exudation, pigmentary changes, and RPE atrophy. The latter finding was noted in our patient and accounted for his reduced vision while the extent of atrophy likely accounted for his nyctalopia. At this time, it is unknown why some patients present with macula changes while others do not. Studies suggest that this may be a rare phenotypic expression or a distinct finding. Further research is needed at this time. Clinicians should be aware of untraditional findings of PPRCA while monitoring for disease progression.

FIGURE 1

Ultra-wide field fundus photographs of the left eye (A) and right eye (B) revealing retinal pigment accumulation adjacent to and around retinal veins radiating from the optic nerves and extending into the mid periphery.

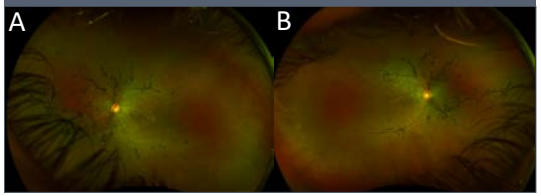

FIGURE 2

Fundus auto fluorescence of the left eye (A) and right eye (B) showing hypo auto fluorescence with surrounding hyper auto fluorescence also radiating from the optic nerve and following the course of the retinal veins into the mid periphery. The extensive hypo auto fluorescence in the midperiphery is indicative of retinal pigment epithelium damage and atrophy.

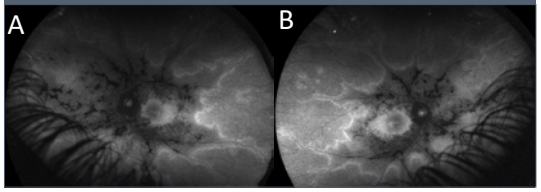

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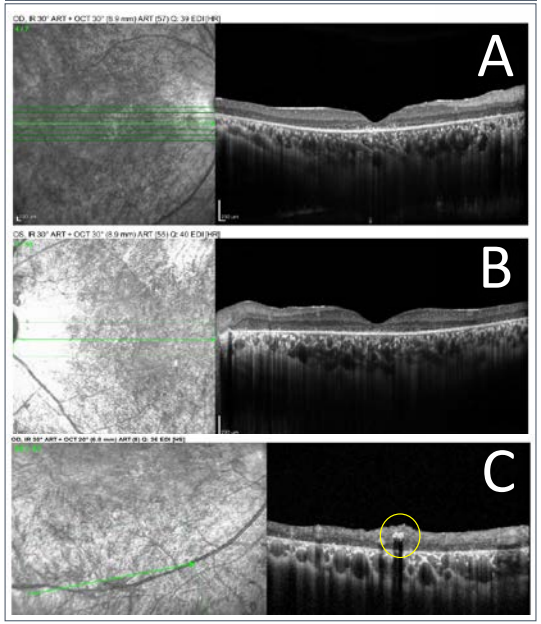
FIGURE 3

Spectral domain optical coherence tomography of the macula revealed perifoveal loss of the ellipsoid zone, interdigitation zone, and thinning of the retinal pigment epithelium in the right (A) and left eye (B) which likely accounted for the patient's reduced acuities. Spectral domain optical coherence tomography was also performed in and around the retinal veins (C) revealing retinal pigment accumulation in the inner and outer retina with accompanying posterior shadowing (yellow circle)



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Schnyder Corneal Dystrophy with Late Onset Keratoconus Development

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INTRODUCTION

Keratoconus (KC) is a bilateral progressive stromal thinning disorder which leads to corneal ectasia, irregular astigmatism, and possible corneal scarring with resultant acuity loss. KC is known to be mostly sporadic however evidence for a genetic etiology is emerging. Linkage studies have identified numerous loci for KC. Studies have also shown that relatives of patients with KC are at higher risk for developing KC. Furthermore, several systemic syndromes have an established association with KC. While the evidence for a genetic linkage for KC is growing, it is known that Schnyder corneal dystrophy (SCD) is an autosomal dominant condition, caused by UBIAD1 mutations. It presents with abnormal accumulations of cholesterol and phospholipids in the cornea. Although limited case reports have shown KC and other corneal dystrophies occurring concurrently, there are no reports KC and SCD presenting together. We report on a patient that was diagnosed with SCD with concomitant KC based on the results of multimodal testing.

CASE HISTORY

A 49-year-old black female presented complaining of distance and near blur OS. Her ocular and medical history was positive for SCD OU and hyperlipidemia. Best corrected visual acuities (BCVA) were 20/50 OD and 20/200 OS. Examination one-year prior showed BCVA to be 20/50 OD/OS. External examination and entrance testing were unremarkable. Slit lamp examination revealed dense corneal arcus 360 with central stromal crystal deposition OD and OS. Corneal thinning was also noted OS>OD. IOP's were 16 mmHg OD/OS with Goldmann applanation tonometry. Dilated fundus examination was unremarkable. Corneal tomography showed large amounts of inferior corneal thinning OS>OD. Anterior segment OCT localized the deposits to the anterior stroma OD and OS. The patient was diagnosed with SCD with concurrent KC OS>OD and was educated on the benefits of a GP fitting, but declined. She continues to be followed with her last visit showing stable findings.

DISCUSSION

There are no known associations between SCD and KC. However, it is possible that there is some unknown genetic or pathophysiological linkage between the two conditions. While most KC cases are sporadic, there is a well-recognized genetic component to the disease. It is plausible that SCD mutations may have gene loci for a hereditary form of KC with possible gene-environmental interactions. KC has also been linked to other corneal dystrophies including granular, macular, and lattice. The pathophysiology of these coexistences is poorly understood but could apply in this case. Postulated theories include abnormal keratocyte synthesis and degeneration of basal epithelial cells in addition to the genetic linkages. Though the presentation in this case could be coincidental, the late onset of KC diagnosis suggests a possible association between the two conditions. Further research is needed at this time. Clinicians should be aware of the presentation of KC with SCD and other corneal dystrophies.

FIGURE 1

Imaging of the right cornea. Top Left: Anterior segment photography of the patient's right cornea displaying cholesterol and phospholipid deposits in the central stroma. Top Right: 4 Maps Refractive display from the OCULUS Pentacam (Pentacam HR, OCULUS Optikgrate GmbH) showing central irregular astigmatism, anterior and posterior elevation corneal elevation changes consistent with an ectatic pattern, K readings of 45.3/47.1 @ 88.1, and corneal thickness of 250 microns.

Bottom Left: Scheimpflug scan of the corneal showing apical thinning and steepening, consistent with keratoconus Bottom Right: Anterior Segment OCT of the cornea showing hyper-reflective areas (red) in the anterior stroma from the cholesterol and phospholipid deposits.

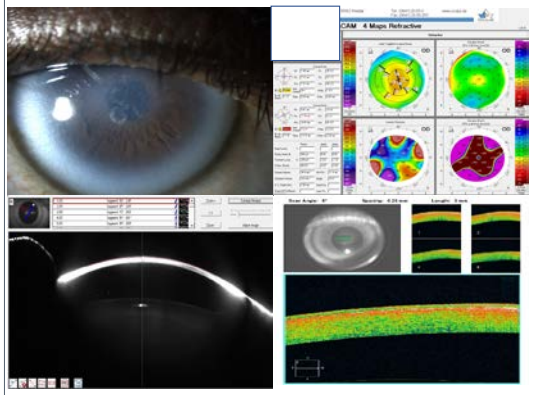
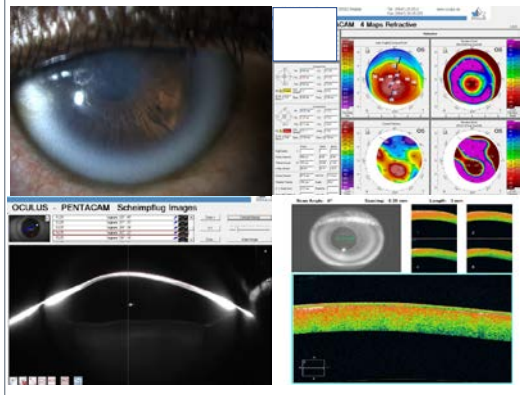


FIGURE 2

Imaging of the left cornea. Top Left: Anterior segment photography displaying cholesterol and phospholipid deposits in the nasal paracentral stroma. Top Right: 4 Maps Refractive display from the OCULUS Pentacam (Pentacam HR, OCULUS Optikgrate GmbH) showing a large area of central irregular astigmatism, anterior and posterior elevation corneal elevation changes consistent with an ectatic pattern, K readings of 71.9/74.9 @ 131.1, and corneal thickness of 181 microns.

Bottom Left: Scheimpflug scan of the corneal showing significant apical thinning and steepening, consistent with keratoconus Bottom Right: Anterior Segment OCT of the cornea showing hyper-reflective areas (red) in the anterior stroma from the cholesterol and phospholipid deposits.



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Homonymous Hemianopsia Following Miscarriage Induced Stroke

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INTRODUCTION

It is widely known that stroke is a leading cause of morbidity and mortality with women having a higher lifetime risk. A 2022 study identified a link between stroke risk and history of stillbirth or miscarriage. This risk was significantly increased in women having 3 or more miscarriages. While ocular complications such as refractive changes, lacrimal gland dysfunction, and central serous chorioretinopathy during pregnancy have been widely researched, literature on visual sequelae following miscarriage is limited. This case illustrates the link between stroke and miscarriage while highlighting the potential visual impact.

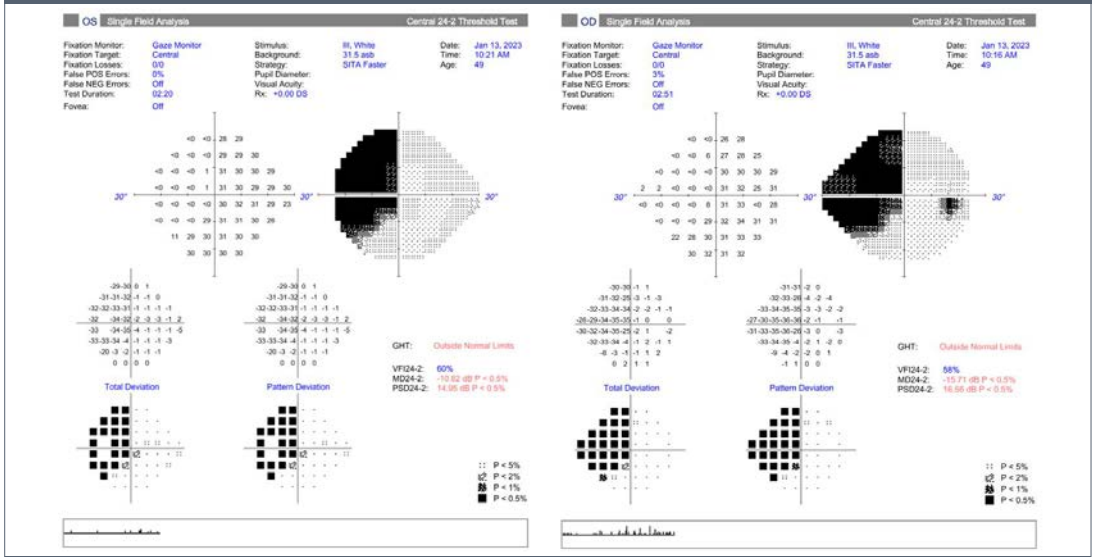
CLINICAL FINDINGS

A 49yo AAF presented with complaints of longstanding difficulty identifying people when approached from the left side. (+) history of left sided visual field restriction and 25% right sided weakness following a stroke caused by a miscarriage 17 years prior. Her ocular and medical histories were otherwise unremarkable.

Clinical Exam:
BCVA: 20/20 OD, OS
CVF: left sided constriction greater superior OD, OS
Pupils: PERRL (-) APD OD, OS
EOMs: FROM OD, OS
SLE / DFE: unremarkable
IOP: 12mmHg OD, OS via GAT
24-2 HVF: left homonymous hemianopsia with mild inferior sparing

The patient was subsequently diagnosed with a left homonymous hemianopias secondary to a stroke caused by miscarriage. She was referred to vision rehabilitation and evaluated for visual field expansion with sector prism.

FIGURE 1
24-2 HVF SITA-Faster revealing a left homonymous hemianopsia denser above the midline with mild inferior sparing



DISCUSSION

Visual changes during pregnancy and the postpartum period are well established in the literature. Unfortunately, the visual impact of stillbirth or miscarriage has not been as widely explored. Potential serious complications of miscarriage include bleeding or infection, however a connection between miscarriage and stroke has been recently identified. Therefore, the visual consequences of stroke can be present in these patients. The exact pathophysiology of stroke in patients experiencing miscarriage is unknown at this time. Potential mechanisms include persistent endothelial dysfunction, elevated homocysteine, or alloimmune and autoimmune factors. It is crucial that eyecare providers be aware of the visual complications of miscarriage induced stroke in order to appropriately evaluate, manage, and treat such patients.

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Acute Bilateral Nystagmus Secondary to Ischemic Stroke In A Cancer Patient

Elyse L. Chaglasian, OD, FAAO • Illinois College of Optometry, Chicago, IL

INTRODUCTION

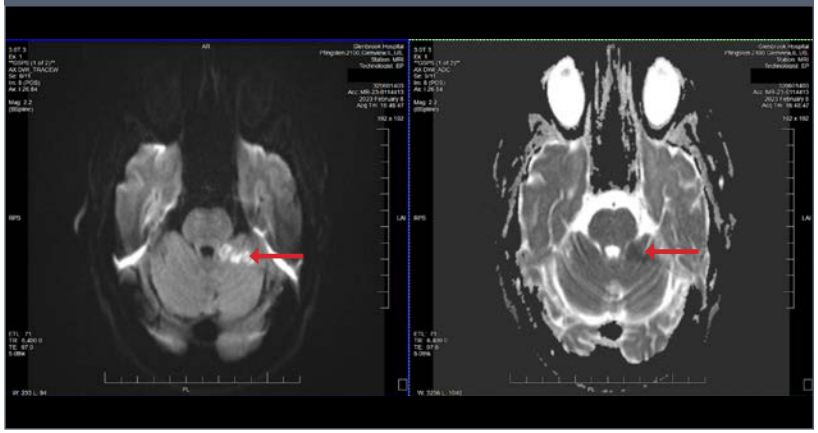
The relationship between cancer and vascular events is well known, as tumors cells can create a hypercoagulable state. Much less common or well understood is the link between chemotherapeutic agents and cerebral infarcts. Cisplatin is a widely used chemotherapeutic agent which has rarely been implicated in acute vascular events.

CASE PRESENTATION

A 64 year-old Caucasian male was at home when he complained of the world suddenly appearing "topsy turvy", as if he was on a rollercoaster. His medical history was significant for testicular seminoma treated with radiation in 2001 and resultant bladder cancer in 2013 successfully treated with intravesical BCG (Bacillus Calmette-Guerin) immunotherapy. After 5 years in remission the cancer returned and was again treated initially with BCG, followed by intravesical Keytruda ® (pembrolizumab) and Gemzar ® (gemcitabine), all without success, thus requiring a radical cystectomy with ureteroileal conduit in 2020. He was currently undergoing chemotherapy with intravenous Platinol ® (cisplatin) and gemcitabine for metastatic urothelial cancer. He had completed three chemotherapy cycles (2 weeks on, I week off), with the last treatment 13 days prior. The patient had no vascular risk factors, such as smoking, hypercholesterolemia, hypertension or history of vascular disease.

Upon gross physical examination, there was acute bilateral nystagmus and oscillopsia, as well as mild dysarthria and ataxia, with persistent emesis. The patient was transported to his local cancer center for evaluation. Blood pressure was 142/83, pulse 120, and temperature 98.2º. Confrontation visual fields and pupillary responses were normal. He was given IV fluids and Zofran® (ondansetron) and MRI imaging revealed an acute cerebellar infarct, measuring 2.2cm, in the left cerebellar hemisphere, superior cerebellar artery (SCA) territory. There was no evidence of intracranial lesions to suggest metastasis.

FIGURE 1
MRI shows area of restricted diffusion on diffuse weighed imaging (DWI) involving the cerebellum (left image) with corresponding hypointensity on apparent diffusion coefficient (ADC) map (right image)



He was admitted to the emergency room and as he was outside the window for tPA treatment he was started on oral and intravenous blood thinning agents, 325 mg aspirin and Lovenox ® (enoxaparin sodium). Echocardiogram with bubble study was unremarkable. Antiphospholipid and antinuclear antibody tests were negative. The nystagmus resolved within hours and the dysarthia within days. Upon discharge, he was prescribed Eliquis ® (apixaban) 5mg bid and his cancer treatment was switched to the immunotherapy drug, Bavenico ® (avelumab). He wore a ZIO patch for 14 days to monitor heart activity which was normal without atrial fibrillation. Dysmetria of the left arm and leg and ataxia improved with bi-weekly outpatient physical therapy. A repeat MRI one month post stroke revealed the area of infarct showing a subacute appearance with irregular enhancement.

VIDEO 1

DISCUSSION

Cisplatin is a platinum based, highly toxic chemotherapeutic drug that inhibits synthesis of RNA, DNA and protein in cells. It is FDA approved for the treatment of testicular, bladder, and advanced ovarian cancers, and is used off label for others. It works by targeting rapidly dividing cells and tumors but is less effective for those that are slow growing. Cisplatin has several black box warnings, including nephrotoxicity, peripheral neuropathy, severe nausea and vomiting, ocular toxicity and retinopathy, ototoxicity and myelosupression. Cisplatin associated cerebral infarction is rare and its mechanism of action remains unclear. Li and colleagues evaluated over 10,000 patients with malignancies and found the incidence of post-chemotherapy ischemic stroke was 0.137%. Platinum compounds, especially cisplatin, were the most commonly used chemotherapeutic agents for ischemic stroke patients.

CONCLUSION

Optometrists who co-manage cancer patients undergoing treatment with chemotherapeutic agents, especially platinum based ones, need to be cognizant of the potential for acute ocular findings secondary to stroke even in the absence of vascular risk factors.

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CONTACT INFORMATION

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A Combined Case of Idiopathic Intracranial Hypertension (IIH) and Myelin Oligodendrocyte Glycoprotein (MOG) Optic Neuritis

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INTRODUCTION

Myelin Oligodendrocyte Glycoprotein (MOG) Optic Neuritis is an antibody-mediated demyelination of the central nervous system. Clinical presentations include acute, unilateral optic neuritis along with reduced color vision, a relative afferent pupillary defect, pain on eye movement, and reduced visual acuity. Idiopathic Intracranial Hypertension (IIH) is a condition which can lead to bilateral papilledema and optic atrophy due to increased intracranial pressure. IIH is a condition of exclusion that presents in obese females of childbearing age. The purpose of this case presentation is to review signs, symptoms, and management for both conditions as one can confound the other in clinical presentation.

CASE PRESENTATION

A 27-year-old female presented to the Urgent Care with eyelid soreness, pain of eye movement, and occasional headaches but denied tinnitus, double vision, nausea, or dizziness. Clinical findings were pertinent for mildly indistinct margins consistent with IIH. At neuro-ophthalmic consultation five days later, the patient had reduced vision OS and reduced color vision OS.

TABLE 1
Exam findings from initial neuro-ophthalmic visit

	OD	OS
Visual Acuity (sc)	20/20-2	20/50-2
Pupils	Pupils equal, round, reactive to light	Pupils equal, round, reactive to light
CVF	Confrontation fields full to finger counting	Confrontation fields full to finger counting
Motility	EOM full, (+) pain on eye movement	EOM full, (+) pain on eye movement

Anterior Segment: Unremarkable OU
Posterior Segment: Elevated disc with C-shaped ODE (OD), Generalized disc elevation with circumferential ODE (OS)
OCT: Elevated disc with inward RPE deflection (S-pattern), inferior/nasal NFL thickening, GCC normal (OD), Markedly elevated disc with inward RPE deflection (S-Pattern). Generalized NFL thickening. GCC normal (OS)
Blood work: (+) MOG-IgG serum antibodies
Lumbar Puncture: 27 cmH20
MRI: Asymmetric T2 hyperintensity enhancement of left intraorbital optic nerve, minimal flattening of the posterior orbits, mild narrowing of the deeper dural sinuses at the junction of the transverse and sigmoid sinus.

FIGURE 1
Initial ONH and RNFL Analysis OU

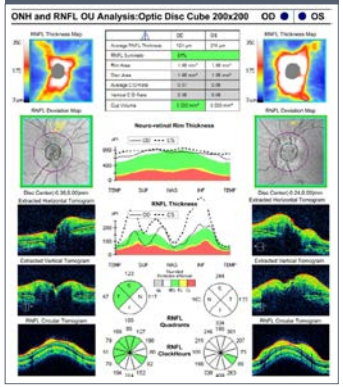

FIGURE 2
ONH and RNFL Analysis OU: 2 months post IV and oral steroid treatment

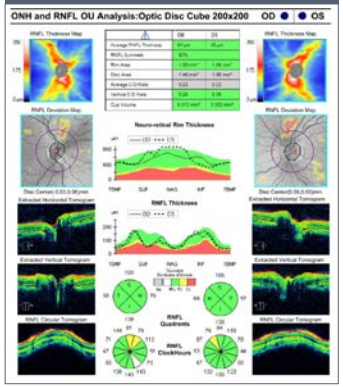

FIGURE 3
OHN OS OCT, ONH OS

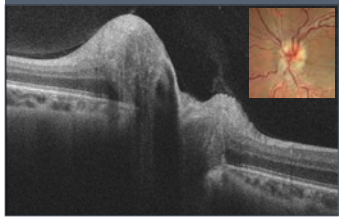

FIGURE 4
MRI of brain and orbits in axial plane: Asymmetric T2 hyperintensity and enhancement of the left intraorbital optic nerve.

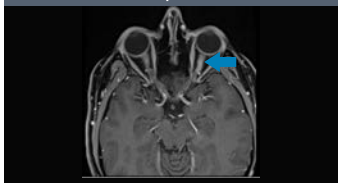

TABLE 2
Summary of diagnostic signs, symptoms, and testing

	MOG Optic Neuritis	IIH
Diagnostic testing	- Blood work: (+) MOG-IgG serum antibodies - Symptoms: pain on eye movement, decreased vision and dyschromatopsia - DFE: (+/-) papillitis unilateral/ bilateral - MRI: enhancement of intraocular optic nerve/EOM, swelling/protrusion of optic nerve	- Symptoms: headaches, tinnitus, nausea, vomiting, dizziness, etc. - DFE: (+) papilledema - MRI: flattening/protrusion of the posterior orbit, partially empty Sella turcica, enhancement of intraocular optic nerve, venous sinus stenosis - Lumbar Puncture: CSF pressure > 25.0 cm H20

TREATMENT AND MANAGEMENT

The patient was treated with IV steroid (methylprednisolone) for three days followed with an oral steroid (prednisone) taper for 3 weeks after being discharged from the hospital. The patient has been monitored closely for the last year with dilated fundus examination, OCT, HVF, color vision test, blood work to detect MOG antibody IgG and has not had recurrences. As of now the patient has not initiated acetazolamide or topiramate treatment for IIH and is followed closely by neurology. Vision remains at 20/20 in each eye, ganglion cell thickness remains unchanged, and the visual field is full in each eye.

DISCUSSION

Treatment for IIH varies from the treatment of MOG optic neuritis. A variety of treatment options can be used for IIH, such as lifestyle changes, oral medications, or surgical intervention based on the severity. Lifestyle changes are focused on weight management while oral medications may include acetazolamide or topiramate. Neurosurgical intervention is considered for cases recalcitrant to medical management. Initial treatment for MOG optic neuritis includes IV steroids such as methylprednisolone with oral taper. With recurrent cases of optic neuritis, other treatments may be considered such as immune-modulating agents.

CONCLUSION

The key to this case was identifying which signs, symptoms and test results pertained to MOG optic neuritis versus IIH. A combined treatment approach is suggestive in the management of this case to provide the best outcome. Additional treatment options should be considered in the future in the case of reoccurrence or worsening of either condition.

References: Available upon request
Financial Support: none

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Accommodative Spasm and Mydriasis secondary to Hyperhidrosis Medication

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INTRODUCTION

QBREXZA® (glycopyrronium) 2.4% cloth, is an FDA approved prescription anticholinergic topical medication used to treat excessive underarm sweating (primary axillary hyperhidrosis) in people 9 years of age and older. This case demonstrates the potential ophthalmic side effects of this medication in efforts to increase clinician awareness of this relatively new medication. It illustrates the tendency for patients, especially pediatric patients, to overlook reporting non-orally administered medications.

CLINICAL FINDINGS

History: 17 yo CM presents s/p ER visit 3 weeks prior for acute onset blurry vision distance and near, photophobia, nausea and vomiting after playing a hand-held video game.

ER notes no medications + mydriasis and reduced vision. Ordered neuroimaging to r/o brain tumor and stroke with ophthalmology eval next day. MRI negative.

Ophthalmology diagnosed suspected accommodative disorder, prescribed +1.00 readers for interim and referred for further optometric evaluation.

Pertinent Clinical Exam: Upon presentation pt. reports improvement in headache, light sensitivity and nausea and mild persistent near blur and fatigue, no diplopia.

ROS: + Hyperhidrosis
Meds: QBREXZA wipes, d/c x 2 days "googled" side effects. Did not report previously as wipes "did not seem like a medication"

DVA sc: 20/20 OD, OS, OU NVA sc: 20/50 OU NVA +1.00 readers: 20/20 OU

PERRL & RN, Motility wnl

Amplitude of accommodation 2D OD and 3D OS, NRA +1.50 D and PRA -2.00D with +2.00 Add

Cycloplegic refraction Plano OU

Assessment: Accommodative insufficiency (AI) secondary to anticholinergic use.

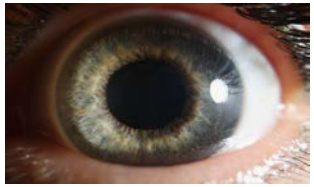
Plan: Continue both +1.00 readers & d/c medication wipes, f/up 4 weeks

4 week f/up - Pt self d/c +1.00 readers 1 week prior. Reports clear and comfortable vision without correction at all distances and no lasting sequelae DVA & NVA sc: 20/20 OD, OS and OU

Amplitude of accommodation 9D OD and 10D OS, NRA +2.50 and PRA -2.50 Uncorrected

Assessment: Resolved accommodative dysfunction secondary to topical anticholinergic use.

Plan:
Refer to dermatology for alternate management of hyperhidrosis.



DISCUSSION

Current results estimate the prevalence of hyperhidrosis at 4.8 %, which represents approximately 15.3 million people in the United States.[3] In 2018, QBREXZA® was approved for the treatment of this condition. Anticholinergics' block acetylcholine receptors in the parasympathetic nervous system which can block the response of the iris sphincter muscle and ciliary muscle resulting in mydriasis and cycloplegia.[4] In clinical studies of topical glycopyrronium 2.4%, dilated pupils and blurred vision are reported side effects up to 7% of the time with headache reported up to 5%. With long-term use, adverse effects will be reported by 59% of patients.[5]

Pharmacologic mydriasis should be high on the differentials of patients presenting with mydriasis not involving other cranial nerves. Accommodative paresis may be associated with coinciding complaints of blur. Anti-nausea patches are often the cause of such findings but this treatment is new and clinicians should be aware of this potential side effect. Given that QBREXZA® is a cloth wipe, patients may not consider reporting it when asked about medication use. Patient education pertaining to such side effects can allow for early and accurate diagnosis that avoids added stress and costs for all parties involved.[6]

TABLE 1
Differential Diagnosis of acquired fixed dilated pupil[1,2]

1.	Drugs: Parasympatholytic/Anticholinergic (e.g. atropine, scopolamine, glycopyrronium) and sympathomimetic (e.g. phenylephrine, cocaine)
2.	Toxins: cyanide, methanol
3.	Neuropathy: botulism, Guillain-Barré syndrome
4.	Ocular causes: iritis, uveitis, iris atrophy, iris sphincter rupture, traumatic paralytic mydriasis
5.	Lesions of ciliary ganglion: Adie tonic pupil, herpes zoster
6.	Third nerve lesion
7.	Coma caused by alcohol, diabetes epilepsy, apoplexy or meningitis
8.	Irritative sympathetic lesion: tumor, encephalitis
9.	Miscellaneous: cardiac arrest, total spinal anesthesia, deep anesthesia

CONCLUSIONS

Acute mydriasis, blurred vision, and headache presenting without careful medication history, may be mistaken for symptoms of life-threatening neurologic conditions including cerebrovascular accident or aneurysm. This can subject patients, parents and families to increased worry while additional expensive tests including neuroimaging are conducted unnecessarily.[6,7] Medication history using direct questions "Do you take any medications? Do you use any topical creams, ointments or wipes? Do you take any supplements?" can help with an early and accurate diagnosis without additional burden of testing and worry caused to the patient and family.

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Unique Presentation Of Malignant Hypertension With Bilateral Serous Macular Detachment

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INTRODUCTION

A young female patient presents with untreated malignant hypertension. Examination reveals severe hypertensive retinopathy with coinciding bilateral macular serous detachments. Treatment with IV anti-hypertensive medication results in rapid resolution of serous detachments, improving visual prognosis. A serous macular detachment due to hypertension is a rare finding that may indicate malignant hypertension or hypertensive emergency.

CLINICAL FINDINGS

32yo black female presents to the urgent care optometry clinic with a complaint of blurry vision in both eyes starting 3 weeks ago. The patient is also complaining of metamorphopsia and pain behind the ears and back of the neck. She adds that lights look yellow, and rooms look darker.

Clinical Exam
VA: 20/40-1 PHNI OD, 20/80w/EV PHNI OS

Physical Exam
BP (mmHg): 206/144 then 264/164 at the ER

Imaging
Fundus Photos: Grade 2 disc edema with peripapillary intraretinal hemorrhages and cotton wool spots 360 OU.

Initial Cirrus OCT Macula:
OD: Large serous sensory detachment. Center thickness of 605 microns. Loss of foveal contour. Intra-retinal cysts nasal to macula with swelling.
OS: Large serous sensory detachment extending to ONH. Center thickness of 516 microns. Loss of foveal contour.

Second Cirrus OCT Macula:
OD: Healthy macular thickness and contour. Center thickness of 170 microns. Intra- retinal exudates nasal to macula.
OS: Health macular thickness and contour. Center thickness of 178 microns. Intra-retinal exudates temporal to ONH.

FIGURE 1
Fundus photos showing grade IV hypertensive retinopathy of the patient's right eye

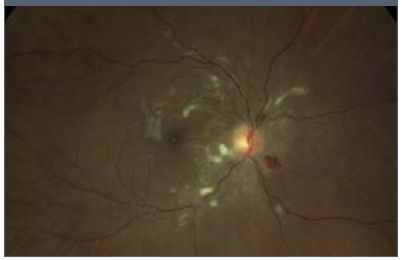


FIGURE 2
Fundus photos showing grade IV hypertensive retinopathy of the patient's left eye

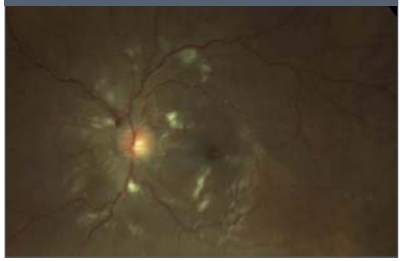


FIGURE 3
Macula OCT cube stills of the right eye at presentation versus after hospital discharge

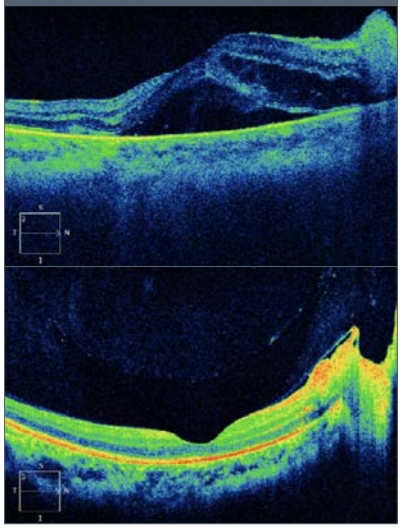
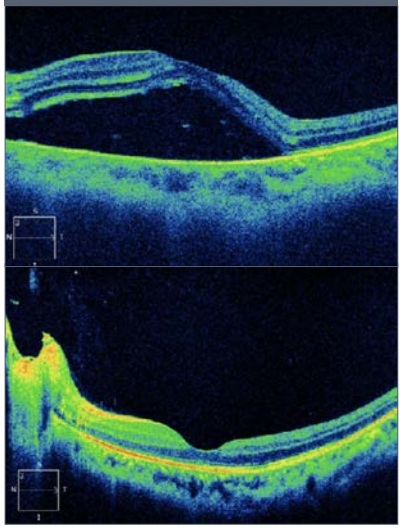


FIGURE 4
Macula OCT cube stills of the left eye at presentation versus after hospital discharge



DISCUSSION

Hypertensive crisis is a systolic blood pressure greater than 180 and/or a diastolic blood pressure greater than 110. High blood pressure damages vasculature throughout the body including both retinal and choroidal vessels. A breakdown in the blood-retinal-barrier results in hemorrhages and ischemia during malignant hypertension. Similarly, a breakdown of the RPE barrier produces fluid to leak under the neural retina yielding a serous macular detachment. Serous macular detachments due to hypertension is a rare finding. The hypertensive retinopathy cases observed with serous macular detachments were overarchingly cases of malignant hypertension or hypertensive emergency. Hypertensive emergencies are marked by blood pressure elevation with acute organ damage consistent with this patient, who was diagnosed with acute kidney failure.

CONCLUSION

Taking blood pressure at each eye exam could help identify patients who need treatment for hypertension. The CDC estimates one in five American adults have hypertension and are unaware of the diagnosis. Measuring blood pressure at yearly eye exams has the potential to identify millions of Americans with hypertension. Not only is hypertension damaging to the body, but it also can cause permanent vision loss through vein and artery occlusions, and ischemic retinal disease. Bilateral serous macular detachments from hypertensive retinopathy are an uncommon and unique finding that may indicate increased urgency.

BIBLIOGRAPHY

Available upon request

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When Beauty Hurts:

Investigating Corneal Neuralgia and Neurotrophic Keratitis post lash enhancement

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CASE HISTORY

A 25-year-old Danish, caucasian female presented with constant ocular pain in both eyes since a lash lift in November 2020. Symptoms of pain started upon lash glue applications and intensified over her hour-long appointment. Itching started three weeks after, and a chalazion developed two months after. She saw an optometrist in Denmark in January 2021 who diagnosed her with Meibomian Gland Dysfunction OU and Ocular Rosacea OU. Since then, she tried the following interventions without success: 20 IPLs, three meibomian gland probing sessions, two Zest/BlephEx, five red light therapy sessions, one year of cyclosporine (Ikervis, Cequa), eight months of Xiidra, two months of Manuka honey drops and gel, two and a half years of omega 3 supplements, six months of doxycycline, six months of Soolantra (rosacea cream) over eyelids, and one round of periocular Botox injections.

Patient Ocular History
- Meibomian Gland Dysfunction OU
- Ocular Rosacea OU

Patient Medical History
- IBS
- Insomnia
- Anxiety

Presenting Treatments
- non-autlogous serum drops 20% 8x/day, PF steroid gtts (softacort) 1x/day OU, PFATs q30min, stone crop gel QAM and QHS, Lyrica, LDN 4.5mg since April, HCL QD

History of Failed Treatment at Presentation
- Cequa BID, allergy drops, sleep mask
- 20 IPLs
- MG Probing 2/2023, 9/2022, 10/2022.
- 50mg Doxycycline d/c'd 2 weeks ago
- PRP drops but d/c bc "sticky" sensation.
- periocular Botox OU 1.5 years ago
- Confocal imagery 6/2023

EXAM FINDINGS

The best corrected vision was 20/20 OD, OS. Anterior segment evaluation revealed 1+ papillae, 1+ palpebral injection, 3+ lid telangiectasia, (+) line of Marx staining UL/LL, 1+ conjunctivochalasis, and 2+ SPK OD, OS. Corneal nerve testing revealed corneal neuropathy OS > OD via Cochet Bonnet; specifically, 5 centrally, 6 superiorly, 5 nasally, 4.5 inferiorly, and 6 temporally OD; 4 centrally, 5.5 superiorly, 3.5 nasally, 4.5 inferiorly, and 5 temporally OS. The 0.5% proparacaine challenge test revealed mixed (central and peripheral) etiology with the following results: pain at 6/10 OD and 8/10 OS before instillation and 1/10 OD and 3/10 OS after instillation. The posterior segment was unremarkable.

DIAGNOSIS AND DISCUSSION

Diagnosis: Neurotrophic Keratitis and Corneal Neuralgia

Corneal Neuralgia and Neurotrophic Keratitis in young patients are usually due to acute ocular trauma. Ocular chemical burn pathophysiology and severity depend on the offending agent, duration of contact, and treatment. In the case of lash glue, cyanoacrylate is the primary ingredient and is acidic. Acidic chemical burns cause damage by denaturing, precipitating, and coagulating corneal proteins. The coagulated proteins create a barrier, preventing deeper penetration of the chemical. Chemical burns can cause scarring, symblepharon, cicatricial entropion or ectropion, stromal thinning with corneal perforation, and/or limbal stem cell deficiency.

DIAGNOSTIC TESTING

	7/17/2023	8/21/2023	9/20/2023
InflammaDry	Positive OD Strong Positive OS	Negative OD Negative OS	Weak Positive OD Negative OS
TearLab	326 OD 288 OS	315 OD 310 OS	299 OD 311 OS

FIGURE 1
Lipiscan images showing normal meibomian gland morphology and quantity

FIGURE 2
External photography of right eye illustrating Stage 1 Neurotrophic Keratitis

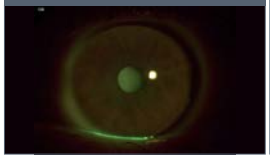

FIGURE 3
External photography of right eye illustrating a clear cornea after two days of wearing an amniotic membrane

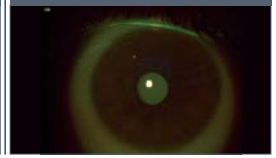

FIGURE 4
External photography of left eye illustrating Stage 1 Neurotrophic Keratitis

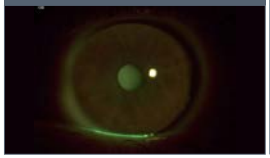

FIGURE 5
External photography of left eye illustrating a clear cornea after two days of wearing an amniotic membrane

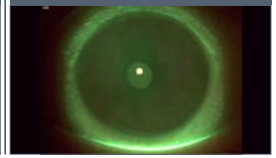

FIGURE 6
External videography of the lipid layer before and after treatment

Before treatment

After treatment

MANAGEMENT

Initiated
- **7/17/2023:** Cequa QID OU, Tyrvaya BID, soft steroid (softacort) TID OU, WLE oil and foam BID OU, lotemax ung qhs, same day NuLids and Zest, same day IPL and RF #1. Inquired about donated Prokera and Oxervate for international patient. Continued existing regimen: non-autlogous serum drops 20% 8x/day, PF steroid gtts (softacort) 1x/day OU, PFATs q30min, stone crop gel QAM and QHS, Lyrica, LDN 4.5mg since April, HCL QD.
  - 7/19/2023: Phone call, could not tolerate Cequa QID, reduce to BID
- **7/24/2023:** Cequa BID OU. Same day IPL and RF #2. Otherwise, same as above.
  - 7/27/2023: Phone call, could not tolerate Cequa BID, Refrigerate and use QHS
- **8/1/2023:** d/c lotemax, start hylonight, switch from non-autologous 20% serum to autologous 40% serum. Omega levels tested in office today and results came back as slightly below normal. Otherwise, same as above.
  - Dx neurotrophic keratitis at this visit.
- **8/7/2023:** Rx Neurolens SRx, same day IPL and RF #3, and Prokera OS. Continued existing drops OD. d/c'd all drops OS. Start tobradex TID OS.
  - Discontinued Lyrica and LDN on her own around this time.
- **8/9/2023:** Prokera removal OS, no SPK post removal. Restart dry eye treatments.
- **8/21/2023:** Same day IPL and RF #4, Prokera OD, d/c'd all drops OD but start tobradex TID OD, continued existing drops OS.
- **8/23/2023:** Prokera removal OD, trace SPK remaining temporally. Restart dry eye treatments.
- **8/28/2023:** Cequa TID OU, Tyrvaya BID, hylonight ung QHS, WLE oil and foam BID OU, autologous serum drops 40% 8x/day, PF steroid gtts (softacort) 1x/day OU, PFATs q30min.
- **9/5/2023:** Continue Cequa TID OU, Tyrvaya BID, autologous serum OU 8x/day, PFATs q30min. Discontinue softacort OU QD
- **9/20/2023:** Continue Cequa TID OU, Tyrvaya BID, autologous serum OU 8x/day, PFATs q30min. Expects to start Oxervate in December when in Denmark.

CONCLUSION

The risks and benefits of lash enhancements should be evaluated thoroughly. The sequelae of chemical burns can significantly decrease the quality of life for patients. In our case, our patient was in such pain that she withdrew from law school, takes naps throughout the day to reduce exposure to irritants, and traveled across Europe and to the US for treatment. With such risks and accessibility of lash enhancements, eye care providers need to be aware of the potential risks and how to treat adverse effects.

References available upon request.

CONTACT

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Monocular Inferior Altitudinal Defect as the Presenting Sign of a Pituitary Adenoma

Michaella Ford, OD; Leonard Messner, OD, FAAO
Illinois College of Optometry, Chicago, Illinois

INTRODUCTION

A patient presents with uncontrolled hypertension and a monocular inferior altitudinal defect. MRI of the brain and orbits with contrast reveals a pituitary macroadenoma with compression of the left optic nerve.

CLINICAL FINDINGS

Case History

- 49-year-old African American male
- **CC:** Blurry vision at near OU for the past few months
- **POH:** blepharitis OU, allergic conjunctivitis OU, mild hypertensive retinopathy OU
- **PMH:** hypertension
- **Meds:** amlodipine

Clinical Findings

- **BCVA:** OD 20/20, OS 20/25
- **CVF:** full to finger counting OD, constricted inferior nasal OS
- **BP:** 160/120 mmHg RAS manual cuff
- **DFE:** optic nerve pink color and well perfused OD, optic nerve pallor OS, superior-temporal wedge defect OS, arteriolar narrowing OU, mild hypertensive retinopathy OD, OS

Imaging

- 24-2 SITA Fast HVF: essential clear field OD, inferior altitudinal defect OS
- Spectralis OCT: RNFL within normal limits OD, RNFL thinning superior/superior-nasal/superior-temporal/temporal OS
- T1 weighted MRI of the brain and orbits with contrast reveals a pituitary macroadenoma compressing the left optic nerve

FIGURE 1a
24-2 HVF showing an essential clear field OD

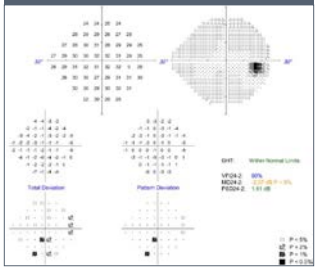

FIGURE 1b
24-2 HVF showing an inferior altitudinal defect OS

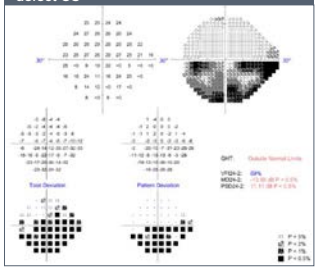

FIGURE 2a
Spectralis OCT showing RNFL within normal limits OD

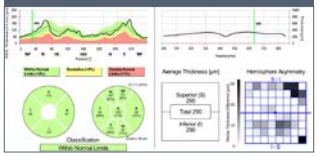

FIGURE 2b
Spectralis OCT showing superior-temporal RNFL thinning OS

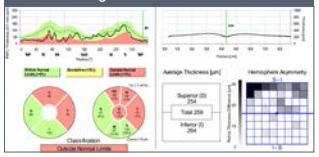

FIGURE 3
T1 weighted MRI of the brain with contrast showing pituitary macroadenoma

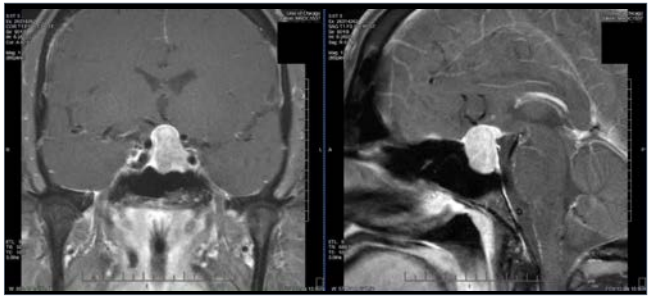

FIGURE 4
24-2 HVF GPA summary showing the initial inferior altitudinal defect OS, new temporal field loss OS 6 months later, and then slight improvement of temporal field loss and inferior altitudinal defect OS 6 months after pituitary resection

DIFFERENTIAL DIAGNOSIS

Non-arteritic anterior ischemic optic neuropathy (NAION), compressive lesion

DISCUSSION

The majority of pituitary adenomas will present with bilateral visual field defects; with bitemporal hemianopsia being the characteristic visual field defect for adenomas with suprasellar extension. Additionally, pituitary adenomas typically present with visual field defects that respect the vertical midline due to compression of the nasal optic nerve fibers. Only 9% of pituitary adenomas will present with a monocular visual field defect. This patient's pituitary adenoma was shifted forward and to the left resulting in a monocular altitudinal defect that respected the horizontal midline. Compression of the optic nerve against the overlying anterior cerebral artery, roof of the optic canal, or falciform ligament can compress the superior nerve fibers resulting in the inferior altitudinal defect.

MANAGEMENT

This patient was referred for a neurosurgical evaluation for resection of his pituitary adenoma. Visual field post resection showed slight improvement in the visual field defect, as well as an improvement in both mean deviation and pattern deviation values. First line treatment for non-secreting adenomas that result in hypopituitarism, vision loss, apoplexy, acromegaly, Cushing disease, and thyrotropinomas is transsphenoidal pituitary surgery as performed in this case. First line treatment for prolactinomas is dopamine agonist therapy such as Bromocriptine and cabergoline. Radiation therapy is second or third line therapy in patients with recurring pituitary adenomas. Patients with small non-secreting adenomas that do not cause mass effects and are proven stable by neuroimaging can be monitored.

CONCLUSION

This patient's demographics, uncontrolled hypertension, and visual field findings all pointed towards NAION being the leading diagnosis. However, neuroimaging revealed an atypical presentation of pituitary adenoma. This case highlights the importance of utilizing neuroimaging to make the correct diagnosis when it comes to neuro-ophthalmic conditions. This can prevent vision loss, and in some cases, be lifesaving.

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Management of Oculomotor Nerve Palsy Secondary to Traumatic Brain Injury in a Child

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INTRODUCTION

Oculomotor nerve palsy is rare in childhood and those resulting from trauma account for about 20 percent of all CNIII palsy presentations. This case highlights the management of acquired diplopia in a child with vision therapy, with intermittent patching of the uninvolved eye and Fresnel prism.

CLINICAL FINDINGS

6-year-old Hispanic female presents with complaints of constant diplopia. The patient suffered a TBI 3 months ago as an unrestrained passenger in a motor vehicle accident.

Table 1: Pertinent Findings Visit 1

	OD	OS
BCVA	20/25-	20/20
Pupils	Fixed and dilated	Round and reactive
EOM	Restriction of SR, IR, MR & IO	Full
Cover Test (D)	25 prism diopter CRXT	
Cover Test (N)	25 prism diopter CRXT	
Manifest Rx	+1.25-1.00x180	+0.50-0.75x 180
Slit Lamp	Unremarkable	
Posterior Segment	Unremarkable	
MRI Brain and Orbits	Subarachnoid hemorrhage of right cerebral hemisphere. No intraorbital injury.	

DISCUSSION

In contrast to CNIII palsies in adults, pupil involvement in children has no prognostic value, and neuroimaging should be considered in all patients to determine the etiology. CNIII palsies can be present as complete or partial palsies. Partial CNIII palsies occur with higher frequency and can manifest with varying degrees of extraocular muscle, lid, and pupil involvement. Oculomotor synkinesis is phenomenon that can begin within 6 weeks following initial CNIII palsy onset. It is described as observable lid retraction during downward gaze or adduction, and improvement of pupil reaction over time. Signs of regeneration can be difficult to identify in patients with partial CNIII palsies, but it is an important consideration before surgical referral. CNIII palsy treatment aims to manage diplopia, accommodative, and oculomotor dysfunctions. Although patching can be initiated, caution should be taken to avoid deprivation amblyopia by prolonged patching of the involved or uninvolved eye. Patients with acquired CNIII palsies from trauma should be evaluated for TBI. A large percentage of patients with TBI experience difficulties with saccades, pursuits, and vergence ability. Vision therapy can aid in management of simultaneously presenting conditions secondary to trauma.

FIGURE 1: Extraocular motility in 9 gazes
25pd CRXT, under action of right MR, IR, SR and IO. No lid ptosis present.

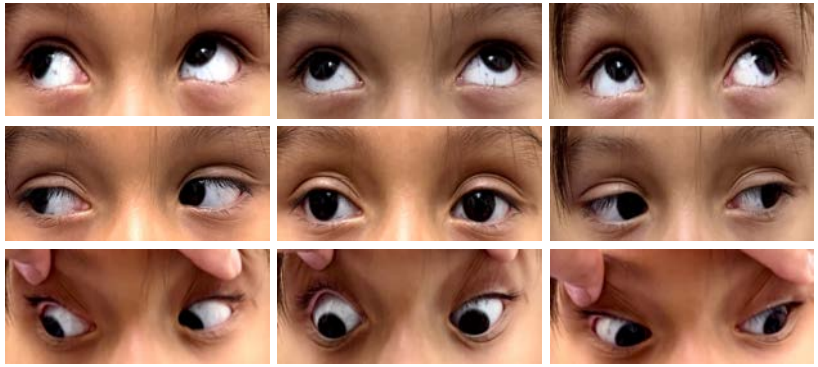

FIGURE 2: Pupil Size
LIGHT / DARK
7mm OD, 3mm OS / 7mm OD, 4mm OS

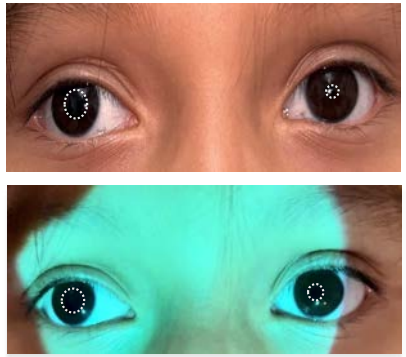

Table 2: VT Clinical Findings

	Visit 1	Visit 20
BCVA	OD 20/25- OS 20/20	OD 20/20- OS 20/20
Cover Test (sc)	25pd CRXT 25pd CRXT'	16pd CRXT 20pd CRXT'
Cover Test (cc-15BI Fresnel OD)	10pd XP 14pd XP'	4pd XP 8pd XP'
NPC	10cm/16cm	10cm/12cm
Amplitude of Accommodation	OD 6D OS 6D	OD 6D OS 10.25D
Randot Stereopsis	None	None
DEM Testing	Type 4	Type 1
Convergence – VTS4	10BI	5BO
Saccades –SVI	46% accuracy	85% accuracy

MANAGEMENT

The patient in this case was treated with 15 prism diopter BI Fresnel prism over full spectacle correction to relieve diplopia. The treatment course included 20 in-office vision therapy sessions focusing on compensating ranges, accommodation, saccadic and pursuit training. Intermittent patching of the unaffected eye was also prescribed. Despite evidence of improved vergence, accommodative and oculomotor ability (see table 2), the patient was referred for strabismus surgery consultation for cosmesis.

CONCLUSION

While neuroimaging and case history can facilitate appropriate diagnosis, the management of these conditions in visually immature children remains a challenge. Options such as vision therapy, prism, and refractive correction are conservative treatments that can allow oculomotor synkinesis to occur while decreasing the risk of amblyopia development. While surgical treatment can enhance cosmesis, it should be considered after allowing time for spontaneous recovery.

References available upon request.

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Dueling etiologies – retinal neovascularization in patient with systemic lupus erythematosus and diabetes mellitus

Erica Ittner, OD • Raman Bhakhri, OD • Chicago, IL
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BACKGROUND

While retinopathy in diabetes mellitus (DM) is a more common clinical presentation than systemic lupus erythematosus (SLE) retinopathy, retinal neovascularization (NV) in a patient with coexisting DM and SLE should not be assumed to be solely of DM origin. Retinopathy in SLE is indicative of systemic disease activity and severity, with SLE potentially being life-threatening depending upon organ systems affected. Presence of retinal vasculopathy in a patient with SLE therefore requires additional investigation to determine the extent of disease activity. This case details a patient diagnosed with advanced retinal NV secondary to uncontrolled SLE with coexisting DM.

CASE REPORT

A 30-year-old woman with history of T2DM and SLE presented with extensive retinal NV OD<OS, with areas of exudation and microaneurysms. The patient self-reported a recent HbA1C of 7.6% with current insulin dosage. Additionally, the patient's SLE was not being systemically treated or monitored by rheumatology, having self-discontinued oral prednisone several months earlier. Ocular and medical histories were otherwise unremarkable. The PCP was contacted to alert them of her ocular condition with the need for monitoring her systemic health status, particularly in consideration of systemic treatment of SLE. The patient was referred to a retinal specialist for pan retinal photocoagulation. At time of abstract submission, her last visit revealed regression of the retinal NV with BCVA stable 20/20 OD, 20/25 OS.

DISCUSSION

Retinal NV stems from the release of angiogenesis -promoting vascular endothelial growth factor (VEGF) as a response to capillary nonperfusion (CNP). CNP is an area of acquired retinal ischemia following loss of blood flow through the capillary bed. The pathogenesis of CNP varies depending upon the root etiology and may be multifactorial.

FIGURE 1A AND 1B

Figure 1a and 1b: Right eye and Left eye, Optos California

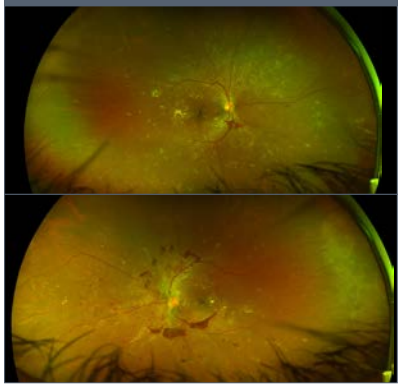


FIGURE 2A

Fluorescein angiogram OD demonstrating CNP, Heidelberg Spectralis

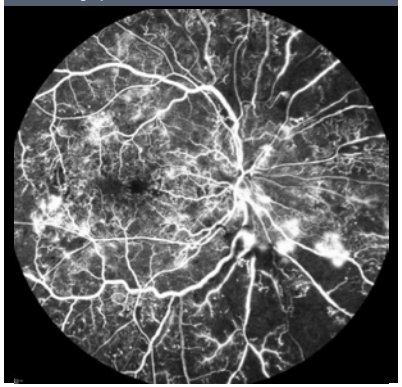
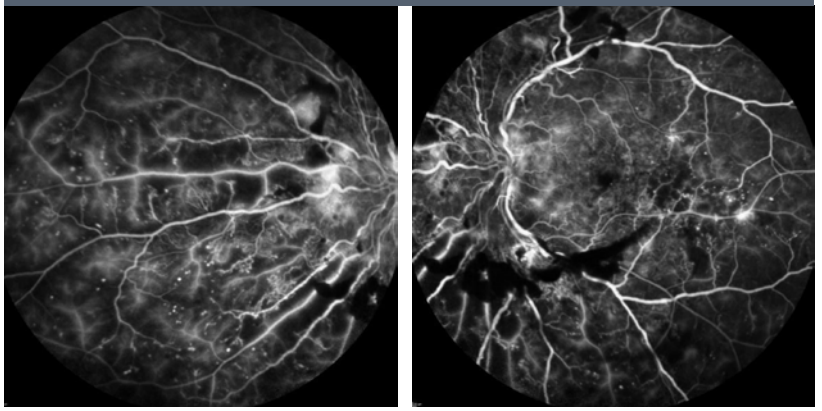


FIGURE 2B AND 2C

Fluorescein angiogram OS demonstrating CNP, Heidelberg Spectralis



In SLE retinopathy, CNP develops secondary to inflammatory and/or thrombotic events. Immune complexes of antigen-autoantibody formations develop and adhere to the endothelial walls of the arterioles, triggering inflammation, causing focal necrosis of the vasculature leading to the capillary plexus. Another potential cause of CNP in SLE is thrombosis, due to the pro-coagulator effect of antiphospholipid antibodies, which are frequently found in SLE patients, or clotting from the inflammatory response to immune complex deposition.

In contrast, DM-related CNP results from damage to the pericytes of the capillary walls, secondary to hyperglycemia. Damaged capillary vessels lose tone then dilate, rerouting blood amongst the capillary net due to pressure differential. The effect of both poorly controlled systemic conditions is CNP development. The patient's uncontrolled SLE, combined with her DM status, likely led to CNP and upregulation of VEGF, ultimately causing development of retinal NV.

CONCLUSION

Appropriate management of systemic conditions is necessary to prevent development of CNP. Clinicians can provide better treatment and management options when familiar with the pathophysiology of retinopathy in autoimmune conditions, such as SLE, especially if concurrent with a known underlying cause of retinopathy, such as DM.

REFERENCES

Available upon request

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A Potential Link Between Gender Reassignment Therapy and IIH

Ryan Junidi, OD
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INTRODUCTION

Idiopathic intracranial hypertension (IIH) is commonly known to have predilection towards obese women of childbearing age. With this condition, assessment of contributing factors is important. Some generally known contributors include vitamin A/retinoids, growth hormones, tetracyclines, and obesity. Although, the pathophysiology around how these affect the concentration of cerebrospinal fluid is not fully understood. This case explores the possibility that exogenous hormone therapy may also play a role in the pathogenesis of IIH.

CLINICAL FINDINGS

HISTORY
19-year old karyotypically 46XX patient presents for evaluation of visual disturbances described as "white splotches in vision." The patient reports a history of recent migraines and worsening tinnitus.

CLINICAL
BCVA 20/40 OD cc, 20/40 OS cc (previously 20/20 OD, OS cc.)
Pupils, CVF, and EOM's WNL.
Anterior segment slit lamp unremarkable.
Posterior segment: Frisén grade 5 optic disc edema with Patton's lines OU on initial presentation.

IMAGING/TESTING
MRI of head and orbits: WNL
Lumbar puncture: opening pressure of 49cmH20
Patient BMI: 31
fundus photos initial and 6-week follow-up: marked edema of optic disc OU with Patton's lines and exudative changes (figure 1 and figure 2)
OCT of nerve: marked thickening of RNFL in all quadrants OU (figure 3a and 3b)

FIGURE 1

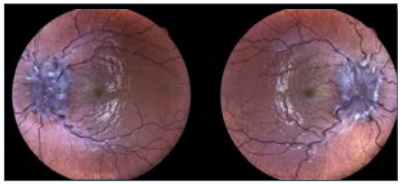


FIGURE 2

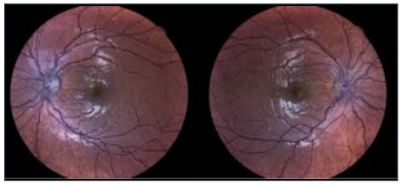


FIGURE 3A

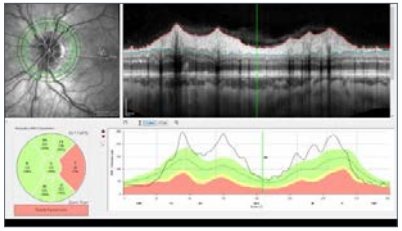
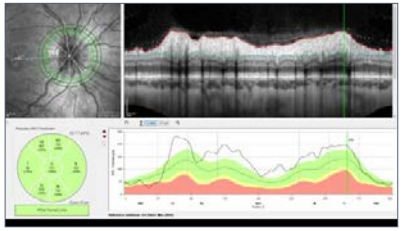


FIGURE 3B



DISCUSSION

Women are known to have a greater predisposition to towards IIH than men do, with 95% of reported cases being female. This gender preference may indicate that hormones play a role in developing ICP.

In this case, consultation and imaging with neurology was used to rule out causative etiologies including brain mass lesion, obstruction of venous drainage, venous sinus thrombosis, and any other head/brain abnormality. Following this, a lumbar puncture was performed and increased intracranial pressure was diagnosed without a direct cause. The patient denies recent weight gain or oral medication changes.

Of note, the patient has been on hormone therapy for 14 months with no systemic or ocular complications. Interestingly, they report a recent increase in testosterone dosage from 40mg to 60mg subcutaneously, per week, for their gender reassignment therapy. A maximum dose defined as 100mg/wk.

MANAGEMENT

Patient started on acetazolamide 750mg PO qd x 1week then increased to 500mg PO bid. Upon follow-up ocular exam 2 weeks after initial visit, papilledema was still present but slightly improved. Between follow-up visits, the patient reports they lost 15-20 pounds within 6 weeks. Patient had an appointment scheduled with their prescribing endocrinologist to discuss hormone treatment dosage, who decided to maintain therapy at the current level.

CONCLUSION

This case offers an interesting temporal correlation between testosterone therapy dosage and the onset of visual and neurological symptoms associated with ICP.

There are a few other documented cases in the literature detailing the onset and treatment of IIH in individuals transitioning from female to male, as well as male to female. These cases show that resolution has been reached both with and without hormone therapy changes.

In this case, the lumbar puncture, weight loss, and acetazolamide have been shown to improve both the signs and symptoms without any changes to testosterone therapy.

The pathogenesis of IIH is not fully understood and these unique cases of hormone alterations in patients who develop this condition may provide insight into the influence of androgen levels in those who develop increased intracranial pressure.

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The Effect of the COVID-19 Pandemic on Glaucoma Follow Up at an Urban Academic Medical Center

Mallory McLaughlin, OD, FAAO • Talha Suhail, OD • Mortada Altwaij, OD • Sayf Al-Khazraji, OD

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INTRODUCTION

This study aimed to quantify the effect of the COVID 19 pandemic on the medical care of patients with glaucoma.

METHODS

Sixty-three patients that met inclusion and exclusion criteria were randomly selected.

Their medical records were evaluated over two time periods:

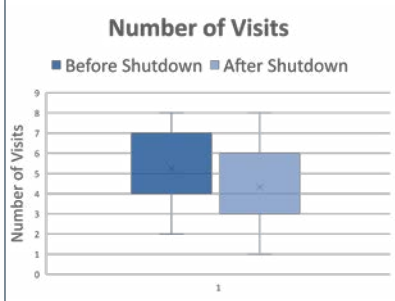
- "Before Shutdown"- August 1, 2018, to March 15, 2020
- "After Shutdown"- July 6, 2020, to February 18, 2022

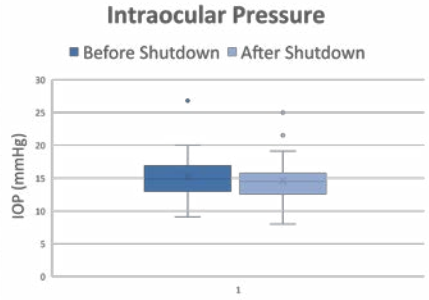
Inclusion criteria:
- Examination in August 2018
- Diagnosis of primary open angle, normal tension, chronic angle closure, pseudo exfoliative, or pigmentary glaucoma

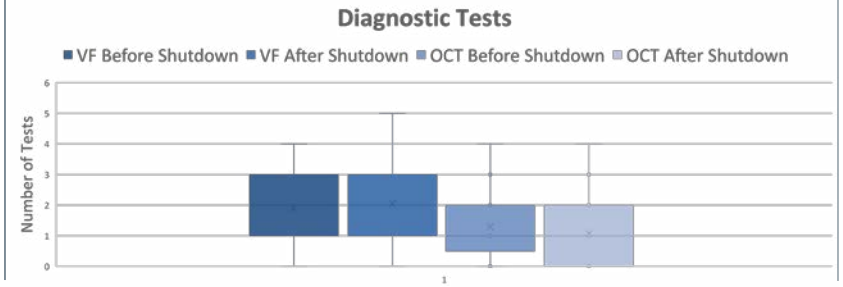
Exclusion criteria:
- Diagnosis of glaucoma suspect, acute angle closure, or ocular hypertension
- Documented death or referral to another institution

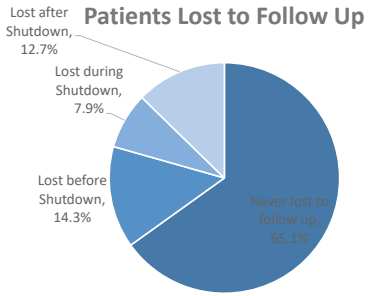
RESULTS

	Mean Before Shutdown	Mean After Shutdown	p=
Total visits	5.24 ± 1.76	4.32 ± 1.92	**0.005**
IOP (mmHg)	15.24 ± 3.23	14.58 ± 3.07	**0.046**
Visual Fields	1.90 ± 1.02	2.05 ± 1.43	0.492
OCTs	1.29 ± 1.01	1.27 ± 1.58	0.920
Average prescribed follow up (days)	96.53 ± 40.19	98.19 ± 49.49	0.813
Average actual follow up (days)	132.59 ± 84.84	128.85 ± 81.84	0.826









CONCLUSIONS

1. The sample size of the study was small.
2. Intraocular pressure was significantly lower and there were significantly more visits after the shutdown.
3. There was not a statistically significant difference in the number of patients lost to follow up.
4. There was not a statistically significant difference in the number of diagnostic tests performed.

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Impact of the Accelerated Clinical Program on Clinical Performance and Residency Rates

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PURPOSE

The purpose of this investigation was to analyze characteristics and outcomes for students who have participated in the Accelerated Clinical Program (ACP) at the Illinois College of Optometry (ICO). This program allows for an accelerated experience through the clinical curriculum, greater independence, and increased clinical exposure.

BACKGROUND

In 2015, ICO started the Accelerated Clinical Program to allow students an earlier introduction to the clinical experience as well as a more robust clinical experience. At this time the first group of students was recruited for participation in this three-year program. The application process occurs after the winter quarter of 1st year and requires submission of a curriculum vitae and a statement of interest from each student; additionally, a transcript is added to each application that includes grades for fall and winter quarters. The applications are reviewed by a committee of clinical faculty and a select student group is offered an interview with the same faculty panel. Those students selected to participate spend their summer in between 1st and 2nd year on campus at ICO starting the primary care clinical sequence early, as well as taking two didactic courses prior to when they would normally be scheduled during their 2nd year. This allows the students more time in their schedules for clinical assignments throughout their 2nd year and thus they can move through the required clinical sequence more quickly during their 3rd year, which ultimately allows for additional clinic sessions and a greater volume of patients examined.

METHODS

Student data from the graduating classes of 2018 through 2022 were included. Each year at the conclusion of the winter quarter of the 1st year of optometric training, following a formal application and interview process, a faculty panel selected between 5-12 students to participate in the ACP. Variables used in the analysis included grade point average (GPA) at time of selection into the ACP, GPA at graduation, number of clinical honors grades during 3rd year primary care service rotations, number of clinical honors grades during 4th year clinical rotations, and participation in a residency program after graduation. Analyses included simple summary statistics, unadjusted group comparisons, and multivariate regression to assess factors related to residency participation as an outcome of interest.

TABLE 1
STUDENT CHARACTERISTICS RELATIVE TO PERFORMING RESIDENCY AMONG TOTAL STUDENTS (N=709)

Variable	Residency n=184 (26.0%)	No Residency n=525 (74.0%)	P-value
*ACP	n=26 (14.1%)	n=21 (4.0%)	<0.0001
GPA, mean, Year 1 Winter	3.24±0.54	3.11±0.52	0.003
GPA, mean at graduation	3.34±0.43	3.19±0.43	<0.0001
‡Honor grades, mean number in Y3	1.1±1.5	0.5±0.9	<0.0001
‡Honors grades, mean number in Y4	3.2±1.5	2.4±1.3	<0.0001
§Honors grades, number of students receiving >median in Y3/Y4	91 (49.5%)	155 (29.5%)	<0.0001

*Abbreviations: ACP, accelerated clinical program; GPA, grade point average, n, number
‡Mean number of quarterly clinical rotation "honors" grades received
§Total number of quarterly "honors" grades received during Year 3 and 4 (median number=3)

TABLE 2
STUDENT CHARACTERISTICS RELATIVE TO ACP STATUS AMONG TOTAL STUDENTS (N=709)

Variable	ACP* n=47 (6.6%)	NON-ACP n=662 (93.4%)	P-value
Residency	26 (55.3%)	158 (23.9%)	<0.0001
†GPA, mean, Year 1 Winter	3.73±0.24	3.10±0.52	<0.0001
†GPA, mean, at graduation	3.73±0.21	3.19±0.42	<0.0001
‡Honor grades, mean number in Y3	2.8±2.2	0.5±0.8	<0.0001
‡Honors grades, mean number in Y4	5.1±2.1	2.4±1.2	<0.0001
§Honors grades, number of students receiving >median in Y3/Y4	40 (85.1%)	206 (31.1%)	<0.0001

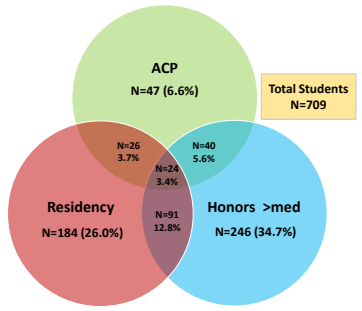
*Abbreviations: ACP, accelerated clinical program; GPA, grade point average, n, number
‡Number of quarterly clinical rotation grades with "honors" awarded
§Total number of quarterly honors grades during Year 3 and 4 (median number=3)

TABLE 3
MULTIVARIATE ANALYSIS OF ACP STUDENT RELATIONSHIP TO PERFORMING A RESIDENCY

Variable	Coefficient (SE)	P-value	Odds Ratio	95% CI
Intercept	-3.33 (0.71)	--	--	--
*ACP student	0.86 (0.33)	0.009	2.4	1.2 to 4.5
†GPA, graduation	0.42 (0.22)	0.06	1.5	1.0 to 2.4
§Honors grades total (>median)	0.60 (0.19)	0.002	1.8	1.3 to 2.6

*Abbreviations: ACP, Accelerated Clinical Program; CI, confidence Interval; GPA, grade point average; SE, standard error
†Mean GPA
§Total number of quarterly honors grades during Year 3 and 4 (median number=3)

FIGURE 1



RESULTS

The analysis included a total of 709 students, with 47 (6.6%) of them participating in the ACP (Tables 1 & 2). The ACP students had a higher GPA on average at the time of program selection (3.73 vs 3.10, P<0.0001) and at graduation (3.73 vs. 3.19, P<0.0001). ACP students also had higher numbers of clinical honors grades on average during their 3rd and 4th years of optometry school (n = 2.8 vs 0.5 and 5.1 vs 2.4, P<0.0001). After graduation, a greater percentage of ACP students performed a residency as compared to non-ACP-students (55.3% vs. 23.9%, P<0.0001). Disregarding ACP status, students who performed a residency also had higher GPAs on average compared to non-residency students during their 1st year (3.24 vs 3.11, P=0.003 and at graduation (3.34 vs 3.19, P<0.0001), and they also had higher numbers of clinical honors grades on average during their 3rd and 4th years of optometry school (n = 1.1 vs 0.5 and 3.2 vs. 2.4, P<0.0001). Further analyses of these data showed that, unadjusted for GPA or numbers of clinical honors grades, ACP students were 3.9x (OR=3.9, 95% CI=2.2 to 7.2, P<0.0001) more likely to perform a residency after graduation. Similarly, adjusting for GPA at graduation and for greater than median number (n=3) of clinical honors grades, ACP students were 2.4x (OR=2.4, 95% CI=1.2 to 4.5, P=0.009) to perform a residency (Table 3). Nearly as strong a predictor, adjusting for ACP status and GPA at graduation, students receiving greater than the median number of clinical honors grades were 1.8x (OR=1.8, 95% CI=1.3 to 2.6, P=0.002) more likely to perform a residency.

CONCLUSION

ACP students had a higher GPA at time of program selection and graduation, received a higher number of clinical honors grades 3rd and 4th year, and were more likely to participate in a residency program.

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Retrospective Study Investigating the Impact of COVID-19 on the Prevalence of Viral Conjunctivitis in an Urgent Care Setting

Vishwa Sheoran, BS • Thy Le, BS • Yu Sun, BS • Stanislav Mordarskiy, BS • Dominick Opitz, OD, FAAO
Greta Gregg, OD, FAAO • Daniel Roberts, OD, PhD, FAAO

INTRODUCTION

Viral conjunctivitis is responsible for the majority of infectious conjunctivitis. It is highly contagious and spread through hand-to-eye contact. The purpose of this study is to investigate the prevalence of viral conjunctivitis, including epidemic keratoconjunctivitis (EKC), in an urgent care setting prior to the COVID-19 pandemic and during the mask mandate period of COVID-19. With PPE use, social distancing, and improved personal hygiene during the pandemic, the incidence rate of viral conjunctivitis may have decreased. This observational study investigates how the prevalence of viral conjunctivitis may have changed since the onset of the COVID-19 pandemic.

METHODS

A retrospective chart review of electronic medical records was conducted at an academic urban eyecare clinic's urgent care service to compare the prevalence of viral conjunctivitis (ICD-10-CM: B30.0, B30.8, and B30.9) before and after the COVID-19 pandemic onset. Patients were sorted into two groups based on the diagnosis of viral conjunctivitis: pre-COVID-19 (June 1, 2018 - March 1, 2020) and during COVID-19 with mask mandate (June 1, 2020 - March 1, 2022). Follow-ups and other causes of conjunctivitis (such as allergic or bacterial conjunctivitis) were excluded. For the analysis, the prevalence ratio of people presenting with viral conjunctivitis was compared before and after the pandemic onset. Unadjusted group comparisons were performed using t-tests and chi-squared tests, and multivariate regression analysis using the SAS System (Cary, NC, USA) was used to test proportions while adjusting for potential confounding variables including age and gender.

RESULTS

A total of 5307 patients presented to the Urgent Care Service pre-COVID-19, which included 192 (3.62%) patients with viral conjunctivitis. In the mask mandate period of the pandemic, a total of 4073 patients presented, which included 86 (2.11%) viral conjunctivitis cases. Mean age of patients pre-COVID was 48.7 +/- 21.5 years (<1 to 99 years) vs. 49.6 +/- 20.4 years (<1 to 102 years) during COVID. Unadjusted, among Urgent Care patients pre-COVID, there was a higher proportion of viral cases than during the COVID period, (3.62% vs 2.11%, p<0.0001). Further, adjusting for age and gender, the significant difference remained and Urgent Care patients were 1.7x more likely to have viral conjunctivitis pre-COVID than during COVID (POR=1.7, 95% CI 1.3 to 2.2, p<0.0001).

FIGURE 1

Prevalence of viral conjunctivitis compared to total urgent care patients at urgent care of Illinois Eye Institute pre-pandemic (June 1, 2018 - March 1, 2020) and during the pandemic (June 1, 2020 - March 1, 2022)

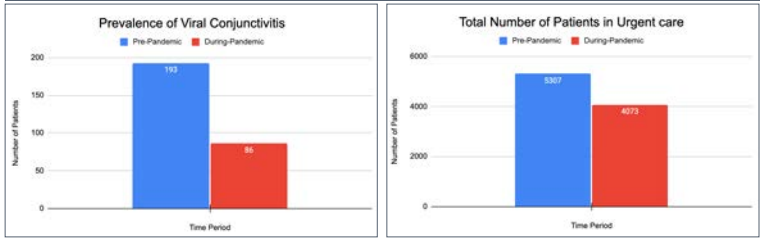

TABLE 1

VIRAL CONJUNCTIVITIS PREVALENCE BEFORE AND AFTER COVID-19 ONSET
ADJUSTING FOR AGE AND GENDER

Variable	Coefficient (SE*)	P-value	Odds Ratio	95% CI
Intercept	1.78 (0.28)	--	--	--
Time period, pre-Covid-19	0.53 (0.13)	<0.0001	1.70	1.32 to 2.21
†Gender, female	0.19 (0.12)	0.14	1.20	0.94 to 1.54
Age, mean	0.01 (0.003)	<0.0001	1.02	1.01 to 1.02

*Abbreviations: CI, confidence interval; SE, standard error
†Gender, not statistically significant, P>0.05

TABLE 2

VIRAL CONJUNCTIVITIS PREVALENCE BEFORE AND AFTER COVID-19 ONSET
TOTAL URGENT CARE SUBJECTS (N=9,380)

Variable	Before Covid-19 Onset n=5,307	After Covid-19 Onset n=4,073	P-value
Viral Conjunctivitis	n=192 (3.62%)	n=86 (2.11%)	<0.0001
Female / Male	63.5% / 36.5%	65.7% / 34.3%	0.025
Age, mean (SD*)	48.7 (21.4)	49.6 (20.4)	0.10

*Abbreviations: SD, standard deviation

DISCUSSION

Overall, within our clinic's Urgent Care Service, the prevalence of viral conjunctivitis cases significantly decreased during the mask mandate period of the COVID-19 pandemic. This data is consistent with the hypothesis that the incidence of viral conjunctivitis was lowered during the pandemic. However, further research is necessary in order to determine if this was specifically due to factors such as, masking, PPE, social distancing, other hygiene measures, or the reduced amount of people seeking care during the pandemic due to restrictions. Our results combined with possible future research on the topic may be beneficial in patient education and in preventing the spread of viral conjunctivitis.

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Successful Use of Hybrid Multifocal Lenses for Myopia Management

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BACKGROUND

Myopia is caused by accelerated elongation of the globe, and future myopic degeneration has been linked to greater axial length growth in children[1]. Myopic children are more likely to have astigmatism versus those without refractive error[2], which has been linked to faster myopic progression[3]. High myopia, such as that of this patient, increases the risk of myopic macular degeneration, one of the leading causes of blindness worldwide[4]. Early detection and diagnosis, along with myopia management options for children with significant corneal astigmatism, is important to slow progression of myopia and thus reduce further risk. This clinical case report highlights successful use of a multifocal hybrid contact lens for myopia management.

CASE REPORT

A 16-year-old Hispanic female complained of distance vision blur with correction in both eyes and reported an increase in glasses prescription annually. She began wearing glasses at a young age and was interested in wearing contact lenses to play volleyball. She had a history of chronic allergic conjunctivitis for which she was taking Pataday with improvement. Her mother was interested in exploring contact lens options for myopia management after having the initial discussion about options in the pediatric clinic.

EXAM FINDINGS

BCVA
- OD: 20/20
- OS: 20/20

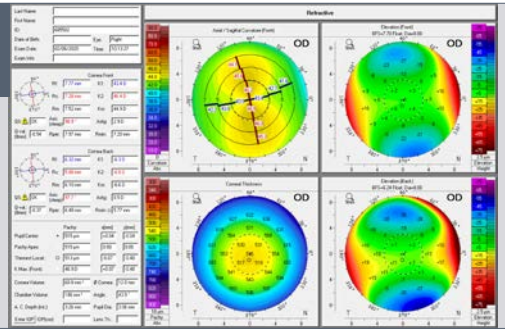
Refraction
- OD: -7.50 -2.25 x 175 (20/20)
- OS: -6.50 -3.00 x 005 (20/20)

Keratometry
- OD: 43.4/46.4 @ 98.9 (3.00 D)
- OS: 43.1/46.5 @ 82.9 (3.40 D)

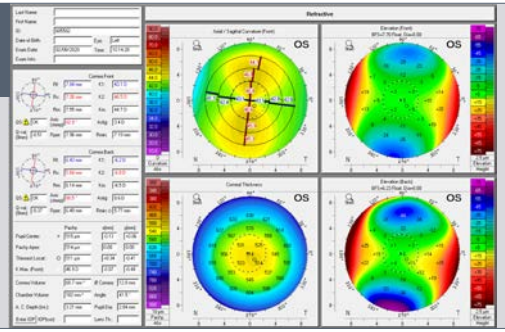
Multifocal Hybrid Contact Lens Parameters

	OD	OS
Power	-7.25 sph ADD +2.50	-6.25 sph ADD +2.50
Design	Center Distance	Center Distance
Base Curve	7.67	7.89
Diameter	14.50	14.50
Skirt	2 Flat	2 Flat

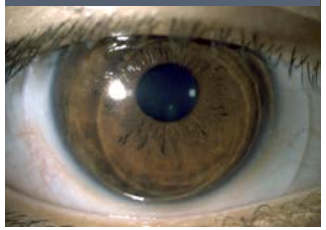
OD Pentacam Images



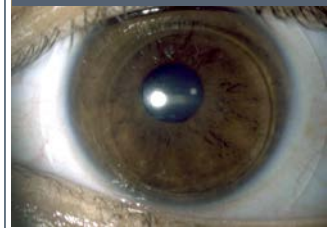
OS Pentacam Images



OD Multifocal Hybrid Lenses



OS Multifocal Hybrid Lenses



RESULTS

Axial Length Measurements After One Year of Daily Wear

	2022	2023
OD	26.16 mm	26.16 mm
OS	25.89 mm	25.92 mm

DISCUSSION

At the first fitting in 2020, no toric soft multifocal contact lens (MFSCL) was manufactured in the required astigmatism power OS. The patient exceeded the amount of corneal astigmatism correctable with orthokeratology. After determining a normal Belin/Ambrosio Enhanced Ectasia Display, a multifocal hybrid lens was used with a center-distance design for off-label myopia management. Hybrid lenses were an option as the patient's astigmatism is corneal but would not correct lenticular astigmatism. Center-distance design MFSCL are used to reduce peripheral hyperopic defocus, which is associated with axial length growth[5]. Center-distance multifocal hybrids provide similar optics, and the center optic zone is customizable for increased peripheral near-add based on pupil size[6]. A goal of less than 0.10 mm of axial length growth annually is used in myopia management as this is the average in non-myopic children after age six[7]. Measurements demonstrated no elongation OD and 0.03 mm of elongation OS from 2022 to 2023, as there was no prior measurement.

CONCLUSION

Multifocal hybrid lenses are a viable option for off-label use in myopia management for patients with significant corneal astigmatism, those without adequate vision in toric MFSCL due to corneal astigmatism, and those with more corneal astigmatism than currently correctable with orthokeratology. Multifocal hybrid lenses are more customizable than MFSCL with center-distance design, which is standard for myopia management.

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Health Locus of Control for Optometry Students Using the MHLC Form A

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PURPOSE

Health locus of control (HLOC) is widely studied in medicine and social sciences to explain how individuals view responsibility toward their own health. Poor treatment adherence and worse overall health outcomes are associated with patients with high external HLOC. Thus far, little is known about the HLOC of healthcare providers or student-interns, including in the field of optometry. Understanding the patterns of provider HLOC may help improve patient-provider communication for those with differing HLOC beliefs.

METHODS

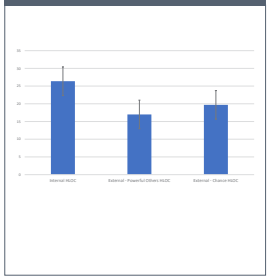
Subjects were recruited via email by faculty representatives from accredited programs of the Association of Schools and Colleges of Optometry (ASCO). Participants completed the Multidimensional Health Locus of Control (MHLC) Form A survey consisting of 18 items pertaining to internal, external/chance, and external/powerful others with scores ranging from 6 to 36 per category.

RESULTS

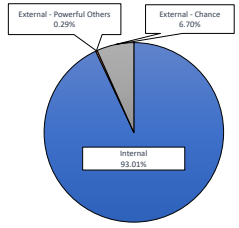
A total of 343 optometry students (76.09% female, 22.45% male, 0.29% nonbinary) from 14 optometry schools in the United States completed the survey. The mean age was 26 (range 22 – 41) with 1st year (20.12%), 2nd year (25.66%), 3rd year (30.61%), and 4th year (23.03%) students represented. Most participants were White (66.47%), followed by Asian (18.95%), Hispanic (5.54%), Multiracial (3.50%), Black or African American (2.33%), and Native American (0.58%).

Optometry student MHLC Form A Participant Map

MHLC Form A - Mean Values n = 343.



Highest Scoring Category per Participant



Multidimensional Health Locus of Control - Form A

Participants largely scored highest for internal HLOC beliefs (mean internal 26.39±4.04, powerful others 16.99±4.45 and chance 19.70±4.58). Almost all participants scored highest for internal HLOC with only 0.29% scoring highest in powerful others and 6.7% scoring highest in chance.

There was no statistical significance for internal HLOC scores between participants of differing genders, race/ethnicity, or year in school. Females scored higher on powerful others HLOC compared to males (17.17±4.45 to 16.30±4.61, p = 0.032), and higher on chance HLOC (18.94±4.52 to 17.62±4.82, p = 0.0062). Students of Asian descent scored highest on powerful others HLOC (18.95±4.30, p = 0.0020) and chance (21.28±4.44, p = 0.0017) compared to Hispanic participants. No other statistically significant differences were observed.

CONCLUSION

Optometry students largely demonstrated a high internal health locus of control. This study brings valuable insight into the psychometric beliefs of young healthcare providers. Prior studies evaluating the HLOC of healthcare providers and student-interns are scarce, with results indicating if HLOC is different between patients and providers, communication may be less effective. Considering many optometry programs serve populations with historically high external HLOC beliefs (patients of low socioeconomic status and minorities), this raises important concerns for how to improve patient-provider communication when HLOC is dissimilar.

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Successful Uptake of Low Vision Aids Relating to the MHLC Survey Results for a Patient with Longstanding Visual Impairment

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PURPOSE

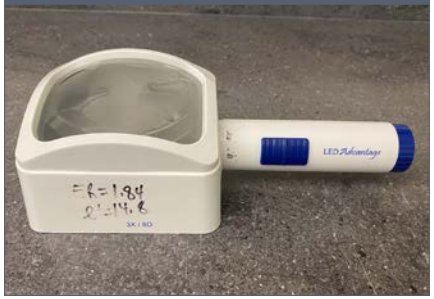
The willingness to use low vision aids is often associated with patient self-efficacy. The Multidimensional Health Locus of Control (MHLC) survey is a Likert scale questionnaire commonly used in medicine to gauge a patient's beliefs in the responsibility toward their own health. Patients scoring high on internal locus of control items tend to better adhere to treatment plans and are generally more proactive in their health. This poster demonstrates the potential connection between MHLC results to the successful uptake of low vision aids for a patient with longstanding vision loss.

CASE REPORT

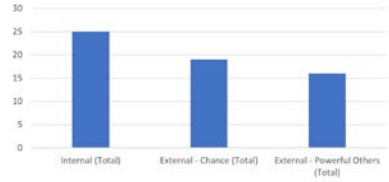
An 83-year-old African American female presented for an annual comprehensive eye examination with a longstanding complaint of blurry vision. She was previously followed for a retinal detachment of the right eye, a macular hole of the left eye, and proliferative diabetic retinopathy of both eyes. Best-corrected visual acuities were 20/40 of the right eye and 20/70 of the left eye using trial frame refraction. Eccentric fixation is noted with each eye. Dilation and further examination confirmed stability of prior ocular conditions. She was encouraged to attend a low vision rehabilitation evaluation to explore visual adaptations. The patient hoped for a prompt referral and was scheduled for the following week.

During the low vision rehabilitation evaluation, the patient expanded upon her difficulties with reading her Bible and watching television. Her current hand-held magnifier is difficult to hold while reading.

Stand Magnifier



MHLC Form A Patient Results



MaxTV

Multidimensional Health Locus of Control - Form A

In addition to confirmation of visual acuity loss and central scotomas of each eye, her contrast sensitivity was moderately reduced. A low vison aid evaluation demonstrated enthusiastic reactions using a 3x/8D LED stand magnifier for reading and a MaxTV head-mounted telescope for watching television. The stand magnifier was purchased at the completion of the evaluation.

The patient completed the Multidimensional Health Locus of Control (MHLC) Form A at the end of the evaluation, scoring highest in the category of internal health locus of control (25 out of a possible 36) and lowest in the category of powerful others (16 out of a possible 36). These results demonstrate strong health self-efficacy potentially related to the patient's eager use of low vision aids.

CONCLUSION

Patients with visual impairment gravitate toward the use of adaptive aids for many reasons including specific goals, severity of need, financial ability, and motivation. The use of the MHLC survey may help identify patients with high health self-efficacy, which could relate to successful use of low vision aids. The use of this survey as a screening tool in the future may help prioritize patients that are more likely to find value in the use of low vision adaptations.

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Recurrent Middle and Posterior Cerebral Artery Infarction due to Neurosarcoidosis

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INTRODUCTION

Neurosarcoidosis is the term used to describe the neurological signs and symptoms associated with sarcoidosis. These may include cranial nerve palsies, vasculitis, seizures, headaches, confusion, dementia, and stroke. While primary causes of strokes include atherosclerosis and thromboembolism, other etiologies must be investigated for early diagnosis and treatment to prevent further damage and recurrences. This presentation outlines a case of recurrent infarctions due to neurosarcoidosis with debilitating visual field outcomes.

CASE PRESENTATION

A 65-year-old male with sarcoidosis presented with complaints of decreased vision OU. The patient had a history of strokes, first in October 2021 and again in November 2021. Upon Humphrey visual field (HVF) testing, a right homonymous hemianopia involving fixation was noted. The patient's magnetic resonance imaging (MRI) revealed an area of old hemorrhagic infarct of the inferior left temporal lobe and paramedian aspect of the posterior left occipital lobe in the left posterior communicating artery (PCA) territory. There was no evidence of acute disease, and the patient was referred to a Vision Rehabilitation specialist for further care. Six months later, the patient presented again after sustaining a "mini stroke" 3 weeks ago. The HVF was now pertinent for a left homonymous hemianopia denser below than above in addition to the previously noted right homonymous hemianopia. A repeat MRI showed a new moderate-sized area of infarct involving the posterior paramedian right occipital lobe within the distribution of the right PCA.

Table 1
Exam findings from initial visit (10/2022)

	OD	OS
VA	20/20	20/20
EOM	FROM	FROM
Pupils	WNL	WNL
CVF	Constriction temporally	Constriction nasally
IOP	10 mmHg	10 mmHg

Table 2
Exam findings from most recent visit (03/2023)

	OD	OS
VA	20/40, PHNI	20/30, PHNI
EOM	FROM	FROM
Pupils	WNL	WNL
CVF	Constriction temporally and inferior-nasally	Constriction nasally and inferior-temporally

FIGURE 1
HVF: Right Homonymous Hemianopia (10/2022)

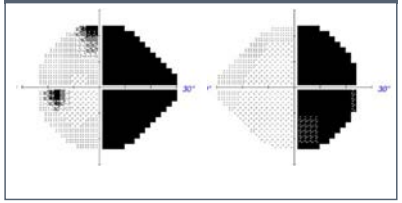


FIGURE 3
HVF: Left Homonymous Hemianopia denser below than above (04/2023)

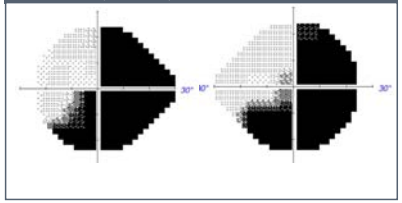


FIGURE 2
MRI: Area of old hemorrhagic infract of the inferior left temporal lobe and paramedian aspect of the posterior left occipital lobe in the left Posterior Communicating Artery (LCA) territory (10/2022)

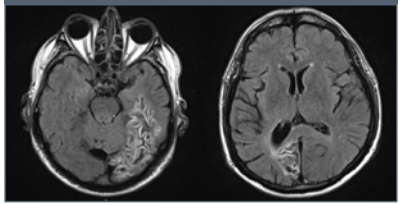
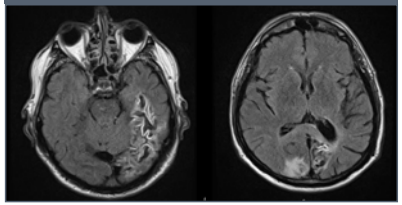


FIGURE 4
MRI: New moderate sized area of infarct involving the posterior paramedian right occipital lobe (04/2023)



CONCLUSION

While Sarcoidosis is an inflammatory disorder that typically affects the lungs and lymph nodes, neurosarcoidosis affects the brain, spinal cord, and peripheral nerves. Inflammation can damage blood vessels causing decreased blood flow or clot formation. These infarcts may be recurrent and affect the visual pathway. HVF testing should be completed regularly on these patients to pick up on visual field defects or new infarctions as Snellen acuity alone is not sensitive enough in these patients. Other ocular testing should include ruling out uveitis, optic neuritis, conjunctivitis, episcleritis, scleritis, choroiditis and cranial nerve palsies as all are ocular complications of the conditions. Vision Rehabilitation referrals may be indicated depending on the gravity of the HVF loss. Management for strokes related to neurosarcoidosis requires appropriate management of the systemic condition. Treatment involves corticosteroids to reduce inflammation and prevent further complications. Other immunosuppressive or immunomodulating medications may be used for long term management. Patients should be closely managed with their neurologist and have repeated HVFs completed to monitor for recurrent strokes.

References
Available upon request

Financial Support: N/A

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Glaucoma Management Challenges in a Patient with Encephalomalacia (EM)

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INTRODUCTION

Encephalomalacia is defined as the softening or loss of brain tissue following an ischemic injury to the brain[1]. These injuries can arise from trauma or perinatal complications including preterm birth[2]. Patients with encephalomalacia may present with neurological symptoms ranging from cognitive impairments to visual impairments[3]. This presentation discusses the presence of encephalomalacia in a patient with glaucoma and its impact on its management.

CASE PRESENTATION

A 41-year-old female with a history of diabetes presented to transfer care for her open-angle glaucoma. She was treated with latanoprost and brimonidine drops. The patient also reported a history of repeated selective laser trabeculoplasty procedures performed to lower her intraocular pressure.

Table 1
Exam findings from visit

	OD	OS
VA	20/20	20/30, PHNI
EOM	FROM (+) R-beating nystagmus	FROM (+) R-beating nystagmus
Pupils	WNL	WNL
CVF	Generalized constriction	Generalized constriction
IOP	25 mmHg	25 mmHg

Ocular History: Chronic Open Angle Glaucoma OU
Medical History: Pre-term birth, Borderline intellectual functioning, Parieto-occipital Encephalomalacia
Family History: Glaucoma (grandmother, father, cousin)
Medications: latanoprost, brimonidine, glipizide
Anterior Segment: Unremarkable
DFE: Focal notching bilaterally with 0.75 C/D ratio OD, OS. No disc hemorrhages OU. Optical Coherence Tomography (OCT): IT>ST RNFL thinning consistent with GCL thinning OD, ST>IT RNFL thinning consistent with GCL thinning OS
HVF: Incongruent right homonymous hemianopia

FIGURE 1: HVF OS, OD

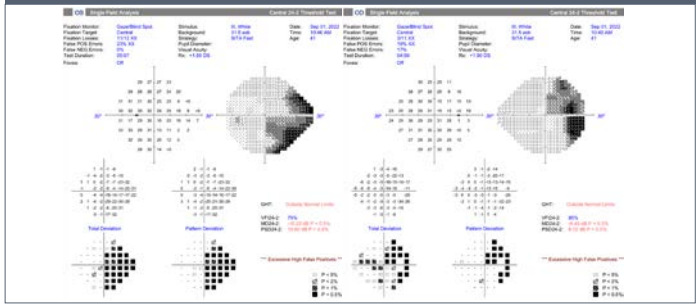


FIGURE 2: PanoMap OD, OS

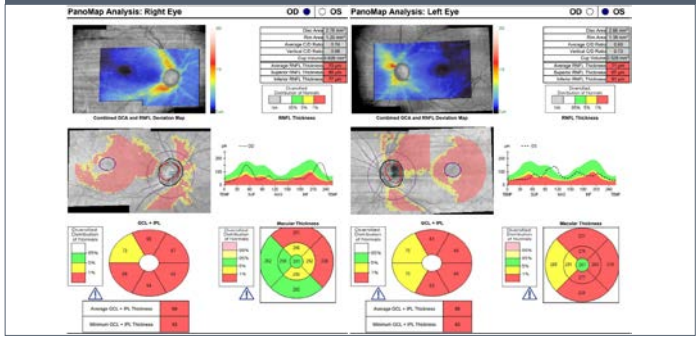
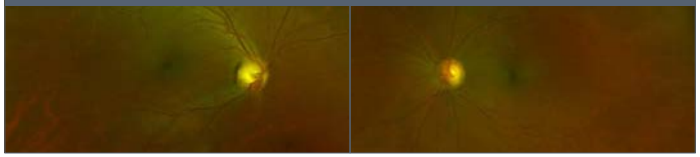


FIGURE 3: Optos photos OD, OS



DISCUSSION

Encephalomalacia causes defects in the visual pathway and on the HVF, as seen in this case. This patient's encephalomalacia is secondary to an ischemic event related to her preterm birth. The patient's left parieto-occipital encephalomalacia correlates with the right incongruent homonymous hemianopsia seen on her visual field testing. This effectively masks potential glaucomatous defects that would be detected with a visual field test. While routine optical coherence tomography scans and visual fields are recommended in glaucoma patients, field testing may be confounded by the patient's other neurologic condition. While encephalomalacia may mask and provide a challenge when interpreting glaucomatous damage on visual fields, the progression of field loss would be indicative of glaucomatous progression. In addition, strict control of intraocular pressure must be maintained. The patient's tomography scans should be monitored closely for signs of retinal thinning.

CONCLUSION

The patient's history revealed repeated selective laser trabeculoplasty procedures to lower her intraocular pressure. Her intraocular pressures often measure greater than 25 mmHg. Optic nerve head evaluation reported cupping with regional notching in both eyes with the optical coherence tomography confirming retinal thinning. Given these factors, continuing glaucoma treatment was necessary.

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Keratoplasty Rejection Trends in an Urban Optometry Clinic

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INTRODUCTION

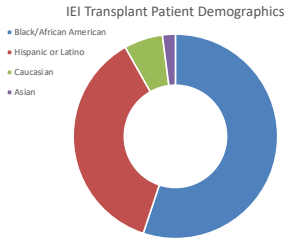
- A keratoplasty may be performed in cases of corneal ectasia, corneal scarring, bullous keratopathy, corneal edema, corneal dystrophy, corneal trauma, severe keratitis, corneal melt and/or ectasia with contact lens intolerance (1).
- Four common corneal transplants seen in patients are: Deep anterior lamellar keratoplasty (DALK), Descemet stripping endothelial keratoplasty (DSEK), Descemet membrane endothelial keratoplasty (DMEK), and Penetrating keratoplasty (PKP) (2).
- Such procedures are complex and require regular clinical follow-up care to prevent corneal transplant rejection.

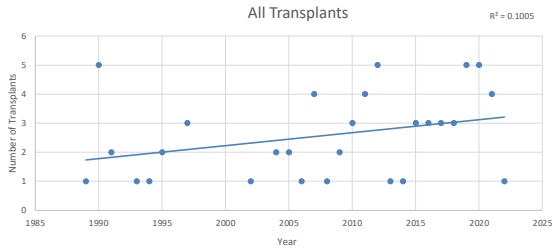
METHODS

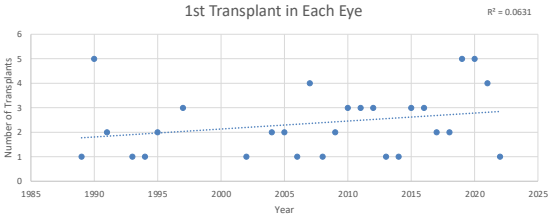
- A retrospective chart review of patients seen at the Illinois Eye Institute (IEI) in Chicago, Illinois, between 2011 and 2022 who reported receiving a corneal transplant was completed.
- Two common types of corneal transplant/ keratoplasty procedures were primarily observed: DALK and PKP.
- The IEI provides eye care to an average of 50,000-60,000 patients annually.
- Over the ten-year study period, the clinic examined 49 patients with keratoplasty, with a total of **69** corneal transplants (surgery dates ranging from 1989-2022).

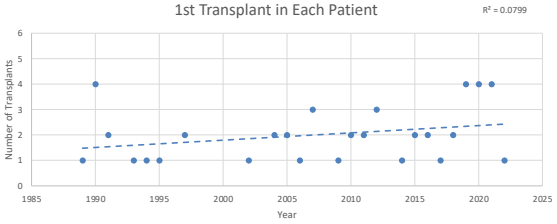
RESULTS

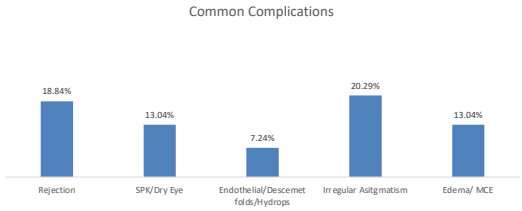
- 59.18% of patients were male
- Median age was 50.96 ±13.27 (range 24-76)
- **PKP** was most commonly observed in this cohort **(95.65%)**
- **Corneal ectasia/keratoconus (97.10%)** was the most common indication for keratoplasty
- Median age at the time of transplant was **40 ±12.33** (range 14-64)
- **18.84%** of total grafts eventually **underwent rejection**
- Success of 20.29% of total grafts was unknown or missing from records
- Rejection rates did not differ significantly among different age groups (p=0.30, n=55), gender (p=0.44, n=55), or race (p=0.26, n=55) through Chi square analysis











CONCLUSION

- The most common keratoplasty procedure performed in this urban academic optometry clinic was PKP for patients with keratoconus/ectasia.
- While many patients had successful transplants, some still experienced rejection of their new graft.
- Rejection rates did not differ by age, race, or gender. Future analysis will provide insight into post-operative visual recovery, specifically concerning contact lens fittings.

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Horner Syndrome as a Presenting Sign of Syphilis

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INTRODUCTION

A patient with Horner syndrome and unremarkable diagnostic Horner workup underwent additional blood work which was positive for syphilis. Following treatment for neurosyphilis, ocular and neurologic symptoms improved. This case demonstrates a presumed syphilitic vasculitis that resulted in a Horner syndrome.

CASE PRESENTATION

Entrance testing

	OD	OS
Visual Acuity	20/20	20/20
EOMs	FROM	FROM
CVF	FTFC	FTFC
Pupils	Bright: 2.5 mm Dim: 4 mm	Bright: 2 mm Dim: 2.5 mm

SLE

	OD	OS
Adnexa	Normal	Normal
Lids/Lashes	lids and lashes normal MRD1: 4 mm, MRD2: 6 mm	UL ptosis MRD1: 0.5 mm, MRD2: 5 mm
Conjunctiva	White and quiet	White and quiet
Sclera	White and quiet	White and quiet
Cornea	normal endothelium, epithelium, stroma and tear film	normal endothelium, epithelium, stroma and tear film
Angles	3-4+ Nasal and Temporal	3-4+ Nasal and Temporal
Ant. Chamber	D&C	Trace cell, (-) flare
Iris	Iris normal	Iris normal
Lens	nuclear sclerosis 1+ (undilated)	nuclear sclerosis 1+ (undilated)

- Referral: Emergency department
- Imagining tests: CT of chest with apex of lung and brachial plexus, MRI of brain/neck with and without contrast, and CTA of head/neck
- Blood tests: CBC with differential, FTA-ABS, VDRL

IMAGE 1
Ptosis OS at initial presentation

IMAGE 2
Pre-apraclonidine pupil size measure with 3.5 mm beam height

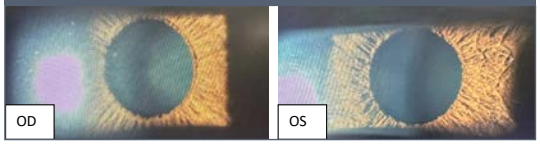

IMAGE 3
Post-apraclonidine pupil size with 3.5 mm beam height

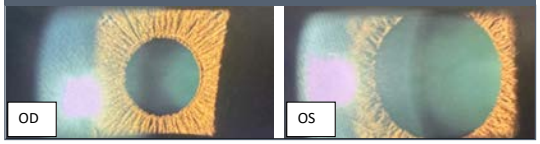

IMAGE 4
Improved ptosis OS following 14-day course of IV penicillin

DIAGNOSIS AND DISCUSSION

Following unremarkable imaging studies, further blood work was done to rule out an infectious etiology which was positive for syphilis. The accompanying ocular and neurologic symptoms prompted treatment for neurosyphilis, and the patient was started on a continuous infusion of IV penicillin for 14 days.

The pathogenesis of Horner syndrome involves disruption of the three-neuron arc at any point along its circuitous anatomical course involving the head, neck, and eye. Regardless of etiology, disruption of sympathetic fibers along this pathway may result in denervation of the iris dilator, Müller's muscle (and its inferior equivalent), and sweat glands of the face producing the classic triad of ptosis, pupillary miosis, and facial anhidrosis.

It is well established that syphilis can result in inflammation of both small and large vessels via direct invasion of the vascular wall. In turn, vasculitis-producing disease has been shown to cause Horner syndrome.

CONCLUSION

Following unremarkable Horner imaging studies, disease processes capable of producing small or large vessel vasculitis, such as syphilis, should be considered and confirmed with appropriate workup if suspected. Co-management with an infectious disease specialist for treatment of syphilis is necessary and beneficial in improving ocular and neurologic manifestations of a Horner syndrome secondary to syphilis.

REFERENCES

Available upon request

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Frequency of Drug Intervention After Initial Focal Laser Treatment for CSDME in Clinical Practice

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PURPOSE

The most prevalent microvascular complication in individuals with diabetic retinopathy (DR) is clinically significant diabetic macular edema (CSDME). Focal laser and drug intervention (most commonly intravitreal anti-VEGF injections) are well established means of effectively treating CSDME. However, as drug intervention continues to become the mainstay in CSDME management, the practical role of focal laser in a real-world clinical setting has become increasingly questioned. The purpose of this study was to assess the incidence of drug intervention following first-line focal laser in a real-world clinical setting. Additionally, it aimed to identify possible demographic, systemic, or clinical factors that help predict the risk of supplemental pharmacological therapies for CSDME.

METHODS

This study was a retrospective secondary data analysis utilizing the electronic health record system of a large outpatient eyecare facility to analyze the medical records of 46 patients. Medical records from July 1, 2017 to June 30, 2019 with a diagnosis of non-proliferative diabetic retinopathy (NPDR) with CSDME were reviewed. Patients with previous treatment for CSDME and/or any condition that hindered the effectiveness of focal laser were excluded. Binary logistic regression analysis of demographics (sex, age, race), self-reported systemic status (last fasting blood sugar, hemoglobin A1c), and pertinent clinical testing data (visual acuity and central macular thickness [CMT]) was used to identify possible variables predictive of downstream drug intervention within two follow-up visits.

RESULTS

Forty-six subjects (63 qualifying eyes) with CSDME treated with first-line focal laser therapy were included in the analyses. Thirteen of the eyes went on to receive supplemental drug intervention within two follow-up appointments after initial focal laser treatment. Table 1 shows that of all variables, only CMT was found to predict downstream drug intervention (Wald statistic = 6.402 with 0.011 significance). Within the studied CMT range, the logistic regression curve revealed that for every 1 micron (um) increase in CMT the likelihood of downstream drug intervention increases by 1%. The dashed line in Figure 1 marks the 50% probability at approximately 436 um.

Table 1
A summary of the various demographic, systemic, and clinical variables that were analyzed. The respective odds ratios, upper and lower confidence intervals, and "Sig." values for each category are listed below.

Category	Odds Ratio	95% CI Lower	95% CI Upper	Sig. Value (looking for below 0.05)
CMT	1.00%	1.001	1.018	0.02
Age	-6.60%	0.853	1.023	0.141
HbA1c	-34.00%	0.329	1.321	0.24
Sex	18.40%	0.274	5.121	0.821
LFBS	0.60%	0.329	1.014	0.21
VA OD	495.00%	0.434	56.432	0.198
VA OS	770.50%	0.191	310.412	0.279

FIGURE 1
Binomial logistic regression curve graphed over data range showing probability of drug intervention after laser treatment as a function of CMT.

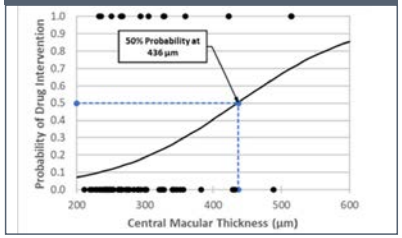


IMAGE 1
Spectralis macular OCT of patient receiving baseline focal laser (CMT 329 um) who DID go on to receive subsequent pharmacological therapy at follow-up (CMT 486 um).

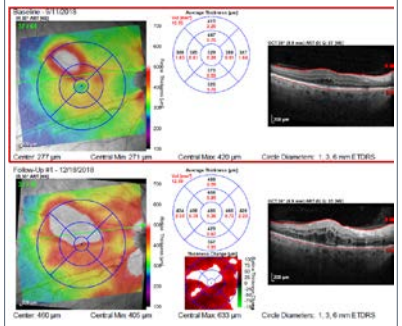
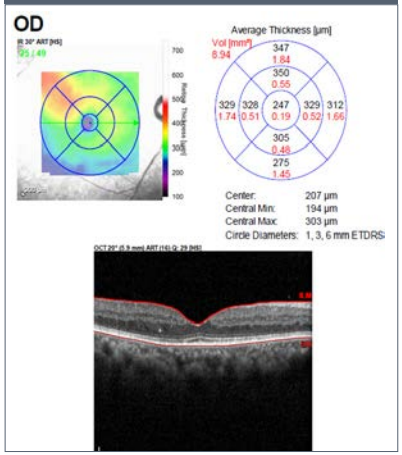


IMAGE 2
Spectralis macular OCT of patient prior to receiving baseline focal laser who DID NOT go on to receive subsequent pharmacological therapy.



DISCUSSION

To our knowledge, retrospective analysis of real-world clinical data examining the prevalence of pharmacological intervention following first-line intervention with focal laser for CSDME has not been investigated. Randomized clinical trials have suggested that about a quarter of eyes with CSDME and good visual acuity initially treated with focal laser go on to receive further pharmacological therapy.[1] These results potentially serve to contribute to assessing the practicality of baseline focal laser therapy in a real-world clinical setting.[1] This study seems to suggest focal laser remains an effective, less invasive means of treating CSDME in a real-world clinical setting, but analysis of CMT values may prove useful in determining the most efficient and effective initial treatment. Although a larger sample size is needed, our preliminary data suggests focal laser should still be considered for first-line treatment of CSDME in a real-world clinical setting.

CONCLUSION

The data suggests focal laser remains a safe and effective treatment option for CSDME in a real-world clinical setting. However, a 1 um increase in pre-treatment CMT increased the likelihood of downstream drug intervention by 1%, suggesting further investigation is warranted to explore a potential critical CMT threshold value that may warrant bypassing focal laser in favor of first-line drug intervention. Nonetheless, the complexities of treating CSDME still remain unique to each patient and physician.

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A complete list of references is available upon request.

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Accuracy of Glaucoma Detection with Stereo Disc Photographs and Optomap Ultra Widefield-Scanning Laser Ophthalmoscope Images

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Illinois College of Optometry, Chicago, Illinois[1]; Toronto, Ontario[2]; Optos, Inc., Marlborough, MA[3]

PURPOSE

The detection of glaucoma using stereo optic disc photos has been widely studied and is known to be an accurate method for optic nerve assessment.[1] Optomap® images are ultra widefield scanning laser ophthalmoscope (UWF-SLO) generated red/green color photos covering approximately 80% of the entire retina, including the optic disc and macula and extending beyond the vortex vein ampullae. The clinical utility of optomap® images for glaucoma detection has not been previously evaluated. The purpose of this study is to compare the accuracy for glaucoma detection using vertical cup-to-disc ratios (VCDRs), presence or absence of optic disc notching, and RNFL wedge defects with stereo optic disc photos and optomap® images evaluated by experienced graders.

METHODS

Thirty-five healthy eyes and 35 glaucomatous eyes were imaged with the Zeiss VISUCAM® PRO NM camera using the offset feature to allow stereoscopic viewing. On the same day, UWF-SLO images were captured on all participants with the Optos Monaco® device. Image quality was assessed prior to image grading, which was acceptable in all subjects. Images were de-identified and presented to four experienced clinician graders who assessed each image in a masked fashion and graded each as either normal or glaucomatous. This was done by utilizing stereo viewing with the VISUCAM® PRO NM photos as well as Ratio Annotation and blend tools with the Monaco® software (Figure 1).

RESULTS

The overall accuracy of VISUCAM® PRO NM assessments among the graders ranged from 77-91%, with an average of 87.3% accuracy. The overall accuracy of optomap® assessments among the graders ranged from 89-93%, with an average of 90.8%. The average sensitivity and specificity, respectively, for VISUCAM® PRO NM were 83% and 94% among all graders. The average sensitivity and specificity, respectively, for optomap® were 87% and 94% among all graders.

FIGURE 1

An example of optomap® UWF-SLO image vertical c/d ratio (VCDR) assessment using the Ratio Annotation tool, yielding a VCDR value of 0.84.

TABLE 1

Overall accuracy in detecting glaucoma for each grader. The average among all graders was better on optomap® assessments.

	Grader 1	Grader 2	Grader 3	Grader 4	Avg
Visucam	77%	90%	91%	91%	87.3%
Optomap	89%	93%	91%	90%	90.8%

TABLE 2

Sensitivity and specificity values for each grader. Optomap® had improved sensitivity over VISUCAM® PRO NM, with equal specificity.

	Grader 1	Grader 2	Grader 3	Grader 4	Avg
Visucam Sensitivity	66%	89%	86%	91%	83%
Optomap Sensitivity	83%	89%	86%	89%	87%
Visucam Specificity	96%	91%	97%	91%	94%
Optomap Specificity	91%	97%	97%	91%	94%

CONCLUSIONS

The overall accuracy in detecting glaucoma was high for both stereo optic disc photos and optomap® images. Sensitivity and specificity were very similar between the devices with specificity higher than sensitivity in both for all graders. The accuracy for glaucoma detection with VISUCAM® PRO NM stereo disc photos and optomap® images was very similar. Further studies will be needed to determine whether optomap® imaging can replace stereoscopic photography as the accepted gold standard for optic nerve assessment.[2]

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An Acute Presentation of Peripheral Ulcerative Keratitis (PUK) Associated with Rheumatoid Arthritis (RA)

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Ocular Disease

Purpose:

This case report aims to present a compelling instance of peripheral ulcerative keratitis (PUK) in a patient with a coexisting diagnosis of rheumatoid arthritis and neurotrophic keratitis.

Case History:

A 74yo Asian female, who has been undergoing treatment for neurotrophic keratitis and severe dryness, presented with constant foreign body sensation, light sensitivity, and visual decline in the left eye that started about 2-3 days ago. Ophthalmic Hx: meibomian gland dysfunction OU, neurotrophic keratitis OU, superficial punctate keratitis OU. Medical Hx: Rheumatoid arthritis, high cholesterol, GERD, hypertension

Differential diagnosis:

Primary: RA associated Peripheral ulcerative keratitis (PUK)
Others: Bacterial keratitis, neurotrophic ulcer, fungal keratitis, ocular manifestations of HSV/HZV, pellucid marginal degeneration.

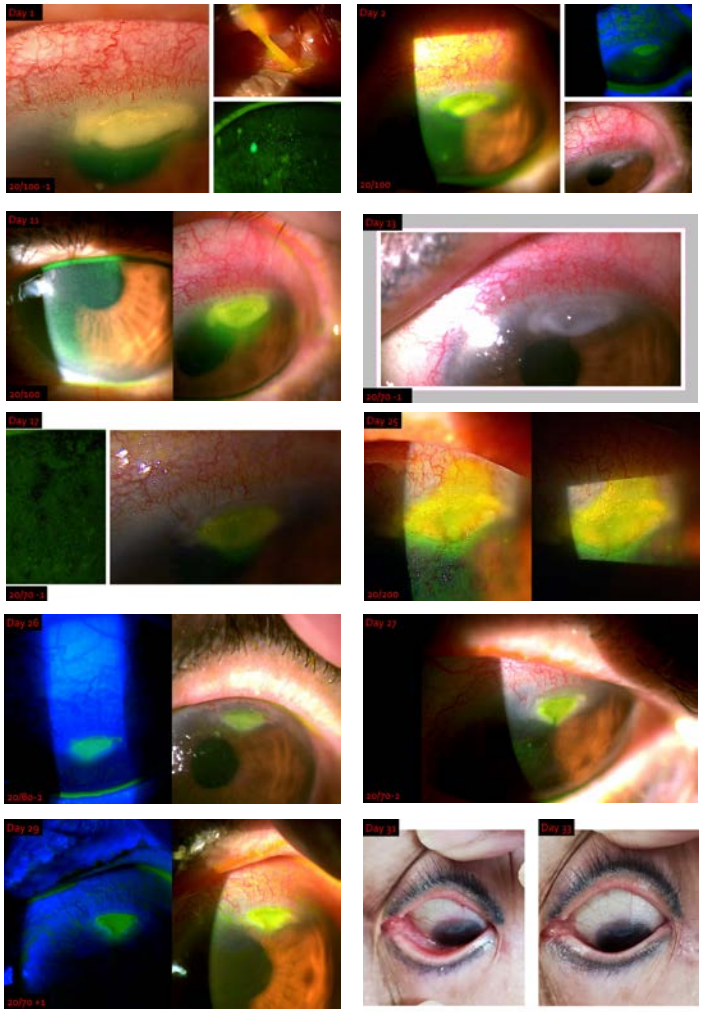
Diagnosis and Discussion:

Peripheral Ulcerative Keratitis (PUK) is characterized by the deposition of immune complexes within corneal blood vessels, triggering inflammation and causing damage to corneal tissue [1]. This inflammatory response attracts neutrophils and other inflammatory mediators, resulting in the release of reactive oxygen species and destructive enzymes that further harm the cornea. The impact on corneal blood vessels leads to inadequate nourishment, compromising the immune response. Additionally, an upregulation of MMP enzymes contributes to the degradation of corneal collagen, leading to corneal thinning. The inflammatory and ischemic environment promotes angiogenesis, exacerbating the disease process [2].

In patients with systemic inflammatory conditions like rheumatoid arthritis, the diagnosis of PUK should be considered. During this case an infectious etiology was considered along with PUK. Due to patient's poor response to antibiotics and positive response to steroids PUK was diagnosed.

Initial Clinical Findings:

Entrance Exam Findings:		
ccVA (glasses)	20/25	20/100 -1 [1mo ago 20/50]
Pupils	PERRL, (-)APD	PERRL, (-)APD
CVF	FTFC	FTFC
EOM	FROM	FROM
Lensometry	-1.75 + 2.00 x 054	-1.50 + 1.25 x 119
Slit-Lamp Findings:		
L/L	2+ telangiectasia w/ scalloped margins, 2+ MGD	2+ telangiectasia w/ scalloped margins, 2+ MGD
Conj.	1+ injection	3+ injection, tr staining
Sclera	White/quite	White/quite
Cornea	1-2+ diffuse SPK	2-3+ diffuse SPK, 1+ filaments, 1mmHx2mmV superior peripheral opaque opacity w/ shallow overlying soft staining
Angle	3-4+	3-4+
A/C	Deep/quite	tr cells
Iris	Normal	normal
Lens	clear	clear
IOP	17	17



Treatment and Management:

The ulcer was cultured at the initial visit and treated with Besivance gtt qid and erythromycin ung qhs OS suspecting infection. The patient's dry eye treatment was continued throughout the treatment process, which included Xiidra gtt bid OU, doxycycline 50 mg PO qid, and BPC157 gtt tid OU. Over the next week, the patient was started on Medrol Pak 4 mg, followed by prednisone 10mg PO bid. Once the culture results reveled positive for gram-negative microbe, ciprofloxacin gtt qid OS was initiated. Six days later, a Prokera BCL was inserted OS. Ciprofloxacin was stopped after the removal of the Prokera two days after insertion, and lotemax ung bid OS was started, followed by another Prokera and a switch to eyesuvis tid OS. The initiation of steroids showed improvement, giving an indication the condition is likely inflammatory and not infectious. The patient was started on pred acetate gtt q2h OS, leading to significant improvement. The prednisone acetate is currently being slowly tapered.

Conclusion:

Peripheral ulcerative keratitis (PUK) is often linked to systemic inflammatory conditions such as rheumatoid arthritis. Managing such cases require an approach that combines oral and topical therapies. Due to the inflammatory etiology of the condition treatment with topical and oral immunosuppressants are very important. Acthar Gel and oral immunosuppressives should be considered in patients with PUK resistant to topical and oral steroid treatments [2].

Take away points:

- PUK is the second most common ocular complication of autoimmune diseases, behind anterior uveitis
- When dealing with peripheral corneal ulceration treat it as infectious until the culture results return
- It can be tricky to treat with patients with neurotrophic keratitis. Their clinic appearance will not match their symptoms
- Amniotic membrane is a great quick way to help with ocular inflammation

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Recurrent Painful Ophthalmoplegic Neuropathy in a Teenage Patient

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INTRODUCTION

Recurrent painful ophthalmoplegic neuropathy (RPON), previously known as ophthalmoplegic migraine, is a rare disorder affecting an estimated 0.7 per million individuals annually.[1] The condition involves **reversible unilateral ophthalmoplegia** and **headaches** caused by **cranial nerve paresis**, in the absence of a cranial or orbital mass.[1,2] There are several different theories as to its pathophysiology. This case describes a case of RPON involving cranial nerve III, Adie's tonic pupil, and accommodative insufficiency in a teenage patient.

CASE REPORT

VISIT 1

A 14-year-old Asian female presented to the Pediatric Clinic of an urban eye care center for a scheduled 6-month follow-up to monitor Adie's tonic pupil OD, accommodative insufficiency, and basic exophoria. Relevant clinical findings are outlined in Table 1.

Ocular History:

- **Adie's tonic pupil** OD
- Accommodative insufficiency
- Basic exophoria
- Previous symptoms of pain behind OD and asthenopia OU, had been prescribed **bifocals** with 1.5 prism diopters **base IN** over each eye for relief of symptoms. At this visit, the patient reported that her spectacles no longer provided such relief and that for the past month, she had been experiencing worsening pain behind her right eye and now felt her right eyelid looked droopy. The patient denied dysgeusia or generalized fatigue but reported experiencing muscle soreness at the end of the day.

VISIT 2 (3 weeks later)

The patient returned for follow up reporting that the radiology report was normal. Her eye pain and ptosis had improved since last visit. At this time she was diagnosed with recurrent painful ophthalmoplegic neuropathy.

IMAGE 1

TABLE 1

Relevant Clinical Findings (Visit 1)

RELEVANT CLINICAL FINDINGS		
	OD	**OS**
Best Corrected Distance VA	20/20	20/20
Pupils	Round, sluggish response, 2+ APD, anisocoria OD>OS greater in bright illumination (Image 1)	Round, brisk reaction to light, (-) APD
Confrontation Visual Field	Full to finger count	Full to finger count
Extraocular Motility	1+ adduction deficit	Full range of motion
Anterior Segment Evaluation	Mild ptosis Otherwise unremarkable	Unremarkable
Assessment & Plan	Suspected partial right cranial nerve III palsy. Refer to pediatrician for computerized tomography (CT) of the orbits and magnetic resonance imaging (MRI) of the midbrain and orbit with and without contrast. Juvenile myasthenia gravis labs recommended if the CT and MRI results are unremarkable.	

TABLE 2

Clinical Summary of RPON for the Optometrist

CLINICAL SUMMARY OF RPON FOR THE OPTOMETRIST	
Symptoms & Clinical Signs	Unilateral ophthalmoplegia (may include ptosis, mydriasis, and/or EOM restriction)* Ipsilateral headache or migraine At least 2 episodes of the above required for diagnostic criteria to be met[3]
Management	MRI of the brain (with/without contrast)[2], serology based on other clinical findings
Treatment	Observation, corticosteroids[2]

*Note: this summary is for RPON affecting CN III, which is the cranial nerve most commonly affected by RPON.[1,2] RPON affecting cranial nerve IV or VI will have different clinical signs.

CONCLUSION

RPON is a rare condition whose primary episode typically occurs in childhood or adolescence. There are two main theories regarding its pathophysiology. The first is the ischemic/compressive theory, which suggests that vasodilation during a migraine causes compression of the affected cranial nerves. The second the inflammation/myelination theory, which posits that inflammation or myelination of the affected cranial nerve irritates the ophthalmic branch of CN V, triggering migraine-like symptoms.[1]

Optometrists should be familiar with the diagnosis of RPON. It is a valuable differential in cases of unilateral ophthalmoplegia, particularly when the patient complains of ipsilateral headaches or migraines. A summary of the symptoms, signs, and management of this condition can be found in Table 2.

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Friend or Foe: The Role of Muller Cells in MacTel2 Patients with Underlying Diabetes

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PURPOSE

Macular telangiectasia type 2 (MacTel2) is a neurodegenerative disease of the retina. Almost half of patients diagnosed with it have a systemic disorder, the most common being diabetes. A recent study noted that having both conditions concurrently was found to be protective in the development of diabetic retinopathy (DR). However, the chances of MacTel2 progression and specifically, the development of choroidal neovascularization (CNVM) were found to increase. Although the overall disease process of MacTel2 is different compared to DR, muller cell involvement likely plays a part in the pathophysiology. This case highlights the development of a CNVM, in a patient with MacTel2 and controlled diabetes with no retinopathy.

CASE REPORT

A 54-year-old Hispanic female presented for her annual eye exam. Her medical history was remarkable for diabetes mellitus type 2 which was diagnosed 10 years ago. Her most recent A1c was 6.9% with fasting blood sugar 165 mg/dl that morning. Her ocular and medical histories were otherwise unremarkable. Best corrected visual acuity was 20/20 OD and 20/25 OS. Entrance testing and slit lamp examination were unremarkable. IOP was 14 mmHg OD/OS. Dilated fundus exam showed bilateral pigmentation temporal to the macula in both eyes with intraretinal hemorrhaging and subretinal fluid temporal to the fovea OS. OCT showed outer retinal layer atrophy and retinal draping OD/OS, with subretinal fluid and a suspected CNVM OS. The patient was diagnosed with MacTel2 OU with a CNVM OS and referred to a retinal specialist. Intravitreal injections of bevacizumab OS were administered. Her last examination findings showed stable findings with a reduction in CNVM size. The patient continues to be followed.

IMAGE 1
Optos Widefield image OD showing pigment clumping temporal to the macula, intraretinal hemorrhage and subretinal fluid.

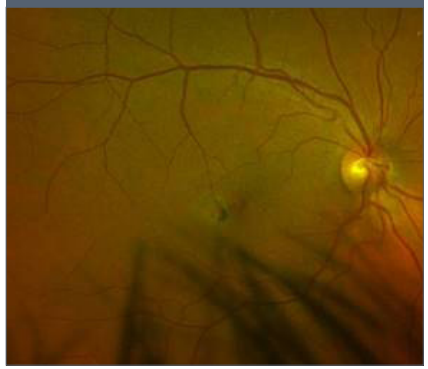


IMAGE 2
Optos Widefield image of OS showing temporal pigment clumping, with intraretinal hemorrhaging and subretinal fluid.

IMAGE 3
OS OCT image showing outer retinal layer atrophy, retinal draping with subretinal fluid and suspected CNVM.

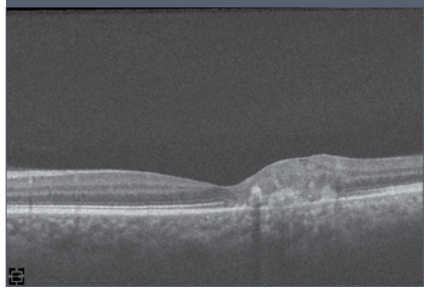
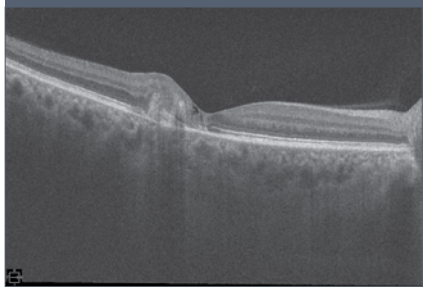


IMAGE 4
OD OCT image showing outer retinal layer atrophy, retinal draping and subretinal fluid.



CONCLUSION

This case aligns with findings in the recent literature that a diagnosis of MacTel2 may be protective against the development of DR. The protective nature is thought to be related to muller cells. In DR, muller cells are more active. In MacTel2 they are reduced in number. Having fewer muller cells lessens the overall number of glucocorticosteroid receptors in the retina. These receptors are thought to modulate diabetic changes. Fewer muller cells also means less cytokines will be produced in response to high glucose levels leading to fewer endothelial changes occurring and thus the chances of developing DR. At the same time, MacTel2 related CNVMs are found to be more frequent in patients with diabetes, as seen with our patient. It is unknown why this occurs with research postulating further and unknown muller cell interactions. Clinicians should be aware of the protective role MacTel 2 in their diabetic patients while staying vigilant for advanced signs of MacTel2.

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Superior Segmental Optic Nerve Hypoplasia: A Differential for Normal Tension Glaucoma

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BACKGROUND

Superior segmental optic nerve hypoplasia (SSONH) is a congenital condition associated with reduced numbers of retinal ganglion cell axons within the superior portion of the optic disc. SSONH may be unilateral or bilateral. The reported prevalence rate is <1%, though it is likely underdiagnosed. The most notable, non-ocular risk factors are maternal diabetes and female gender. Patients typically have good visual acuity and mild to no symptoms interfering with daily function. Patients are often evaluated for acquired optic atrophy, commonly glaucoma, owing to thinned retinal nerve fiber layer (RNFL) and inferior visual field defects. To prevent misdiagnosis and unnecessary treatment, it is important to consider SSONH as a differential for normal tension glaucoma.

CASE

A 23-year-old female presented for ongoing glaucoma care after a move from out of state. She had been treated for normal tension glaucoma with timolol bid OU for the past three years. She was unaware of past IOP values but had been told of visual field loss OS>OD. She had no visual complaints and denied previous corticosteroid use, surgery, trauma, or inflammation. She reported a strong maternal family history of glaucoma but denied knowledge of maternal diabetes. Visual acuity was 20/20 in each eye, entrance tests and slit lamp exam were unremarkable, IOP was 10 mmHg OD and 11 mmHg OS, angles were open and anatomically normal as viewed with gonioscopy. See Figures 1-3 for additional findings.

After discussion with the patient, timolol was discontinued, with the caveat that any significant increase in IOP or progression of RNFL/GCL or VF loss may prompt re-initiation of treatment.

DISCUSSION

In this case, a young patient presents with some characteristics of normal tension glaucoma, but without classic risk factors. The optic discs show superonasal neural retinal rim (NRR) thinning, as opposed to inferotemporal NRR thinning more typical of glaucoma. SSONH has four characteristic signs:

- Superior entrance of the central retinal artery
- Superior peripapillary halo
- Thinning of the superior peripapillary RNFL
- Superior disc pallor

FIGURE 1
Anomalous optic discs w/ superior insertion of the central retinal artery, a partial circumpapillary halo, pallor and thinning of the nasal (OD) and superonasal (OS) neuroretinal rim.

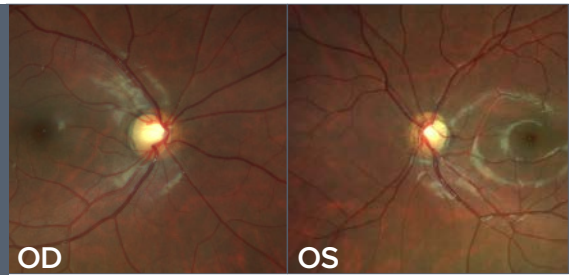


FIGURE 2
Optical coherence tomography (OCT) shows severe thinning of the RNFL superonasal OD and superior, nasal, and inferonasal OS.

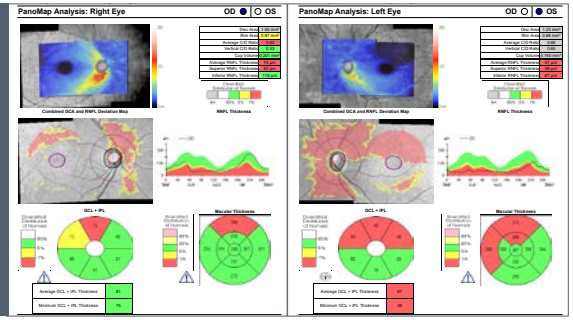
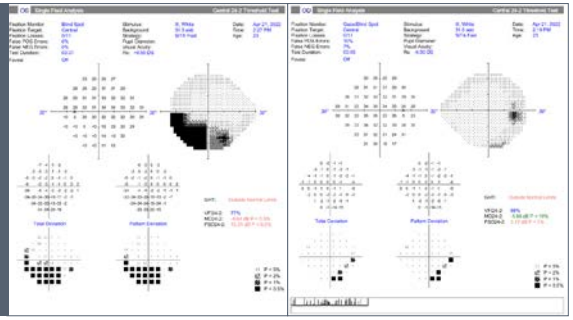


FIGURE 3
Corresponding inferotemporal VF defects OU. These defects were stable when compared to previous tests.



The presence of all four signs is variable; most studies require only two, in addition to non-progressive visual field loss. The optic nerves in this case show all four signs and visual field defects were stable compared to baseline tests. Additionally, in this case, the superonasal and nasal location of the RNFL thinning and sectoral pattern of VF loss is atypical of glaucoma which commonly shows RNFL thinning inferotemporally with nasal VF defects. Significantly thinner nasal RNFL is seen in SSONH compared to both glaucomatous and normal eyes, and the ratio of superonasal to superotemporal RNFL thickness may help differentiate from glaucoma.

To date, there are no established definitive diagnostic criteria that differentiate SSONH from glaucoma except for long-term stability of the optic disc and VF defect. However, familiarity with the common presentation and risk factors for SSONH can help improve diagnostic accuracy and reduce the morbidity of unnecessary, chronic treatment for a stable, congenital condition.

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Comparison of Optic Nerve Assessment with Stereo Disc Photographs and Optomap Ultra Widefield Scanning Laser Ophthalmoscope Images

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Daniel Roberts, OD, PhD, FAAO[1] • Christina Morettin, OD, FAAO[2] • Janice McMahon, OD, FAAO[1] • Michael Sinai, PhD[3]
Chicago, IL[1] • Toronto, ON[2] • San Diego, CA[3]

INTRODUCTION

In addition to direct clinical examination, paired stereo photos are traditionally considered the gold standard for documentation and assessment of the optic nerve. Optomap® images are ultra widefield scanning laser ophthalmoscope (UWF-SLO) generated red/green color photos covering approximately 80% of the entire retina including the optic disc and macula and extending beyond the vortex vein ampullae. The clinical utility of optomap® images for optic nerve assessment has not been evaluated previously.

This study aims to compare vertical cup-to-disc ratio (VCDR) in normal and glaucomatous eyes using paired stereo photos and optomap® images by trained clinicians.

FIGURE 1
Visucam image pairs were viewed in 3D with assistance of stereo viewer.

FIGURE 2
2D optomap image with annotation tool used to demarcate disc and cup margins.

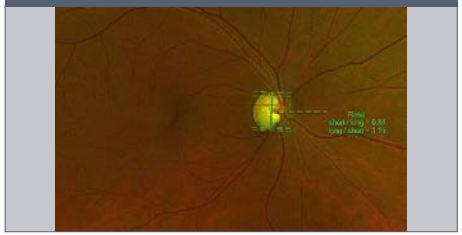


FIGURE 3A-3D
Estimated vertical cup-disc ratio (VCDR) show high correlation for each grader for optomap and the stereo photographs.

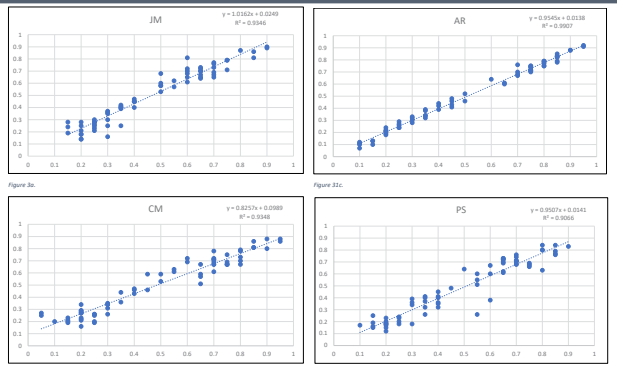
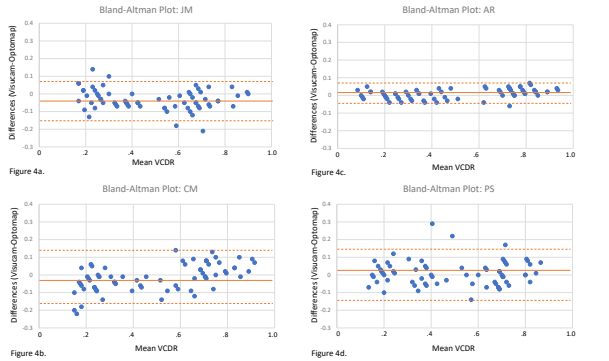


FIGURE 4A-4D
Estimated vertical cup-disc ratio (VCDR) show high correlation for each grader for Visucam stereo photos and optomap®. Mean differences within each grader were -0.03 (1a), -0.02 (1b), +0.01 (1c), +0.01 (1d).



METHODS

Thirty-five healthy eyes and 35 glaucomatous eyes were imaged with the Zeiss VISUCAM® PRO NM device using the offset feature to allow for stereoscopic viewing. On the same day, UWF-SLO images were captured on all participants using the Optos Monaco® device. Image quality was assessed prior to image grading, which was acceptable in all subjects. Images were de-identified and presented to 4 experienced clinician graders, masked to the diagnosis (normal vs. glaucoma). VCDRs were estimated with the aid of stereo viewers for the paired VISUCAM® PRO NM photos (Figure 1). VCDRs were calculated using the Ratio Annotation tool in the OptosAdvance® viewing software (Figure 2). Regression analysis and Bland Altman plots were used to compare the grading results.

RESULTS

Correlations were very high for each grader comparing the VCDR from the stereo photos and optomap images. R-square values were 0.94, 0.94, 0.99 and 0.91 for each of the four graders. Slopes were 1.02, 0.83, 0.96, and 0.95 for each grader Mean differences within each grader were -0.01, -0.01, +0.02, and +0.03 (Figure 4).

CONCLUSIONS

The strong correlations and small mean differences suggest that the optic nerve cup-to-disc assessment using optomap® images by experienced graders is essentially equivalent to assessment using 3D optic disc photos.

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Preganglionic Horner Syndrome as the Presenting Sign of a Presumed Parathyroid Adenoma

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BACKGROUND

Parathyroid glands:

- Small and oval-shaped and sit posterior to the thyroid gland.
- Lie just medial to the common carotid artery (CCA) in the neck.
- Typically, humans have four of them, two on each side.
- Release parathyroid hormone, which regulates calcium in the body.

Parathyroid adenomas (PTA):

- Benign growths that cause upregulation of calcium in the body.
- Typically diagnosed by blood tests showing elevated blood calcium levels.
- Cause an array of potential symptoms, including fatigue, depression, polydipsia, and polyuria.
- Most commonly affect middle-aged women.
- Can compress the CCA and the preganglionic/second order oculosympathetic fibers resulting in Horner syndrome (HS).
- HS has been reported as an uncommon complication of thyroidectomy, but rarely as the presenting sign of a thyroid or parathyroid neoplasm.

CASE DETAILS

- A 63-year-old man presented for a comprehensive eye examination complaining of blurry vision. He reported childhood blunt ocular trauma OS. When questioned, he initially reported that he thought the ptosis OS had been present for several years, but he was unsure. His medical history was significant for hypertension and benign prostatic hyperplasia.
- During the examination, it was noted that he had a 3mm ptosis of the upper left lid and a 1mm inverse ptosis of the left lower lid. Pupil examination revealed a 1.5mm anisocoria, with the left pupil being smaller. There was no iris heterochromia.

FIGURE 1
Superior and inferior ptosis and miosis OS

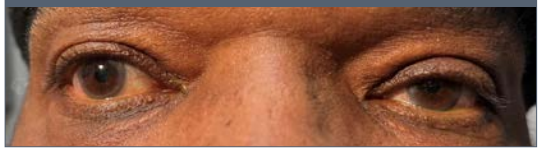


FIGURE 2
T1 coronal neck w/ contrast: T1 coronal neck MRI with contrast showing hyperintense parathyroid gland mass

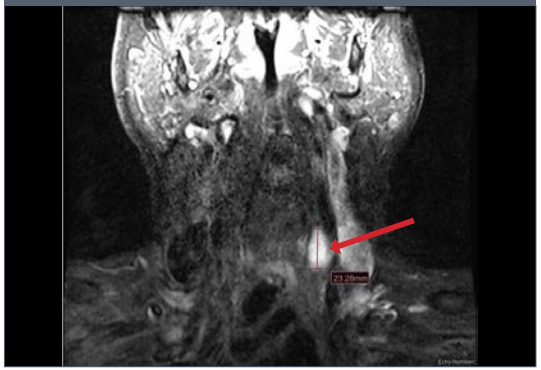
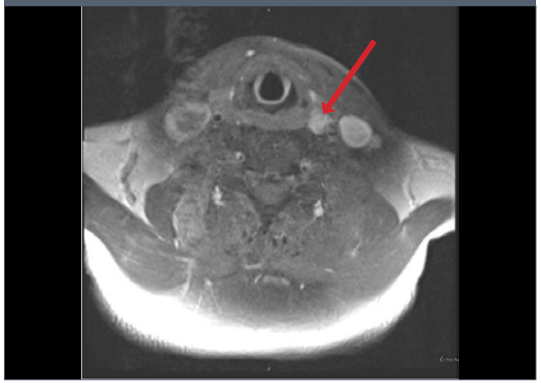


FIGURE 3
T1 axial neck w/ contrast: T1 axial neck MRI with contrast showing hyperintense mass adjacent to CCA



- Differential diagnosis at this time included traumatic lid/pupil abnormality, congenital HS, and acquired HS.
- In office apraclonidine 0.5% testing confirmed the diagnosis of HS since the anisocoria reversed when examined one hour after drop instillation OU.
- Since the patient had reported no localizing symptoms at this time, MRI with and without contrast was ordered for the head, neck, and chest in search of a lesion causing an acquired HS.
- Common causes of HS by location:
  - Central/first order: lateral medullary stroke, tumor, demyelination
  - Preganglionic/second order: apical lung tumor, trauma
  - Postganglionic/third order: carotid artery dissection, cavernous sinus syndrome, cluster headache
- Neck MRI revealed an enhancing mass emanating from the left parathyroid gland with compression of the adjacent CCA consistent with a parathyroid adenoma. Biopsy and tumor resection was planned.
- After the work-up, the patient reported chronic hypercalcemia of undetermined etiology. He also reported anhidrosis of the left side of his face.

SUMMARY

This case illustrates the rare finding of Horner syndrome as the presenting sign of a presumed parathyroid adenoma and the neuroimaging protocol for individuals with oculosympathetic paresis. While the patient's unclear case history initially pointed to possible traumatic cause of the findings, apraclonidine testing confirmed HS. Due to the patient's variable timeline of symptoms, a congenital HS was suspected. Due to a lack of localizing symptoms at the time of evaluation, a full work up was indicated to rule out pathology in each of the three oculosympathetic pathway neurons. Had the patient disclosed the hypercalcemia initially, then a more pinpointed work-up may have been possible. This shows the importance of a full review of symptoms. This case also demonstrates the importance of working up a patient thoroughly, even when a congenital cause is suspected.

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Intracranial Hypertension in a Transgender patient

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INTRODUCTION

Hormonal changes play a key role in the development and management of Intracranial Hypertension in the transgender population. This case highlights the role of transgender hormonal therapy in the pathogenesis of increased intracranial hypertension and discusses the clinical treatment and management.

CLINICAL FINDINGS

A 27yo transgender patient (born female, transitioning to male) presents with blurry vision OD x 2 months with constant pulsatile/ throbbing headaches and chronic tinnitus.

pOHx: High Myopia OU
FOHx: No glaucoma or blindness
PMHx: Chronic lower back pain, PTSD, Depressive Disorder, Obesity,
Height/ Weight: 62 in, 210 lbs, BMI: 38.49
Allergies: patient has answered NKA
Meds: Testosterone Cypionate inj soln, Cholecalciferol, Doxycycline Monohydrate, Hydrocortisone, Hydroxyzine, Melatonin, Mirtazapine, Prazosin, Sertraline

Clinical Exam:
BCVA: 20/30 PHNI OU
Pupil Testing: PERRL without APD OU
CVF, EOM, Slit Lamp: unremarkable
Posterior segment: 4+ disc edema with heme 360 OU, central macular thickening OD

Laboratory/ Radiology Studies:
Cirrus OCT Macula: sub-foveal fluid OU
Cirrus OCT RNFL: Edema OU
HVF 24-2: OD enlarged blindspot, inferior paracentral scotoma; OS enlarged blindspot
Labs: negative syphilis CIA, ANA, ACE, QuantiFERON gold, VZV, HIV, Lyme, NMO
MRI/ MRV: Papilledema and narrowing of bilateral distal transverse sinuses concerning for intracranial hypertension. No findings of venous sinus thrombosis.
LP: opening pressure 25 cm, CSF within normal limits

DISCUSSION

Intracranial hypertension (IH) is a condition that can cause optic disc edema due to increased intracranial pressure (ICP). The ICP can be secondary to intracranial mass; associated with medication use or when no underlying cause is identified, be idiopathic (IIH). Patients complain of headache, transient visual obscurations, chronic tinnitus, nausea and vomiting. IIH most commonly presents in young, obese women of childbearing age. The pathophysiology of IIH is complex but a link between IIH and androgen sex hormones and adipose tissue has been noted. Another proposed mechanism includes blockage of CSF absorption that may be secondary to transverse venous sinus stenosis.

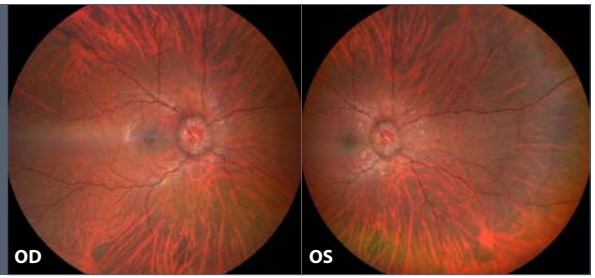


FIGURE 1
Fundus photo of initial presentation with optic disc edema with heme.

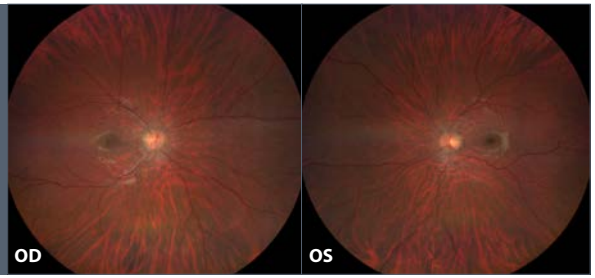


FIGURE 2
Fundus photo improvement of optic disc edema following ventriculoperitoneal shunt treatment.

FIGURE 3
OCT RNFL with optic nerve edema.

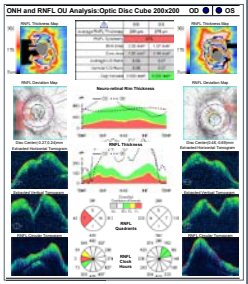
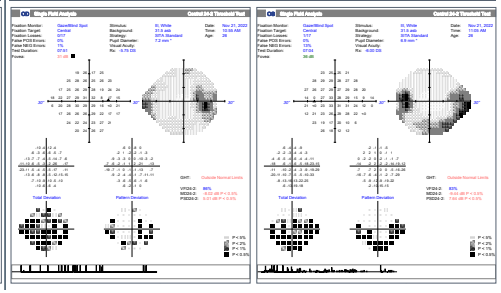


FIGURE 4
Two HVF 24-2: OD with enlarged blindspot, inferior paracentral scotoma; OS enlarged blindspot.



There have been multiple case reports of IH among female-to-male transgender patients after initiating testosterone therapy. These reports associate development of IH with hyperandrogenism.

The choroid plexus is a principle site of CSF production, regulated via metabolic pumps. A study on rats noted that testosterone increases activity in those pumps, resulting in elevated ICP. Additionally, women who have IIH have been found to have significantly higher CSF androstenedione concentrations, a precursor to testosterone. Others theorize that it is the aromatization of testosterone to estradiol, that causes a supra-normal concentration of testosterone. This is more common in injectable testosterone therapy.

Common manifestations for transgender patients with IH are predominantly headache (79% of cases), transient visual obscuration, pulsatile tinnitus and vision loss. These symptoms occurred concurrently with exogenous testosterone use in 89.5% of cases.

MANAGEMENT

While our patient technically fits the clinical profile for IIH, the potential role of testosterone use is important to consider as a causative agent. Treatment with Diamox was initiated. The patient was counseled on possible cessation of weekly testosterone injections, but declined. Diamox was ultimately unsuccessful and therefore, the patient underwent an emergency ventriculoperitoneal shunt. Visual acuity remains stable and the disc edema has significantly improved. The patient will continue to be monitored closely.

CONCLUSION

Transitioning transgender patients represent a population at risk for IH due to hormonal therapy. Reports note severe cases of IH for female-to-male transgender patients and a higher incidence with injectable testosterone. It is important to consider hormone therapy as a risk factor in transgender patients presenting with signs and symptoms of IIH. Treatment should include discontinuation of testosterone or switching from injection to oral or topical treatment if possible.

References: Available upon request

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The Effect of Blink Rate and Visual Setting on Tear Film Stability

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INTRODUCTION

Digital Eye Strain (DES) is a group of vision-related issues that are aggravated by prolonged screen use, with dry eyes being a common complaint. Previous research suggests that a reduced blink rate and poor visual setting may be associated with dry eye symptoms. The purpose of this study was to investigate the effect of blink rate and visual setting on the tear film stability in young adults aged 21 to 35 years.

METHODS

This study recruited 38 young adults from the Illinois College of Optometry. Each participant was asked to watch a 15-minute video in four different conditions in which a high or low blink rate was paired with an optimal or poor visual setting (Table 1). The optimal visual setting was a working distance of 60cm in photopic condition (Lux=200). The poor visual setting was a working distance of 30cm in scotopic condition (Lux=0). The high blink rate was defined as 20 blinks per minute and the low blink rate was 10 blinks per minute. In the high blink rate condition, participants were also instructed to blink fully. The blink rate was reinforced by metronome to ensure compliance. The four test conditions were randomized. Both the tear prism height and tear break up time (TBUT) were measured before and following each test conditions. The tear prism height was recorded using the OCULUS Keratograph 5M and tear break up time (TBUT) was measured with sodium (NaFl) fluorescein dye using slit lamp. Two-way repeated measures ANOVA was performed to determine whether blink rate and visual setting affected tear prism height and TBUT.

RESULTS

- The mean age (SD) of participants was 25.9 (2.9) years, ranged from 22.0 to 34.0 years. At baseline, the mean TBUT was 5.32 ± 4.76s and the mean tear prism height was 0.26 ± 0.07mm.
- TBUT was significantly reduced in the low blink conditions compared to the high blink conditions (F (1,37) = 4.50, P=.04). No difference in TBUT was found between poor and optimal visual settings. Tear.
- Prism Height was significantly increased in the poor visual setting compared to the optimal visual setting (F (1,37) = 5.35, P=.03). No difference in tear prism height was found between low and high blink rate. The changes in TBUT and tear prism height from baseline are listed in Table 2.

TABLE 1
Experimental Conditions and Parameters

Condition	Description
Optimal Visual Setting	60cm working distance, photopic condition (lux=200)
Poor Visual Setting	30cm working distance, scotopic condition (lux=0)
High Blink Rate	20 blinks per minute, instruction given to blink fully
Low Blink Rate	10 blinks per minute, no instructions given
Controlled Factors	Screen brightness (lux=300), Standard IEI Humidity, Viewing Angle 30° below eye level

TABLE 2
Change of TBUT and Tear Prism Height from Baseline (N=38, Mean ± SD) in Different Visual Settings and Blink Rates

Blink	Visual setting	TBUT (seconds)	Tear Prism Height (mm)
High	Optimal	-0.72 ± 2.62	0.02 ± 0.04
	Poor	-0.93 ± 2.47	0.03 ± 0.06
Low	Optimal	-1.50 ± 3.26	0.00 ± 0.04
	Poor	-1.25 ± 2.26	0.03 ± 0.06

Note: A positive value indicates an increase in value whereas a negative value indicates a decrease

FIGURE 1
The difference in TBUT from baseline was analyzed. TBUT was significantly lower in the conditions of a low blink rate compared to a high blink rate. TBUT was not significantly different due to changes in visual setting.

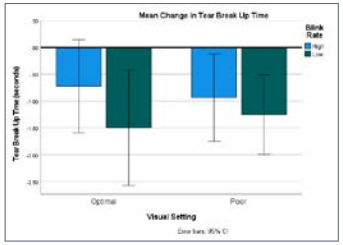
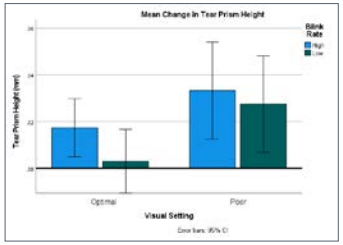


FIGURE 2
The difference in Tear Prism Height from baseline was analyzed. Tear Prism Height was significantly higher in the conditions of a poor visual setting compared to the optimal visual setting. Tear Prism Height was not significantly different due to changes in blink rate.



CONCLUSION

- Our findings suggest that tear break up time can be improved by a high blink rate (20 blinks/min) compared to a low blink rate (10 blinks/min).
- Interestingly, both an improper working distance (30cm) and inadequate ambient lighting (Lux=0) caused an increase in tear prism height, which could be a result of reflex tearing caused by the poor visual setting.

DISCUSSION

- Our previous study found that a reduced blink rate was not correlated with an increase in DES symptoms. Interestingly, our recent findings suggest that in the same time frame, a reduced blink rate leads to a reduced TBUT. This implies that while screen users may not be aware of the changes to their tear film stability, these changes can occur within 15 minutes. Over prolonged periods of screen use, these changes may culminate in symptoms of digital eye strain.
- In addition, our previous study found that during screen use, a poor visual setting was correlated with an increase in DES symptoms. The reporting of DES symptoms coincides with the tear meniscus height increase during the poor visual setting, suggesting that reflex tearing occurred. This is in contrast to the effects of a reduced blink rate.
- The tear reflex response may be correlated to many factors which may stress the visual system, including contrast sensitivity, glares and halos of the screen, depth of focus, and stresses to accommodation and convergence.

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Ptosis and Cranial Nerve VI Palsy Secondary to Relapse in Chronic Lymphocytic Leukemia

Jini V. John, OD • Christopher Bugajski, OD, FAAO • Robert Binkley, OD, FAAO • Mary Wittendorf, OD

Jackie Walorski VA Clinic, Mishawaka, Indiana

INTRODUCTION

Infiltrative etiology of relapsed chronic lymphocytic leukemia (CLL), while rare, should be considered in patients presenting with ocular manifestations of unknown origin with a history of systemic CLL diagnosis. This case demonstrates the clinical presentation, diagnostic testing and management of subsequent right cranial nerve VI palsy and ptosis related to CLL relapse.

CASE SUMMARY

Case History:

- 73-year-old Caucasian male
- **CC:** Diplopia on right gaze, UL ptosis OD
- **POH:** Optic neuropathy OD secondary to CLL infiltration
- **PMH:** CLL, hypertension, cerebral infarction, hypothyroidism
- **Meds:** Zanubrutinib, metoprolol, aspirin, clopidogrel, levothyroxine

Clinical Findings:

See Table 1.

Laboratory/Ancillary Testing:

See Table 2.

TABLE 1

Clinical exam findings, OD longstanding and stable APD and optic nerve pallor secondary to initial CLL diagnosis, while temporal EOM restriction and upper lid ptosis new onset secondary to CLL relapse

Exam Findings	OD	OS
VA	20/25	20/20
Pupils	2+ APD	PRRLA
EOMs	Temporal restriction	FROM
Lids	UL ptosis	Normal
Optic Nerve	0.20r, 2+ pallor	0.20r, normal appearance

TREATMENT & MANAGEMENT

This patient had a full work up along with ancillary testing such as lab work, neurological imaging and flow cytometry of CSF obtained from lumbar puncture. Treatment for CN VI palsy involves treating the underlying etiology and managing symptoms of diplopia if applicable. Stability is necessary to consider prism as an option to reduce diplopia. This patient was being monitored for any further neurological changes, however complete resolution of symptoms occurred within a few weeks time. Management with an oncologist is necessary to treat the underlying condition of CLL. Due to the recurrent nature of CLL, it requires use of a chemotherapeutic agent such as zanubrutinib to be established in a long-term treatment regimen to inhibit the proliferation of malignant lymphocytes. The patient's response to therapy resulted in rapid improvement in ptosis.

TABLE 2

Results from pertinent lab work , ancillary testing in office, neuroimaging, and lumbar puncture . OCT thinning with corresponding HVF defect, both longstanding and stable (see Figures 1 & 2).

Testing / Imaging	Results	
Lab work	WBC: 51.51 x 10(3)/mm3 [Critical]	
OCT	OD: longstanding superonasal and temporal thinning	OS: Normal
HVF	OD: longstanding inferotemporal defect	OS: Normal
CT Scan	Clear	
MRI	Clear	
Lumbar Puncture (Flow cytometry of CSF)	No significant lymphoid immunophenotypic abnormalities	

Figure 1

OD OCT results displaying superonasal and temporal thinning secondary to initial CLL diagnosis, no changes noted with CLL relapse.

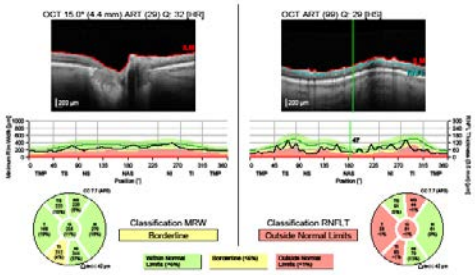
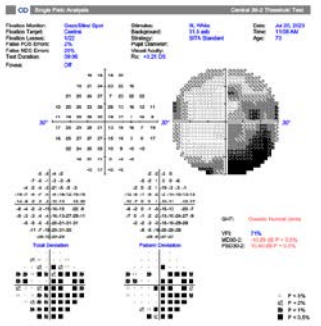


Figure 2

OD HVF results displaying inferotemporal defect secondary to initial CLL diagnosis, no changes noted with CLL relapse.



DISCUSSION

Chronic lymphocytic leukemia is a proliferative condition where a malignant neoplasm of the bone marrow causes abnormal WBC production which can lead to infiltration of other tissues and organs. It is the most common proliferative hematologic disorder in the western world, most frequently affecting males 70-80 years old. Ocular involvement may occur at any time throughout the course of CLL and can precede the diagnosis. Direct leukemic infiltration of the central nervous system can present with neuro-ophthalmic signs such as cranial nerve palsies, optic neuropathy, and papilledema. Indirect mechanisms include immunosuppression, thus increasing susceptibility to infections, or hematological factors such as anemia, thrombocytopenia, or hyperviscosity of the WBC leading to increased intracranial pressure, hemorrhaging, or ischemia of ocular tissues. It is important to recognize the various possible ocular presentations related to CLL to allow for appropriate management.

CONCLUSION

Neuro-ophthalmic presentation always needs a full work up and appropriate ancillary testing. If there's a systemic history of CLL coinciding with pathology involving the ocular musculature like CN palsies, then CLL relapse through infiltration of the orbit should be considered a possible etiology. Co-management with oncology is necessary to provide adequate treatment and management of underlying systemic disease which subsequently may provide improvement in the patient's ocular manifestations.

BIBLIOGRAPHY

Available upon request.

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Hamar Time: Subtle Presentation of Combined Hamartoma of Retina and RPE

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INTRODUCTION

Combined Hamartoma of Retina and RPE can be challenging to diagnose due to its varying clinical appearance and rarity in clinical occurrence. Therefore, ancillary testing is important for making the proper diagnosis and management protocol.

CASE HISTORY

48 year old black female presents for evaluation of refractive status due to blur at near with spectacles. Patient reports no other complaints. Her past ocular history consists of hypertensive retinopathy grade 2 OU. Patient's medical history remarkable for sleep apnea, hypertension, and removal of lipocarcinoma.

CLINICAL FINDINGS

	OD	OS
VA cc	20/20	20/20
Cover Test	Orthophoria	Orthophoria
Anterior Ocular Health	**unremarkable**	**unremarkable**
Dilated Fundus Exam	Pink and distinct optic nerve, attenuation of blood vessels and A/V nicking	Pink and distinct optic nerve with overlying glial tissue nasally, attenuation of blood vessels and A/V nicking, retinal tissue overlying retinal vasculature of superior temporal arcade
OCT	Unremarkable, no pathology noted	Scan of superior temporal arcades reveals inner retinal thickening with an overlying epiretinal membrane and vitreous traction

DISCUSSION

Combined hamartoma of the retina and RPE (CHRRPE) is a rare, benign lesion arising from the malformation of the neurosensory retina, RPE, and vitreous with glial, vascular, and melanocytic tissue. CHRRPE is usually diagnosed in pediatric patients with reduced vision or strabismus but can be incidentally found in older asymptomatic patients as in our case.

FIGURE 1
Fundus photo, OD, depicting pink and distinct optic nerve, macula with no pathology, and attenuated blood vessles with A/V nicking

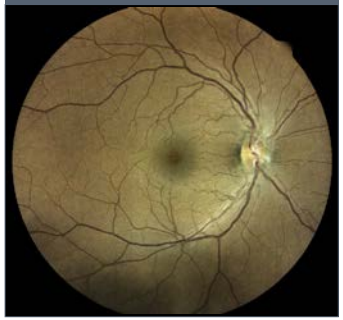


FIGURE 2
Fundus photo, OS, showing retinal tissue overlying the superior temporal arcades, A/V nicking, and attenuated blood vessel.

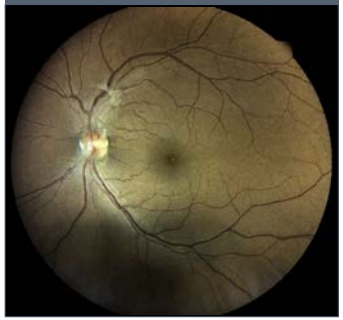


FIGURE 3
OCT reveals disorganized retinal tissue, inner retinal thickening with overlying vitreous traction and overlying ERM

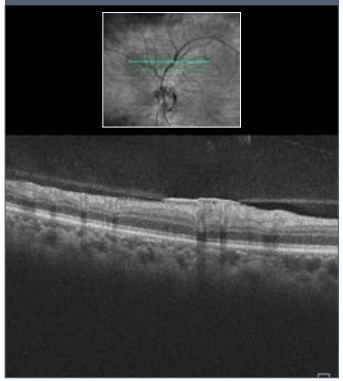
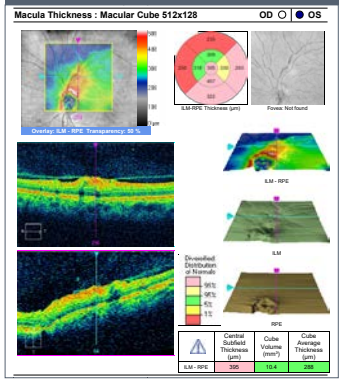


FIGURE 4
Thickness map demonstrating 395 um of retinal thickening



In fundus examination, CHRRPE can present in a multitude of fashions with various locations and varying degrees of elevation, pigmentation, and overlying glial tissue which may lead to retinal distortion. OCT imaging of CHRRPE consists of varying amounts of thickened and disorganized retinal and preretinal tissue, epiretinal membrane (ERM), and no evidence of choroidal involvement. Subtle white retinal tissue overlying the superior temporal arcades (Figure 2) mimicked the presentation of an ERM in this patient. However, due to patient's age and the unusual location, and OCT imaging results (Figure 3), CHRRPE was the likely diagnosis.

MANAGEMENT

Due to the mild presentation and location of the CHRRPE, the patient was asymptomatic. CHRRPE can progress and lead to ocular complications such as reduced vision (if macula is involved), ERM formation, and retinal holes. Rarer complications include choroidal neovascular membrane, retinal neovascularization, and retinal detachment. Pediatric patients are at a risk of developing amblyopia and strabismus due to these. While no formal guideline for follow-up exists, some literature suggests that any lesion within a zone that extends 1.5 mm from the optic disk and perifovea be evaluated every 3-4 months. Lesions in the equator can be monitored every 6 months, and lesions anterior to the equator can be followed up every 6-12 months. Surgical treatments for ERMs can be considered if significant and macula involving with appropriate treatment being reserved for rarer complications. This patient had no visually threatening retinal complications; hence, a 6-month follow-up was deemed adequate.

CONCLUSION

Due to its many forms of presentation, CHRRPE can be difficult to diagnose. Although mostly benign, an accurate diagnosis is paramount, as it can lead to many ocular sequelae which can cause reduced vision and/or strabismus. Proper evaluation with multimodal imaging is important to ensure adequate follow up and timely intervention if necessary.

BIBLIOGRAPHY: Available upon request

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Serous Macular Detachment in a Patient with Isolated Optic Disc Coloboma

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SUMMARY

A patient with optic disc coloboma experienced a serous macular detachment. Treatment includes monitoring, medications, or laser to decrease the duration of condition. Optic disc anomalies should be monitored closely for detachments and sub-retinal fluid.

CASE HISTORY

A 26-year-old African American female presents with sudden onset blur and metamorphopsia OD. Patient has a known history of optic disc coloboma OD and >30pd CRXT. Pertinent medical history includes Sjögren's Syndrome, with no systemic treatment and ocular symptoms that are treated with artificial tears. Pertinent exam findings in Table 1.

DIAGNOSIS

Serous macular detachment secondary to isolated unilateral optic disc coloboma

TABLE 1
Exam Pertinent Findings

Exam Pertinent Findings		
OD	Eye	OS
20/100	VA	20/20
(+) APD	Pupils	(-) APD
FTFC	CVF	FTFC
FROM	EOMs	FROM
>30pd CRXT	Cover Test	Ortho
TBUT < 10 seconds, 1+ diffuse PEE	Slit Lamp Exam	TBUT < 10 seconds, 1+ diffuse PEE
See Figures 1 and 2	Fundus Examination	WNL
See Figures 3 and 4	Imaging	WNL

FIGURE 1
Optic disc coloboma with subretinal fluid involving the macula OD on Optos

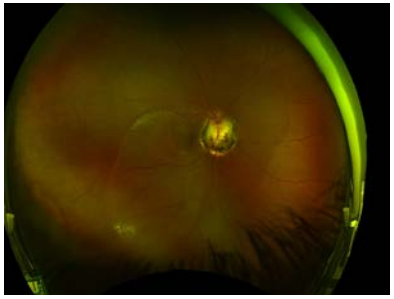


FIGURE 2
Large, well-demarcated area of subretinal fluid temporal and interior temporal to disc involving the macula on FAF

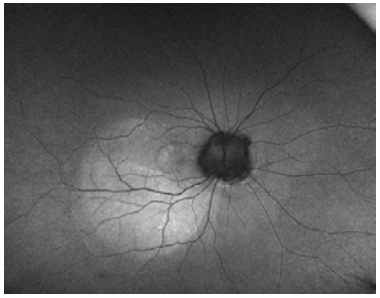


FIGURE 3
Optic disc coloboma OD on FA – no leakage noted in macular area

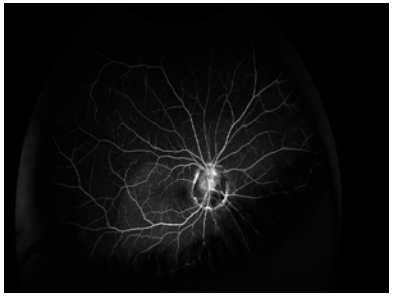
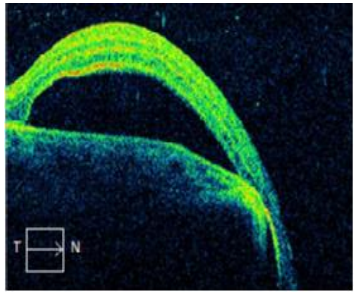


FIGURE 4
Serous detachment of OD on macular OCT



TREATMENT AND MANAGEMENT

Treatment is variable. Some cases of serous macular detachment self-resolve within 6 months, while chronic or recurrent cases may require further intervention. Laser treatment, such as barrage laser photocoagulation, as well as oral carbonic anhydrase inhibitors (CAIs) like acetazolamide, have been shown to decrease the duration of active disease.

The patient elected to monitor the condition for improvement. Upon 6-month follow-up, BCVA OD improved to 20/50, but distortion and size of serous detachment remained stable. The patient has since chosen to start acetazolamide 500mg bid PO and will be returning for close follow up.

DISCUSSION

Optic disc coloboma is a congenital abnormality linked to defective closure of the optic fissure by the seventh week of fetal development. The peripapillary retinal tissue surrounding the coloboma is noted to be thinner or atrophic, increasing the possibility of subretinal fluid buildup from cerebrospinal fluid or vitreous. Though the origin of the fluid is highly debated, there is evidence that due to the anomalous nerve fiber orientation, fluid could leak from the atrophied laminar edge of the optic nerve or through the coloboma of the disc itself and pool into the macular space, causing a serous detachment.

CONCLUSION

Patients with congenital optic nerve anomalies such as optic disc coloboma and optic disc pit should be monitored closely by eye care providers due to increased risk of retinal detachments. Regular dilated eye exams, as well as optic nerve and macular imaging, are crucial to monitor for any breaks that can cause fluid leakage into the retina. Patients should be educated on signs and symptoms of retinal detachments and acute maculopathy that should be monitored with a home Amsler grid.

REFERENCES

Available upon request.

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The effect of stimulus duration on contrast sensitivity in the inferred magnocellular visual pathway after flicker adaptation

Xiaohua Zhuang, PhD, FAAO; Clara Hong, OD; Eric Cui, OD

1. INTRODUCTION

Human psychophysical studies showed that after adapting to a flickering stimulus, the contrast sensitivity in the magnocellular visual pathway was temporarily reduced [1, 2]. This desensitization effect has been reported on subjects of various ages [3].

PURPOSE: The current study investigates the temporal characteristic of this desensitization effect with various stimulus durations.

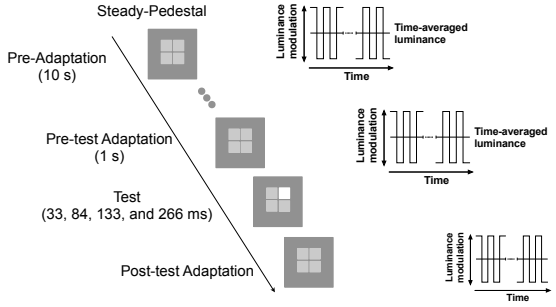
2. METHODS

Observers: Five subjects aged 20 - 30 yrs with normal vision were tested.

Stimuli: The steady-pedestal paradigm was used [4]. A pedestal of four 1°x1° squares with a predefined luminance (15.0, 16.86, 18.88, 21.19, or 23.77 cd/m^2) was presented in a background at 15.0 cd/m^2.

Apparatus: An apple computer and a 21" NEC CRT monitor.

Paradigm:



Task and Threshold Estimation: To identify the test square that differs from the other three in a 4AFC double-random staircase procedure, with the average of last six reversals taken as the estimate of contrast threshold.

Adaptation Condition:

- **Non-flicker:** Steadily present pedestal at a predefined luminance (15.0, 16.9, 18.9, 21.2, or 23.8 cd/m^2).
- **Flicker:** 7.5 Hz square-wave luminance modulated pedestal at a time-averaging luminance of 15.0 cd/m^2 and 50% contrast.

Test Duration: 33, 84, 133 and 266 ms.

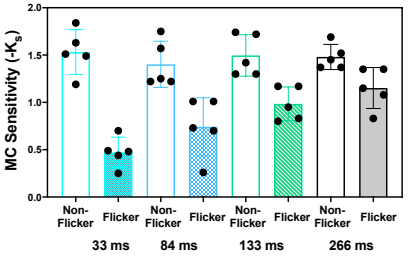
3. RESULTS

Analysis:

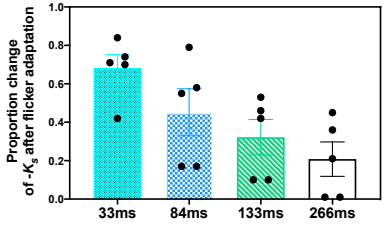
(1) Steady-pedestal model based on primate physiology findings [4, 5] :

- $\log(\Delta I) = K_s + \log(I)$
- $-K_s$: the log sensitivity of the MC-pathway

(2) Linear mixed model was used to analyze the effects of Adaptation Condition, Test Duration, and their interaction on contrast sensitivity in the magnocellular pathway.



Contrast sensitivity by Test Duration by Adaptation Condition



Desensitization effect by Test Duration

Results:

(1) the main effect of Adaptation Condition was significant (p<0.001), indicating reduction of contrast sensitivity from flicker adaptation; and
(2) the main effect of Test Duration was significant (p=0.003); and
(3) the interaction effect was significant (p=0.001), showing a larger desensitization effect with a shorter test duration.

4. CONCLUSION

Contrast sensitivity is significantly reduced in the magnocellular pathway after flicker adaptation, and the magnitude of contrast sensitivity loss various with different stimulus duration. A shorter stimulus duration shows a more pronounce temporal loss of contract sensitivity in the magnocellular pathway after flicker adaptation.

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Diagnostic efficacy of a modified risk calculator based on the Ocular Hypertension Treatment Study (OHTS)

#230

Chaglasian, Michael[1]; Tokhmakhian, Ani[1]; Patel, Himanee[1]; Koepke, Macy[1]; Durbin, Mary[2]; Lee, Christopher[2]
1. Illinois College of Optometry, Chicago, IL, United States. 2. Topcon Healthcare, Oakland, NJ, United States.

INTRODUCTION

The OHTS risk calculator was developed and validated [1,2] to estimate the risk of developing primary open angle glaucoma for ocular hypertensives (OHT). The OHTS calculator was developed before the regular clinical use of spectral domain optical coherence tomography (OCT). The purpose of this study was to evaluate a glaucoma risk calculator modified to include OCT data.

METHODS

The OHTS calculator Point System method was modified to assign points for circumpapillary retinal nerve fiber layer (cpRNFL) thickness based on Maestro2 (Topcon, Inc., Tokyo, Japan) OCT measurements (average of both eyes) rather than subjective evaluation of the vertical cup-to-disc ratio.

Points were assigned as follows:

- 0 points if cpRNFL > 90 µm,
- 1 point if 85 µm < cpRNFL <= 90 µm,
- 2 points if 83 µm < cpRNFL <= 85 µm ,
- 3 points for 83 µm <= cpRNFL > 80 µm, or
- 4 points if cpRNFL <= 80 µm.

The remaining elements of the points system were used as follows:

- Age
- Central corneal thickness (CCT)
- intraocular pressure (IOP) (using Goldman and/or NCT); the pre-treatment IOP was used when available
- pattern standard deviation (PSD) from visual field measurements (from HFA SITA-Fast or IMOvifa AIZE-R).

Although the OHTS calculator was developed to predict the 5-year conversion from OHT to POAG, we tested the ability to distinguish normal subjects and patients with suspected glaucoma from patients diagnosed with glaucoma in a convenience sample from the Illinois College of Optometry (ICO) and the Topcon Healthcare Innovation Center (THINC).

Subjects were excluded if they had other diagnoses besides glaucoma, if they had a poor-quality OCT scan or the TopQ score was less than 25 for either eye, or if any of the required elements for OHTS was missing for either eye.

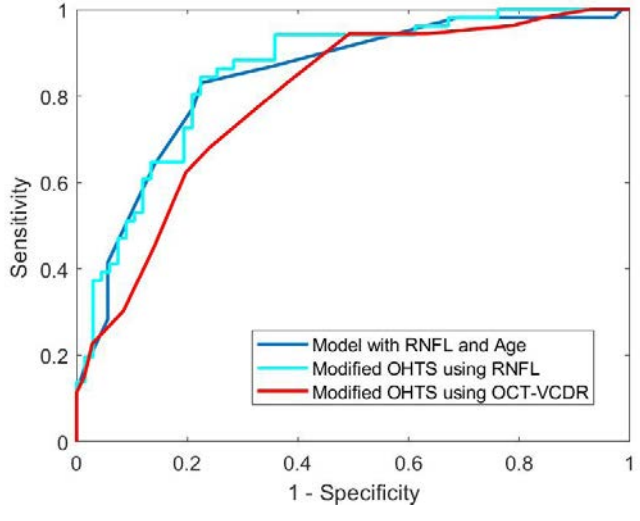
An additional evaluation was done using the VCDR measured from the Maestro2 OCT wide field scan. This was included in place of the clinician assessment of VCDR from a fundus photo or clinical examination.

RESULTS

118 subjects were included (54 glaucoma, 36 suspects, 28 normals)
Mean age was 61.6 (+/1 10.6), 59.9 (+/- 16.3) and 60.3 (+/- 7.8)
74 were African American, 21 were Caucasian and 10 were other ethnicity
76 were female, 48 male
Mean IOP was 15.9 for both eyes, pre-treatment IOP was 19.4 and 18.9 for the 63 eyes that had these measurements.

AUC for OHTS-RNFL is:	0.84	(CI: 0.75	0.90)
AUC for OHTS-VCDR is:	0.79	(CI: 0.70	0.86)
AUC for RNFL with Age is:	0.86	(CI: 0.78	0.91)

FIGURE 1
Receiver operating characteristic curves for three methods.



CONCLUSION

Modifying OHTS using OCT data in this small population performed similarly to a simple model using Average RNFL thickness at distinguishing eyes with glaucoma from those that were normal or suspected of glaucoma.

Although the OHTS model was developed in a specific population with specific predictive goals, it may be possible to extend or expand it to answer new questions related to the management of glaucoma.

This study was not able to identify a significant value of the OHTS calculator over OCT for this purpose.

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[2] Ocular Hypertension Treatment Study (OHTS) Group, European Glaucoma Prevention Study Group. Validated Prediction Model for the Development of Primary Open-Angle Glaucoma in Individuals with Ocular Hypertension. Ophthalmology 2007; 114(1):10-9. PMID: 17095090. PMCID: PMC1995665.

COMMERCIAL RELATIONSHIPS

Michael Chaglasian: Commercial Relationship(s); Code C (Consultant/Contractor):Topcon Corporation | Ani Tokhmakhian: Commercial Relationship: Code N (No Commercial Relationship) | Himanee Patel: Commercial Relationship: Code N | Macy Koepke: Commercial Relationship: Code N | Mary Durbin: Commercial Relationship(s); Code E (Employment):Topcon Corporation | | Christopher Lee: Commercial Relationship(s);Code E

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Scleral lens design and patient-reported mid-day fogging

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SCOPE
Scleral Lenses in Current Ophthalmic Practice Evaluation

BACKGROUND

It has been estimated that up to 46% of scleral lens (SL) wearers report mid-day fogging (hazy or cloudy vision) after a few hours of lens wear.

There have been multiple factors suggested that contribute to mid-day fogging including inflammation, particulate material in the post-lens fluid reservoir, poor surface wettability, increased tear exchange, and inadequate lens fitting characteristics.

There is a general lack of consensus regarding the role scleral lens design contributes to this phenomenon.

PURPOSE

The purpose of this study was to identify if there are differences in SL design features in patients reporting fogging versus patients not reporting fogging.

METHODS

- Established SL wearers (> 6 months SL wear with current lens design) were recruited during follow-up examinations at two practice locations and consented to participate in the study.
- Participants wore SLs for a minimum of 2 hours prior to the visit.
- The following data were collected:
  - SL diameter
  - Scleral lens landing zone design
  - Presence or absence of plasma treatment
  - Presence or absence of hydra-peg
- Descriptive statistics are reported for foggers (participants reporting fogging) and non-foggers (participants who did not report fogging).

RESULTS

Foggers:
- Average Scleral Lenses diameter: 17.4 + 1.2mm (range 15.6-19, n=24)
- Scleral Lenses Haptic Designs:
  - Spherical: 20% (9/46)
  - Toric: 21% (10/46)
  - Quadrant-specific: 59% (27/46)
- Scleral Lenses Treatment:
  - Plasma treatment: 60% (25/42)
  - Hydra-PEG: 40% (17/42)

Non-foggers:
- Average Scleral Lenses diameter: 17.5 + 1.3mm, (range 15-19, n=19)
- Scleral Lenses Haptic Designs:
  - Spherical: 8% (3/37)
  - Toric: 27% (10/37)
  - Quadrant-specific: 65% (24/37)
- Scleral Lenses Treatment:
  - Plasma treatment: 30% (10/34)
  - Hydra-PEG: 70% (24/34)

FIGURE 1
Scleral Lens Diameter for Foggers and Non-foggers

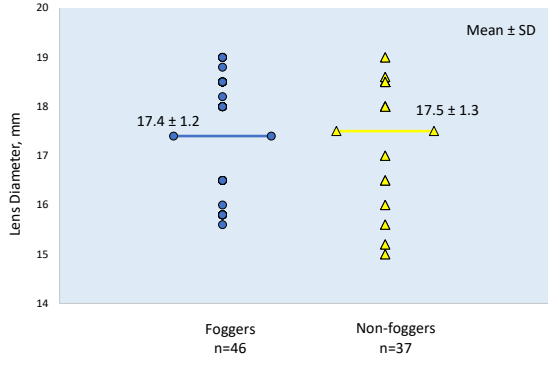


FIGURE 2
Scleral Lens Haptic Designs for Foggers and Non-Foggers

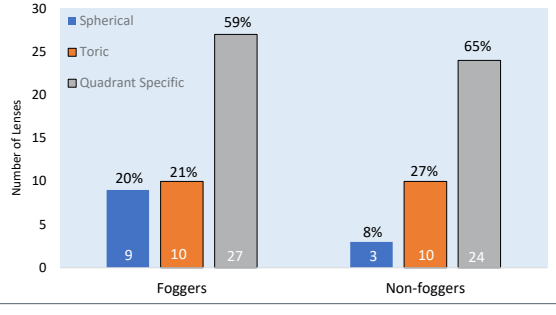
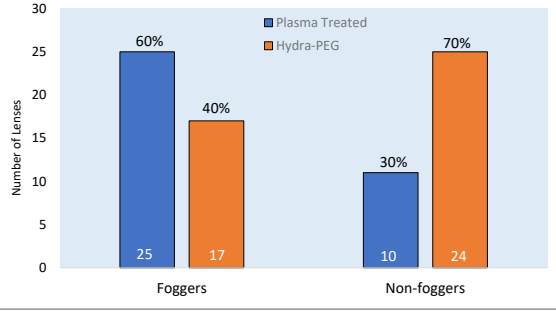


FIGURE 3
Scleral Lens Treatment for Foggers and Non-Foggers



CONCLUSIONS

- SL diameter and haptic designs were similar between foggers and non-foggers.
- More non-foggers had Hydra-PEG coating on their SLs compared to foggers, suggesting that poor surface wetting may contribute to this phenomenon more than SL design.

DISCLOSURES

None: (C. Nau and M. Schornack, and K. Patton)

J. Harthan: (F) Art Optical, Bausch and Lomb, Kala Pharmaceuticals, Ocular Therapeutix, Metro Optics, SynergEyes; (C) Euclid Systems, International Keratoconus Academy, Johnson & Johnson Vision, Metro Optics, SynergEyes, Visioneering Technologies Inc.

E.Shorter: (F) Johnson & Johnson, BostonSight, Contamac, Art Optical, SynergEyes

J. Fogt: (C) Alcon, Contamac, and TearOptix; (F) Alcon, Contamac, EyeNovia, Innovega, Nevakar, Bausch + Lomb, Cooper Vision, and Interojo

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Duration of viral load, clinical signs, and symptoms in qPCR-confirmed adenoviral conjunctivitis

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1 Illinois College of Optometry; 2 Carl Vinson VA Medical Center; 3. Illinois Eye and Ear Infirmary University of Illinois at Chicago; 4 The Ohio State University College of Optometry; 5 Washington University School of Medicine; 6 Rocky Mountain University of Health Professions; 7 University of California Berkeley School of Optometry; 8 Fort Sam Houston; 9 Yale School of Medicine.

BACKGROUND

- The proportion of infectious conjunctivitis cases that have viral etiologies is estimated to be as high as 80%, with most viral infections attributed to adenoviruses.
- Although generally self-limiting, the duration of adenovirus conjunctivitis (Ad-Cs) has not been fully elucidated.

PURPOSE

The purpose of this report is to evaluate the duration of detectable viral titers, and the persistence of clinical signs and symptoms of adenoviral conjunctivitis in untreated patients after viral titers are no longer detectable by polymerase chain reaction (PCR).

METHODS

- Individuals ≥18 years with red eye symptoms of 4 days or less.
- Enrolled in a double-masked, randomized clinical trial of the safety and efficacy of a single, in-office administration of 5% povidone iodine (Reducing Adenoviral Patient Infected Days, RAPID, study).
- Only participants in the control arm (in-office saline lavage and prescribed at-home artificial tears) who tested positive by both point-of-care immunoassay antigen and qPCR testing are included in this report.
- Participant-reported symptoms, clinician-graded signs, and PCR-determined viral titers were evaluated at baseline, days 1-2, 4, 7, 14, and 21.
- At each visit, participants rated 10 symptoms on a scale of 0 (not at all bothersome) to 10 (very bothersome): tearing, eyelash matting, burning, itching, gritty/sandy, eyelid swelling, redness, blurred vision, sensitivity to light, and overall discomfort.
- At each visit, clinicians graded 7 clinical signs on a scale of from "0" (absent) to "4" (severe): serous discharge, bulbar redness, mucoid discharge, eyelid edema, eyelash matting, bulbar edema, and conjunctival follicles.

RESULTS

- 212 participants were screened.
- 28 participants tested positive at baseline for Ad-Cs with both point-of-care immunoassay testing and qPCR.
- These 28 participants were randomized to treatment with PVP-I (n=16) or to the saline control group (n=12).
- All participants in the saline control group who completed follow-up examinations at day 1-2 (9 of 9) and day 4-5 visit (8 of 8) had detectable virus.
- On day 7, 56% (5 of 9) had detectable viral titers.
- By day 14 the majority (75%, 6 of 8) of participants had no detectable viral titers.
- By day 21, no participant had detectable viral titers (0%, 0 of 7).
- On day 21, several participants reported blurry vision (5 of 7), discomfort (2 of 7) or redness (1 of 7), see Figure 1.
- On day 21, masked clinicians noted conjunctival redness and follicular conjunctivitis (4 of 7) as well as bulbar edema (3 of 7), see Figure 2.

FIGURE 1
Distribution of patient-reported symptoms of redness, overall discomfort and blurry vision.

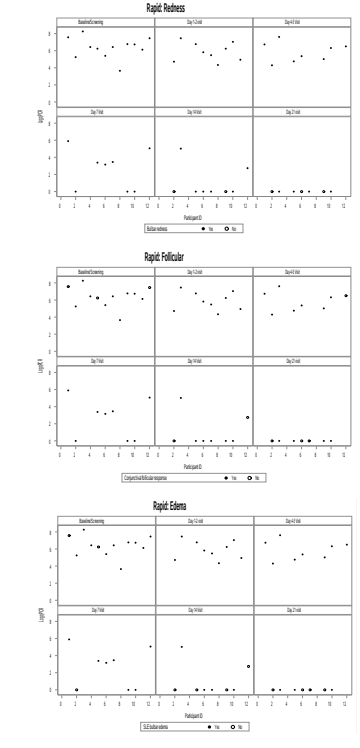
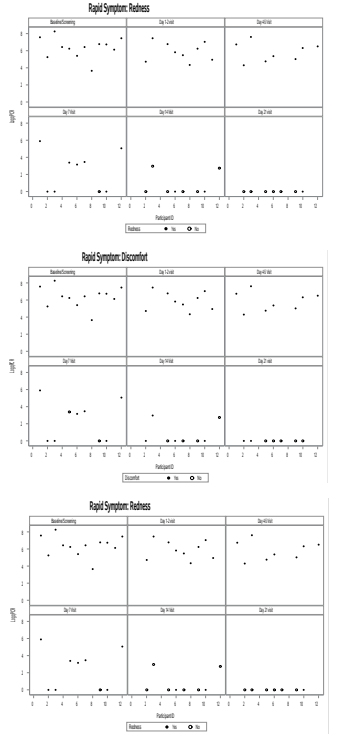


FIGURE 2
Distribution of clinician-graded signs of conjunctival redness, follicular conjunctivitis and bulbar edema.



DISCUSSION

- Adenoviral conjunctivitis is highly contagious and outbreaks often occur in close and crowded settings. Infected individuals are often isolated from others in order to prevent transmission of adenovirus conjunctivitis.
- The absence of symptoms and signs is often used by clinicians to determine the duration of patient quarantine; however, there is little data to support the validity of signs and symptoms as evidence of viral clearance.
- The results of this study suggest that clinical signs and symptoms of adenoviral conjunctivitis can be highly variable.
- These findings suggest that the use of clinical signs and symptoms to set the duration of the quarantine period could result in patients being furloughed longer than necessary and may cause excessive economic impact.
- This study demonstrates the usefulness of PCR in making an accurate diagnosis and highlights the importance of the development of an inexpensive, rapid PCR test for management of adenoviral conjunctivitis.

CONCLUSIONS

Several participant-reported symptoms and clinical signs persisted after viral titers were no longer detectable by qPCR. Hence, using symptoms and signs to determine the length of school or work furlough may unnecessarily be longer than needed.

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Clinicaltrials.gov: NCT02472223

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A Longitudinal Study of Refractive Error Changes in Hispanic and Black Children over 4 Consecutive Years

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3241 South Michigan Avenue, Chicago, Illinois 60616

PURPOSE

In a cross-sectional study based on a young cohort (0.5 to 6 years old), MEPEDS reported a higher prevalence of astigmatism in Hispanic children as compared to Black children (MEPEDS group, 2011). The purpose of this study was to assess change in refractive errors over 4 consecutive years in Hispanic and Black children aged from 2 to 15 years.

METHODS

- Two groups of participants (total N=485, 2 to 15 years old):
  - Non-Hispanic Black: N=310
  - Hispanic/Latino: N=175
- The follow-up duration was up to 4 years.
- A linear mixed-effect model was used to estimate the rate of individual development for SEQ and each ocular component and, and to compare the 2 groups.
- Children aged 2 to 15 years old who had a comprehensive eye exam in 4 consecutive years and had a cycloplegic auto-refraction in yearly exam were filtered for the study.
- Cycloplegia was induced with one drop of 1% tropicamide and 2.5% phenylephrine hydrochloride and two drops of 1% cyclopentolate (5-min apart). After 30 minutes of cycloplegia, auto-refraction was measured using either Canon R-F10 or Topkon KR-800.
- Cycloplegic refraction was recorded in conventional form as a sphere, cylinder, and axis. Sphere and cylinder were converted into the spherical equivalent (SEQ) value: SEQ = sphere + 0.5*cylinder. Astigmatism was estimated in the magnitude of cylinder and power vector (J0 and J45). SEQ in the right eye was used to estimate refractive error; CYL, J0, and J45 were used to estimate astigmatism; the absolute value of interocular SEQ difference was used to estimate anisometropia.
- The annual change in SEQ, CYL, J0, and J45 over 4 years was analyzed. Mixed linear model was used to analyze the longitudinal change over time.

TABLE 1
Demographic Characteristics of the Participants (N = 485)

Gender	Number of Subjects (%)
Female	279 (57.5%)
Male	206 (42.5%)

Race	Number of Subjects (%)
Non-Hispanic Black	310(64%)
Hispanic/Latino	175 (36 %)

Initial Age (years)	
Range	2.4 – 15.0
Mean (SD)	8.7 (2.9)

Baseline Refractive Error (SE)	Number of Subjects (%)
Myopia (≤ -1.00 D)	144 (30%)
Emmetropia (-1.00 to +1.00 D)	193 (40%)
Hyperopia (≥ 1.00 D)	148 (30%)

FIGURE 1
Boxplot results of SEQ, CYL, J0 and J45 in the Black and Hispanic groups. The red color indicates the Black group; the cyan color indicates the Hispanic group.

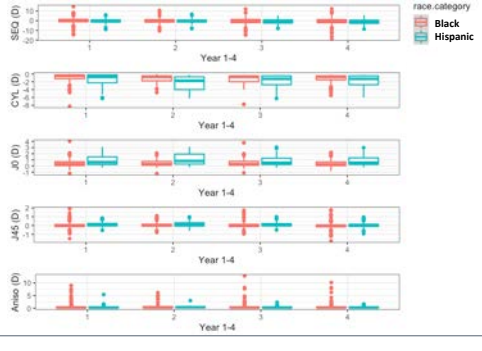
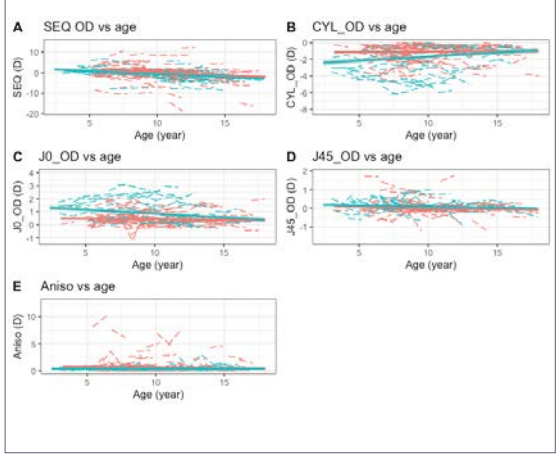


FIGURE 2
SEQ, CYL, J0, J45 of each participant and the best-fit models for the Black and Hispanic groups. The red color indicates the Black group; the cyan color indicates the Hispanic group. The dash lines indicate individual longitudinal data; the solid line indicates the best-fit linear model for each group. The shaded areas indicate 95% confidence intervals.



RESULTS

- At the baseline exam for the cohort in the study the prevalence of myopia, emmetropia, and hyperopia was 30% (n=144), 40% (n=193), and 30% (n=148) respectively.
- SEQ in the Black children was not significantly different from SEQ in Hispanic children (0.10± 2.92D vs -0.37±2.05D, P=0.06); However, Hispanic children had significantly higher degree of astigmatism than Black children (Hispanic: -1.84± 1.55D vs Black: -1.13±1.08D, P<0.001). The differences in astigmatism was seen in both J0 and J45 (P<0.05); Hispanic children had more with-the-rule and oblique astigmatism than the Black children.
- Anisometropia was statistically significantly higher in Black children than in the Hispanic (Black: 0.56±1.11D vs Hispanic: 0.35± 0.48D, P<0.05).
- In the 4th year visit, SEQ slightly decreased for both groups. As in **Figure 1**, SEQ changed -0.23D/year for both groups (statistically significant, P<0.001). Astigmatism or anisometropia did not change significantly over 4 years (P>0.05).

CONCLUSION

Our study found that the magnitude of astigmatism in Hispanic children was significantly higher than Black children. Over four years, refractive error became more myopic.

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Poster #: 4786 - B0079

Demographics of Keratoplasty Patients at an Urban Academic Optometry Clinic

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INTRODUCTION

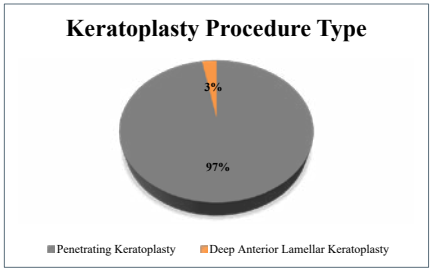
- A keratoplasty may be performed in cases of corneal ectasia, corneal scarring, bullous keratopathy, corneal edema, corneal dystrophy, corneal trauma, severe keratitis, corneal melt and/or ectasia with contact lens intolerance (1).
- Four common corneal transplants seen in patients are: deep anterior lamellar keratoplasty (DALK), Descemet stripping endothelial keratoplasty (DSEK), Descemet membrane endothelial keratoplasty (DMEK), and penetrating keratoplasty (PKP) (2).
- Such procedures are complex and require regular clinical follow-up care to prevent corneal transplant rejection.
- Demographic analysis of patients receiving corneal transplants can help clinicians more effectively target patient outreach efforts regarding adherence to follow-up care.

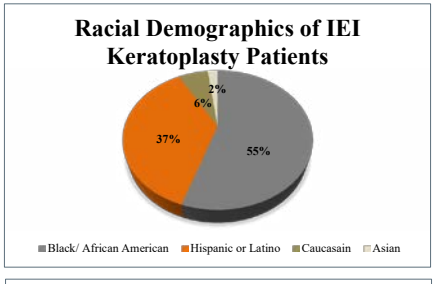
METHODS

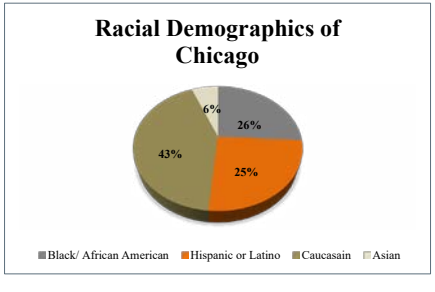
- A retrospective chart review of patients seen at the Illinois Eye Institute (IEI) in Chicago, Illinois, between 2011 and 2022 who reported receiving a corneal transplant was completed.
- Two common types of corneal transplant/ keratoplasty procedures were primarily observed: deep anterior lamellar keratoplasty (DALK) and penetrating keratoplasty (PKP).

RESULTS

- IEI provides eye care to an average of 50,000-60,000 patients annually.
- Over the last 10 years IEI has seen: 49 patients with keratoplasty, with 69 total corneal transplants (surgery performed between 1989-2022) were evaluated.
- The median patient age was 50.96 ±13.27 (range 24-76) with 59.18% being male.
- The ethnicity breakdown was: Black/African American (55.10%), Hispanic or Latino (36.73%), Caucasian (6.12%), and Asian (2.04%).
- Insurance status included: private insurance (65.31%), Medicare/Medicaid (22.45%), no insurance/paying out of pocket (12.24%).
- The most common keratoplasty procedure seen on follow-up was PKP (95.65%).
- The most prevalent indication for keratoplasty was corneal ectasia/keratoconus (97.10%).







CONCLUSION

- Keratoplasty patients that seek follow-up care at our urban academic optometry clinic tend to be Black/African American, have keratoconus, undergo PKP, and carry private insurance.
- Understanding the characteristics of our keratoplasty patient population improves quality of care and provides the framework for further research on post-operative complications and visual recovery.

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OCT Macular Ganglion Cell Layer Step Patterns and Their Relationship to Visual Field Nasal Step Defects and Other Parameters in Glaucoma and Glaucoma Suspect Patients

Soo Jung Lee, O.D., Kipp Beyerle, O.D., Lirong Sun, O.D., Christina Morettin, O.D., Anne Rozwat, O.D., Daniel Roberts, O.D., Ph.D.

INTRODUCTION

Glaucoma is a progressive optic neuropathy with pathologic alterations to retinal ganglion cells (RGC). The ganglion cell analysis (GCA) on optical coherence tomography (OCT) provides an objective quantitative analysis of the ganglion cell layer (GCL) and inner plexiform layer (IPL), which represent the cell bodies and dendrites of RGCs, respectively.[1] The macula area analyzed by this plot represents a significant 50% of RGCs overall and RGC density 10 times higher compared to more peripheral retina.[2,3] The clinical usefulness of this scan is supported by studies that suggest that macular structural damage is present in even earlier stages of glaucoma[4,5], and because the GCL+IPL is a more reproducible and symmetric measurement compared to the peripapillary RNFL analyzed by the optic disc scan.[5,6] Glaucomatous alterations on the GCA are indicated by loss of GCL+IPL temporal to the fovea resulting in an asymmetric appearance along the horizontal raphe. This pattern that resembles a nautilus shell has also been unconventionally referred to as the "squeegee sign." The purpose of the study was to investigate the relationship between spectral domain OCT (SD-OCT) temporal GCL probability plot "step" patterns and visual field sensitivity above and below the nasal horizontal raphe.

METHODS

Patients with glaucoma or suspicion for glaucoma were randomly selected using ICD-9-CM diagnostic codes from the first visits of all patients seen at an inner-city academic eye care center during 2012-2017. Record reviews were then performed to identify subjects who met the following inclusion criteria: 1) confirmed diagnoses of glaucoma, ocular hypertension (IOP>21 mm Hg), or glaucoma suspect; 2) Cirrus SD-OCT imaging with retinal nerve fiber layer (RNFL) and GCL scans (signal strength >7) and Humphrey Visual Field (HVF) 24-2 SITA Standard or SITA Fast testing (fixation<20%, FP<15%, FN<30%) within one year of each other. Exclusion criteria were: 1) age <18 years of age, refractive error >6D sphere or astigmatism >2D, and 2) other ocular/systemic abnormality that may significantly affect SD-OCT or HVF testing. Using reference images (no step, trace, 1-4+), right eye GCL step grades were classified by masked reviewers (Figure 1, Table 1) and then step presence was compared with other parameters and to HVF sensitivity in the nasal step region. Non-visual field parameters compared in the analysis to GCL step grade included age, refractive error, GCL+IPL average thickness, average retinal nerve fiber layer thickness, disc area, average and vertical cup-to-disc ratio, and cup volume. Visual field parameters used in the analysis compared point value differences above and below the horizontal raphe in the nasal step region (Figure 2).

RESULTS

The study group included 137 subjects (mean age, 62.4 +/- 13.5 years, 25.5-90.9 years; 51.1% male, 91.2% African American; 55.5% with glaucoma, 13.9% with ocular hypertension, and 30.7% glaucoma suspects). The distribution of GCL step grades is shown in Tables 2 and 3. Prevalence of any grade GCL step was 68.4% among glaucoma eyes, 52.5% among ocular hypertension eyes, and 54.8% among suspect eyes. Respectively, prevalence of a grade 3-4+ GCL step was 21.1%, 5.3%, and 4.8%. Eyes with any grade GCL step pattern were more likely than eyes without a step to have thinner average RNFL thickness (P=0.001), thinner average GCL-IPL thickness (P=0.004), larger average (P=0.001) and vertical cup-to-disc ratios (P=0.003), but they did not show HVF differences directly above and below the nasal horizontal raphe (P>0.5). Eyes with grade 3-4+ GCL step patterns did show HVF sensitivity differences in the nasal step region (P<0.01).

TABLE 1
GCL Step Grading Scale

Step Grade	Thickness Map	Deviation Map
0	No horizontal demarcation line is present at the temporal horizontal raphe.	No suspicious differences are present respecting the temporal horizontal raphe.
0.5 (trace)	A slight horizontal demarcation is present ≤1/3 the width between the calculation circles along the temporal horizontal raphe.	Suspicious differences respecting the horizontal raphe are absent or very faint.
1	A horizontal demarcation is present ≥1/3 the width between the calculation circles at the temporal horizontal raphe. Coloration differences respecting the raphe are faint or mildly pronounced.	Suspicious differences respecting the horizontal raphe are absent or very faint.
2	A horizontal demarcation is present ≥1/3 the width between the calculation circles at the temporal horizontal raphe. Coloration differences respecting the raphe are moderately pronounced.	Differences respecting the horizontal raphe are mild to moderate.
3	A wide horizontal demarcation is present at the temporal horizontal raphe. The coloration contrast respecting the raphe is marked.	Differences respecting the horizontal raphe are marked
4	A horizontal demarcation is present the full width between the calculation circles at the temporal horizontal raphe. The coloration contrast respecting the raphe is marked.	Differences respecting the horizontal raphe are very marked.

TABLE 2
GCL step grade distribution among all subjects.

GCL Step Grade	Number of Subjects (Total 137)	Percent
0	52	38.0
0.5 (trace)	44	32.1
1	7	5.1
2	15	11.0
3	5	3.7
4	14	10.2

FIGURE 1
Reference thickness (left) and deviation (right) map images used for grading GCL-IPL step patterns. For the thickness map, the presence of a horizontal demarcation line was judged at the temporal horizontal raphe. For the deviation map, the presence of step-like changes respecting the temporal horizontal raphe were also taken into consideration.

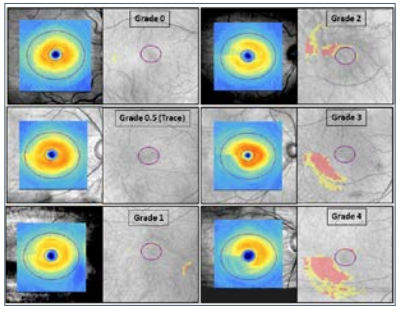
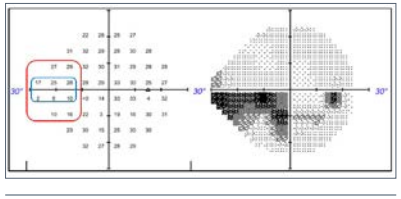


TABLE 3
GCL step grade distribution by glaucoma category.

Glaucoma Status	GCL Step Grade 0	GCL Step Grade Tr-2	GCL Step Grade 3-4	Total
Glaucoma	24 (31.6%)	36 (47.4%)	16 (21.1%)	76
Ocular Hypertension	9 (47.4%)	9 (47.4%)	1 (5.3%)	19
Suspect	19 (45.2%)	21 (50.0%)	2 (4.8%)	42
Total	52	66	19	137

FIGURE 2
Visual field parameters used in the analysis compared the average values of the three most temporal points above the horizontal raphe to the corresponding points just below the raphe (blue rectangle). Similar comparisons were made using those three lateral points plus the lateral two points on the row just above the first row (red rectangle).



CONCLUSIONS

Eyes with SD-OCT GCL step patterns may tend to have lower average GCL and RNFL thicknesses and larger cup-to-disc ratios. Only eyes with more pronounced GCL step patterns may tend to have significant relative sensitivity differences in the nasal step region via HVF threshold automated perimetry.

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DISCLOSURES

None

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Analysis of Intraocular Pressure Among Patients with a History of Cancer

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INTRODUCTION

During a prior investigation of intraocular pressure (IOP), our group observed an association between lower IOP and a history of any type of cancer diagnosis. That investigation suggested the need for further study to help understand this potential relationship.

METHODS

Subjects were collected from the primary eye care service of an academic eye care center in Chicago, IL, USA. Data was extracted from patients with any type of cancer diagnosis noted in their electronic medical record along with an existing dataset collected during 2011 to 2020. All subjects had Goldmann applanation tonometry and comprehensive eye exam to ascertain eye health status. Exclusion criteria included: 1) <18 years of age; 2) use of IOP-lowering medication; 3) history of ocular surgery that could significantly affect IOP such as cataract, refractive, or glaucoma surgery; and 4) any condition or injury that could affect IOP.

RESULTS

The study included a total of 4,561 total subjects (82.8% African American, 66.4% female), with an oversample of 375 (8.2%) reporting a history of any site cancer. The predominant cancers (Figure 1) were breast (40.6%, n=151), prostate (15.5%, n=58), colon (8.6%, n=33), uterine (corpus/cervix, 5.9%, n=22), and lung (5.7%, n=21). Mean IOP was 14.91 +/- 3.14 mm Hg among cancer subjects and 15.29 +/- 3.35 mm Hg among non-cancer subjects (unadjusted, P=0.03). Other univariate relationships to IOP are shown in Tables 1 and 2. Using multivariate analysis to control for numerous factors, including age, race, gender, refractive error, diabetes, and hypertension, people who reported a history of any site cancer had an IOP that was 0.42 +/- 0.18 mm Hg lower on average (P=0.019) compared to people who didn't report a cancer history (Table 3). Subgroup analyses for the two most prevalent cancers, breast, and prostate, showed similar IOP effect ranges for each group but statistical significance was marginal (P=0.05, P=0.16) due to sample size (Table 4).

TABLE 1
UNIVARIATE RELATIONSHIPS WITH IOP*- CATEGORICAL VARIABLES

Variable	Subject Distribution	Mean IOP (SD)	P-value
Cancer history - any site Yes / No	8.2% / 91.8%	14.9 (3.1) / 15.3 (3.4)	**0.03**
Race African American / Other	82.8% / 17.2%	15.3 (3.4) / 14.9 (3.1)	**0.002**
Gender Female / Male	66.4% / 33.6%	15.4 (3.3) / 15.0 (3.4)	**<0.001**
Diabetes Yes / No	22.1% / 77.9%	16.04 (3.4) / 15.0 (3.3)	**<0.0001**
Hypertension Yes / No	48.4% / 51.6%	15.6 (3.4) / 15.0 (3.2)	**0.001**

*Abbreviations: IOP, intraocular pressure; SD, standard deviation
†Bolded p-values significant at α=0.05 level

TABLE 2
UNIVARIATE CORRELATIONS WITH IOP* - CONTINUOUS VARIABLES

Variable	Correlation with IOP (r)	P-value†
Age (years)	0.07	**<0.0001**
Refractive Error (SE, diopters)	-0.05	**<0.001**

*Abbreviations: IOP, intraocular pressure; SE, spherical equivalent.
†Bolded p-values significant at α=0.05 level

TABLE 3
MULTIVARIATE ANALYSIS – RELATIONSHIP OF CANCER HISTORY TO IOP* CONTROLLING FOR OTHER VARIABLES

Variable	Coefficient (SE)	P-value
Intercept	14.0 (0.20)	--
History of cancer (any site)	-0.42 (0.18)	0.019
African American race	0.22 (0.13)	0.08
Gender (female)	0.40 (0.10)	<0.0001
†Refractive error (per diopter)	-0.07 (0.01)	<0.0001
Diabetes	0.90 (0.12)	<0.001
Hypertension	0.38 (0.18)	<0.001

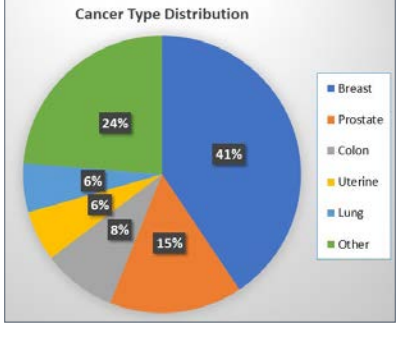
*Abbreviations: IOP, intraocular pressure; SE, standard error
†Spherical equivalent value

TABLE 4
MULTIVARIATE ANALYSIS – RELATIONSHIP OF CANCER HISTORY TO IOP* INCLUDING ONLY BREAST CANCER CASES/FEMALES

Variable	Coefficient (SE)	P-value
Intercept	14.9 (0.09)	--
History of cancer (breast only)	-0.53 (0.28)	0.051
†Refractive error (per diopter)	-0.06 (0.02)	<0.003
Diabetes	1.02 (0.16)	<0.0001
Hypertension	0.44 (0.13)	<0.001

*Abbreviations: IOP, intraocular pressure; SE, standard error
†Spherical equivalent value

FIGURE 1
The predominant cancers were breast (40.6%, n=151), prostate (15.5%, n=58), colon (8.6%, n=33), uterine (corpus/cervix, 5.9%, n=22), and lung (5.7%, n=21).



DISCUSSION

Although the mechanism between lower IOP and people with a history of cancer is not well understood, there may be several potential mechanisms. For example, Qualtrough et al, found that colorectal tumor cells produce prostaglandin F2α (PGF2α) in the colorectal tumorigenesis pathway (1). There are prostaglandin F2 receptors located on the ciliary body muscle and trabecular meshwork. When stimulated, this drainage pathway widens and increases the outflow of aqueous humor from the anterior chamber of the eye through Schlemm's canal, lowering the intraocular pressure. It is postulated that cancerous cells of all kinds similarly produce this PGF2α molecule which stimulates this cascade and results in decreased intraocular pressure. In this study, we evaluated mainly patients who had a history of cancer, rather than active cancer. Perhaps the elevation of matrix metalloproteinases in people with previous cancer has led to structural alterations in the trabecular meshwork that results in permanent lowering of intraocular pressure. Possibly chemotherapeutic interventions may permanently influence IOP.

As this research progresses, it will be important to further elucidate the IOP characteristics of people with various cancer histories and their treatments. This may help isolate and identify pathways that may be responsible for our observations. At this point, it also cannot be ruled out that certain biases are a factor, such as a survival bias among those who have not succumb to cancer.

CONCLUSION

There may be a small but measurable relationship between IOP and having a history of cancer. Although small, IOP magnitude may be comparable to other variables commonly adjusted for in investigations of IOP. Further investigation of cancer history and cancer subgroups is warranted to understand what factors, including potential selection biases, may explain these observations.

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Adding clinical information to a risk score based on optical coherence tomography (OCT) improves diagnostic performance

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INTRODUCTION

Several calculators based solely on OCT data have been proposed to screen for or diagnose glaucoma. Fukai et al (2022) developed and validated a risk score using only retinal thickness-related values taken from Maestro (Topcon Corp., Tokyo, Japan) Spectral Domain-OCT scans. Three multivariable logistic regression models were developed and compared. Each eye was assigned a glaucoma risk score on a scale of 0 to 100 (OCT-based risk score (ORS)). The best performing model, with an AUC of 0.968, a sensitivity of 85.4%, and a specificity 91.3%, was Model 3.[1] This model was shown to generalize well in a mostly African American population.[2]

PURPOSE

The purpose of this study was to evaluate the benefits of adding clinical data such as age, intra-ocular pressure (IOP), pattern standard deviation (PSD) and central corneal thickness (CCT) to Model 3 from Fukai et al (2022).

METHODS

Data from a convenience sample of patients being seen at the Illinois College of Optometry (ICO) was reviewed to identify subjects with OCT data from Maestro2 (Topcon Corp., Tokyo, Japan) as well as other clinical information, including intraocular pressure (IOP), central corneal thickness (CCT) and visual field pattern standard deviation (VF PSD). Analysis was limited to subjects with definite glaucoma or glaucoma suspects, as evaluated clinically. Standard diagnostic criteria including family history, disc appearance, IOP, CCT, OCT of retinal nerve fiber layer and macula, visual field, and corneal hysteresis were used to determine diagnosis.

Subjects were excluded from the dataset based on their OCT scans for the following reasons: blinks, motion artifacts, a TopQ image quality less than 24.5, or a mispositioned optic disc.

A generalized linear regression model was developed that included the ORS from Model 3 for both eyes (P_OCT, previously reported in Guzman et al), the age of the subject and the IOP, PSD, and CCT for both eyes.

$$Y\_Clinical{+}OCT = -1.7693 + 0.069689 * P\_OCT + -0.0058716 * CCT + -0.037666 * Age + 0.27802 * PSD + 0.051246 * IOP$$

$$P\_Clinical{+}OCT = (exp(Y)) / (1+exp(Y)) * 100 \quad \textbf{(Clinical Risk Score)}$$

Receiver operating characteristic analysis was performed for both the ORS and the clinically-based risk score (CRS) to try to distinguish subjects with definite glaucoma from suspects.

RESULTS

A total of 106 (55 glaucoma, 51 suspect) subjects were included in the dataset, 75% African-American, 64% female. Clinical characteristics are displayed in Table 1. Figure 1 shows the receiver operating curves for the standalone ORS model (AUC = 0.84) and a generalized linear regression model based on the ORS, additional clinical factors from both eyes, and the age of the patient (AUC = 0.88).

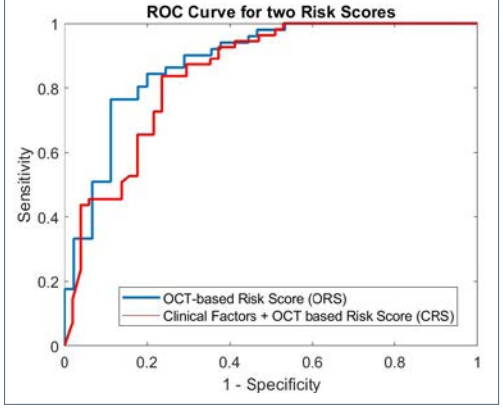
TABLE 1
Clinical Characteristics

	Glaucoma	Suspect
Age (yrs)	61.5 ± 11.8	59.9 ± 15.9
CCT (um)	538.9 ± 35.2	554.2 ± 37.5
IOP (mmHg)	24.9 ± 8.7	22.6 ± 5.2
VF PSD (dB)	3.6 ± 2.5	2.4 ± 2.0

TABLE 2
AUC values for the OCT-based risk score (ORS) and the clinically-based risk score (CRS).

Risk Calculator	AUC
ORS	0.84 (0.753 - 0.911)
CRS	0.88 (0.801 – 0.943)

FIGURE 1
ROC curves for OCT-based risk score (red) and clinically-based risk score (blue). AUC improved by 0.04 with the CRS.



CONCLUSION

The addition of age, IOP, PSD, and CCT improve the performance of an OCT-based risk calculator at distinguishing subjects with glaucoma from those with only suspicion of glaucoma. The greatest benefit (improved sensitivity) was seen when specificity was low. This is acceptable because the task we looked at in this study was to separate Glaucoma from Suspects, which would take place in a clinical setting with access to these measurements and expertise to interpret them.

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The Effect of Blink Rate and Visual Setting on the Symptoms of Digital Eye Strain

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INTRODUCTION

Digital eye strain (DES) is a group of vision-related problems that include symptoms of dry eyes and asthenopia. Previous research suggests that a reduced blink rate from screen use may lead to the dry eye symptoms of DES, while improper visual settings, such as a close working distance and poor lighting may lead to the asthenopia symptoms of DES. The purpose of this study was to determine the effects of blink rate and visual setting on DES symptoms in young adults aged 21 to 35 years.

METHODS

This study recruited 38 young adults with mean age of 25.9 years (range: 22.0 to 34.0) from the Illinois College of Optometry. Participants were asked to watch a 15-minute video in four different conditions in which a high or low blink rate was paired with an optimal or poor visual setting. The optimal visual setting was a working distance of 60cm in a photopic condition (Lux=200). The poor visual setting was a viewing distance of 30cm in a scotopic condition (Lux=0). The high blink rate was defined as 20 blinks per minute and the low blink rate was 10 blinks per minute. Summary of the variables in the experimental design and controlled variable are presented in Table 1. A 10- item digital eye strain survey, adapted from Portello et al. is presented in Table 2, in which participants rated their symptoms from 0 to 10. This survey was administered at the beginning of each visit as baseline as well as after each test condition. The study required two visits and the four test conditions were randomized. Two-way repeated measures ANOVA was performed to determine whether blink rate and visual setting affected the symptoms of DES.

TABLE 1
Experimental Conditions and Parameters

Condition	Description
Optimal Visual Setting	60cm working distance, photopic condition (lux=200)
Poor Visual Setting	30cm working distance, scotopic condition (lux=0)
High Blink Rate	20 blinks per minute, instruction given to blink fully
Low Blink Rate	10 blinks per minute, no instructions given
Controlled Factors	Screen brightness (lux=300), Standard IEI Humidity, Viewing Angle 30° below eye level

TABLE 2
Digital Eye Strain Survey

Symptoms	Mild				Moderate				Severe		
Blurred Vision While Viewing the Text	0	1	2	3	4	5	6	7	8	9	10
Blurred Vision when looking into the distance	0	1	2	3	4	5	6	7	8	9	10
Difficulty or slowness refocusing	0	1	2	3	4	5	6	7	8	9	10
Irritated or burning eyes	0	1	2	3	4	5	6	7	8	9	10
Dry Eyes	0	1	2	3	4	5	6	7	8	9	10
Eyestrain	0	1	2	3	4	5	6	7	8	9	10
Headache	0	1	2	3	4	5	6	7	8	9	10
Tired Eyes	0	1	2	3	4	5	6	7	8	9	10
Sensitivity to bright lights	0	1	2	3	4	5	6	7	8	9	10
Discomfort in your eyes	0	1	2	3	4	5	6	7	8	9	10

TABLE 3
Change of Digital Eye Strain Symptom Scores from Baseline (N=38, Mean ± SD) in Different Visual Settings and Blink Rates

Blink	Visual setting	Difficulty or slowness refocusing	Dry eyes	Eye strain	Sensitivity to light	Discomfort in your eyes	Total symptom scores
High	Optimal	0.26 ± 1.82	0.50 ± 2.05	0.55 ± 1.90	0.05 ± 2.05	0.42 ± 1.78	4.28 ± 15.91
	Poor	0.47 ± 1.67	1.00 ± 2.01	0.79 ± 1.76	0.87 ± 1.97	0.97 ± 2.25	6.97 ± 14.65
Low	Optimal	-0.13 ± 1.01	0.79 ± 1.59	0.16 ± 1.55	0.00 ± 1.41	0.40 ± 1.24	2.02 ± 6.97
	Poor	0.45 ± 1.26	1.34 ± 2.06	1.31 ± 2.29	0.66 ± 2.00	1.13 ± 2.24	8.16 ± 13.32

Note: A positive value indicates an increase in symptoms whereas a negative value indicates a decrease.

FIGURE 1

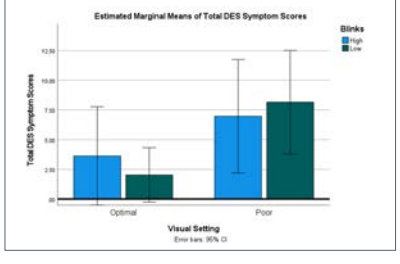
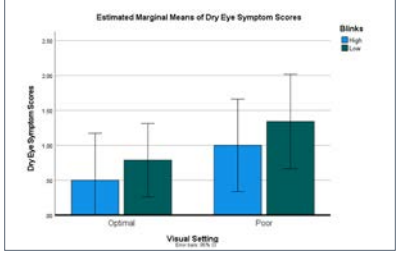


FIGURE 2



RESULTS

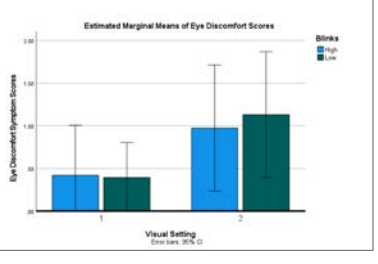
- Increase of DES score from baseline was significantly higher in the poor visual setting than that in the optimal visual setting (F (1,37) = 7.85, P=.008).
- Changes in visual setting had a significant effect on 5 of the total 10 survey items: difficulty refocusing from distance (F (1,37) = 5.08, P= .03), dry eyes (F (1,37) = 6.45, P=.02), eye strain (F (1,37) = 6.53, P=.02), sensitivity to light (F (1,37) = 5.66, P=.02), and discomfort in the eyes (F (1,37) =5.85, P=.02). The mean scores for these factors are listed in Table 3. Figures 1-3 presents a visual summary of our findings.
- No difference in DES scores was found between high blink rate and low blink rate conditions (F (1,37) = 0.09, P=.77).

CONCLUSION

Our findings suggest:

- Both a proper working distance (60cm) and adequate room lighting (Lux=200) could potentially alleviate the symptoms of digital eye strain.
- Interestingly, a high blink rate (20 blinks/min) did not reduce digital eye strain symptoms compared to a low blink rate (10 blinks/min).

FIGURE 3



DISCUSSION

- In this study participants noticed immediate worsening of their DES symptoms due to a poor visual setting. Because participants reported both dry eye and asthenopia symptoms, future research can investigate the changes to tear film and the binocular systems that occur due to changes to the visual setting.
- Our study was limited by the 15 minutes of screen time per trial. However, it also revealed to us that the onset of DES symptoms can occur quickly, within 15 minutes. As a first line of defense, clinicians can consider reinforcing good viewing habits in patients who present with DES symptoms as it may offer immediate alleviation of symptoms.

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OCTA Imaging Reveals Changes in Foveal Avascular Zone Shape in Prediabetes

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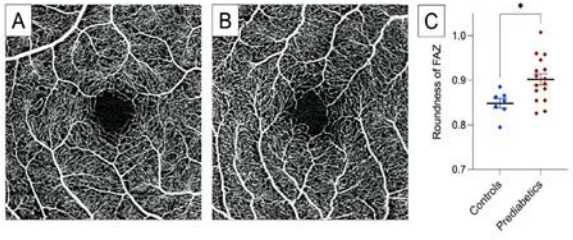
INTRODUCTION

OCT Angiography (OCTA) has shown changes in the foveal avascular zone (FAZ) in patients with diabetes, even without diabetic retinopathy. It is not as clear if prediabetic patients have similar FAZ microvascular alterations as compared to control subjects. The purpose of this observational clinical study is to determine if FAZ parameters are significantly different in people with prediabetes compared to healthy age-matched controls.

METHODS

One eye from 7 control and 16 prediabetic participants with intact ocular health was included in this preliminary study of more than 60 participants who were then selected based off of age-matched criteria. Following an ocular health examination to rule out pathology, the Zeiss Cirrus HD-OCT model 5000, OCTA Metrix 10.0, was used to image 3 x 3 mm of the superficial capillary plexus centered on the fovea. Images were analyzed using ImageJ software. Participants were age-matched, and images were corrected for axial length using the Littman and Bennett formulas. Outcome measures included the FAZ area, perimeter, circularity (perimeter smoothness), and roundness (axial symmetry). Statistical analysis was completed using Student's t-test and coefficient of variation (CoV).

FIGURE 1



Example of the FAZ in a prediabetic (A) and control (B) subject. (C) OCTA image analysis of the superficial capillary plexus revealed FAZ roundness was significantly increased in the prediabetic group compared to controls (p=0.015).

TABLE 1

	Controls	Prediabetics
Age (years) Age (min – max)	30.9 ± 2.2 25 - 40	31.7 ± 1.5 25 - 45
Sex (% Female)	75	13
Fasting Blood Sugar (mg/dl)	87 ± 4	103 ± 2
Axial Length (mm)	24.17 ± 0.21	24.11 ± 0.22
FAZ Area	0.32 ± 0.05 42.4%	0.32 ± 0.03 38%
FAZ Perimeter	2.77 ± 0.21 19.7%	2.69 ± 0.16 21.8%
FAZ Circularity	0.47 ± 0.03 19.5%	0.53 ± 0.02 14.4%
FAZ Aspect Ratio	1.11 ± 0.02 4.6%	1.06 ± 0.01 5.6%
FAZ Roundness	0.85 ± 0.01 3.4%	0.90 ± 0.01* 5.6
FAZ Solidarity	0.87 ± 0.02 5.2%	0.90 ± 0.01 4.7%

Subject Demographics and Quantitative Results: Average ± SEM and Coefficient of Variation (%), *p=0.015.

RESULTS

Participant demographics and quantitative results are summarized in table 1. FAZ size of the prediabetes and control groups were not significantly different (P>0.05). Roundness of the FAZ was significantly increased in the prediabetic group (p=0.015, see figure 1), and similarly FAZ circularity showed a trend (p=0.17) towards increased circularity in the prediabetes group compared to controls. Averaged across both groups, CoV for FAZ shape factors of circularity and roundness was 17% and 5%, respectively, versus 40% for FAZ area, suggesting that FAZ shape parameters are more sensitive characteristics for detecting differences between these populations.

DISCUSSION

The relationship between an enlarged FAZ area and diabetes has been previously noted by multiple researchers. Vujosevic et al hypothesized that initial diabetic changes in the deep capillary plexus played the main role in the enlarged FAZ area, while Claudio Furino et al found that changes at the superficial capillary plexus had a more evident connection. According to Lavia et al, the higher blood vessel density found in the superficial capillary plexus allowed for greater accuracy when analyzing the various FAZ parameters, hence why the superficial capillary plexus was selected for this study.

However, there was no statistically significant link found between prediabetes and an enlarged FAZ area. Instead, FAZ shape had a stronger correlation. Circularity pertains to the perimeter of the FAZ and subsequent similarity to a circle, while roundness refers to the axial symmetry of the designated shape. The low coefficient of variation found for both shape factors indicate a more precise measurement for prediabetes.

CONCLUSION

The results indicate FAZ shape, and not size, is significantly different in the prediabetes group compared to healthy controls. The lower CoV suggests FAZ shape parameters may be more sensitive measures of early changes in retinal vascular health in prediabetes. Future studies may support the use of OCTA imaging in identifying prediabetic changes.

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COMMERCIAL RELATIONSHIPS

Funding for parent study provided by the Hass Avocado Board. Funding for control subjects provided by ICO Research Resource Committee.

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COVD

5 ICO PRESENTATIONS

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An Overview of the Illinois College of Optometry, Vision Therapy and Vision Rehabilitation Residency Program

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HISTORY OF THE PROGRAM

The ICO Binocular Vision & Pediatric Residency Program began in 1990. Dr. Janice Scharre served as the first Program Coordinator and held that position until 1995. Dr. Susan Cotter held the position of Program Coordinator from 1995-97, and then Dr. Valerie Kattouf held the position until 2003. Dr. Christine Allison began the position in 2003 and is the current program coordinator. Sixty residents have completed the program, with two residents currently participating in the program.

The program's Mission Statement is:

Offering advanced competency in pediatrics and binocular vision management through education, scholarship, and patient care.

THE PROGRAM

The Program begins on July 1 and runs for 53 weeks. The benefits are listed in Table 1.

The resident's will be provided advanced clinical education in the areas of binocular vision, perception, pediatric optometry, and developmental disabilities. The resident's provide direct care to patients in the Binocular Vision/Pediatric Optometry Clinic and the Developmental Disabilities Clinic at ICO. The patients' range in age from infants to adults, with a large variety of conditions. Residents perform comprehensive eye examinations, visual efficiency evaluations, strabismus/amblyopia evaluations, developmental disability examinations, visual perceptual evaluations, and vision therapy on a routine basis.

In order to keep their therapeutic skills fresh, the residents spend one session per week for the entire length of the program in the Urgent Care Service of the Center for Advanced Ophthalmic Care at ICO. This is an urgent care clinic where the residents will be seeing a variety of anterior segment and posterior segment emergency patients.

The residents teach in one 3rd year laboratory per quarter for the Fall, Winter, and Spring quarters. The labs that they teach are the Treatment of Binocular Vision Disorders Lab (VT procedures), the Strabismus/Amblyopia Lab (strabismus testing procedures), and the Infant/Child Development and Management Lab (visual-perceptual testing procedures). The residents also start precepting students in the Binocular Vision and Pediatric Clinic beginning in the Winter quarter.

To develop skills in the area of Pediatric Low Vision, the residents take two trips to the Illinois School for the Visually Impaired, where they examine pediatric low vision patients and provide them with low vision devices provided by the Lions Clubs. They also have the opportunity to work with one of our Pediatric Low Vision Specialists in the Pediatric department on campus. The residents also participate at two Special Olympics Lions Club International Opening Eyes Screening events. One called Medfest, is held in the Fall each year at the United Center, and the other is during the summer at the Illinois State Summer Special Olympics Games.

The residents are required to give three Grand Rounds presentations to the 4th year students and the faculty based on cases that they see at ICO. Each presentation is to be given in a power point format and lasts approximately 15 minutes.

In order to provide flexibility in the program, the residents can select to work one session in another service at ICO, outside of the pediatric service. For instance, they may choose to work one session in the Cornea/Contact Lens Service, the Neuro Service, the Glaucoma Service, the Primary Care Clinic, or the Low Vision Service.

Tables 2-4 show the educational, teaching, and research responsibilities required for the program.

Figures 1-4 show an example of one of the previous resident's schedules for the year.

The minimum number of patients the residents are required to see in each area are listed below:

Strabismus/amblyopia	20
Visual Processing Evaluations	20
Pediatric Primary Care/Visual Efficiency Examinations	140
Special Needs Primary Care Evaluations	25
Vision Therapy Sessions	100
Pediatric Low Vision Evaluations	10
Advanced Care Patient Visits	100
Infant Examinations	25

Why Do a Residency Program?

- Increased competency with all examination techniques
- Increased experience with challenging cases
- Increased ability to examine infants and toddlers
- Increased experience with public speaking
- Increased marketability for the future
- Increased ability to work in education or hospital-based optometry
- Increased confidence in your own skills and knowledge

How do I Apply?

There are currently two residency positions available each year.

- You must first apply to the National Matching Services, Inc at **ormatch@natmatch.com**.
- A Letter of Intent must be sent to ORMatch
- A Curriculum Vitae must be sent to ORMatch
- You must have the following materials sent to ORMatch
  - o An official Optometry Transcript
  - o Official National Board of Optometry Scores for Part I and Part II
  - o Three letters of recommendation from clinical faculty

ALL MATERIALS MUST ARRIVE TO THE PROGRAM COORDINATOR BY JANUARY 31.

Once an application is complete, the Program Coordinator may invite the applicant for an interview in early to mid- February. An interview will be given with the Program Coordinator and members of the ICO Pediatric Faculty. A tour of the ICO facilities will also be provided at that time by the current residents.

Questions can be directed to:
Christine Allison, O.D., F.A.A.O., F.C.O.V.D.
BV & PO Residency Program Coordinator

TABLE 1
Benefits

1. Medical and dental insurance; prescription card (monthly fee to participate)
2. Professional liability insurance
3. 1 week paid vacation
4. 5 days for continuing education / meetings
5. Group term life insurance
6. Disability insurance

TABLE 2
Educational Responsibilities

1. Direct patient care in the Binocular Vision & Pediatric Service.
2. Supervision of fourth year optometry students in the Binocular Vision & Pediatric Service and other specialty rotations.
3. Direct patient care in the Emergency Service.
4. Co-management of cases with ophthalmology and other health care providers.
5. Literature review and clinical research.
6. Weekly seminar and case discussions with senior faculty from the Binocular Vision & Pediatric Service.
7. Opportunity to provide some pediatric low vision services.
8. Seminar on didactic and clinical teaching methods from an expert in medical education.
9. Opportunity to attend the annual meetings of the American Academy of Optometry and College of Optometrists in Vision Development.

TABLE 3
Teaching Responsibilities

1. Provide clinical consultation to optometry student interns, under the supervision of experienced clinical faculty.
2. Participate in clinical grand rounds for fourth year optometry students, other residents, and optometric faculty.
3. Provide didactic or laboratory instruction to students in courses pertaining to binocular vision and vision perception.
4. Provide didactic instruction and lead discussion groups for optometry students in the Binocular Vision & Pediatric Seminar groups.
5. Opportunities to provide continuing education to optometrists or other health care professionals through grand rounds and other presentations.

TABLE 4
Research Responsibilities

1. Required (one or the other): a. A completed research project of publishable quality. b. Literature review or case report of publishable quality.
2. Recommended: Presentation of research or patient case report at state, regional, national, or international meetings.

FIGURE 1
Example of a Starting Summer Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
AM	DAY	Visual Perceptual Lab TA		Direct Care of Peds Patients	Development Time and Peds Resident Conferences	Vision Therapy 9:00-1:00
PM	OFF	Peds Pts with Peds MD on campus	Direct Care of Peds Patients	Urgent Care Service	Faculty Conference Series & Resident's Conference	
EVE		Vision Therapy	Direct Care of Peds Patients			

FIGURE 2
Example of a Fall Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
AM	DAY	Visual Perceptual Lab TA	Direct care of Peds Patients	Direct Care Peds Patients	Development Time and Peds Resident Conferences	Vision Therapy 9:00-1:00
PM	OFF	Peds Pts with Peds MD on campus		Urgent Care Service	Faculty Conference Series & Resident's Conference	
EVE		Vision Therapy	Direct Care of Peds Patients			

FIGURE 3
Example of a Winter Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
AM	DAY	Cornea/ Contact Lens Resident selected session		Strabismus Testing Lab TA	Development Time and Peds Resident Conferences	Vision Therapy 9:00-1:00
PM	OFF	Peds Pts with MD on campus or Peds Low Vision	Peds Clinic Precept Students	Urgent Care Service	Faculty Conference Series & Resident's Conference	
EVE		Vision Therapy	Direct care of patients			

FIGURE 4
Example of a Spring Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
AM	DAY	Primary Care Resident selected session	Direct care of Peds Patients	Peds Clinic Precept Students	Development Time and Peds Resident Conferences	Vision Therapy 9:00-1:00
PM	OFF	Peds Pts with MD on campus or Peds Low Vision		Urgent Care Service	Faculty Conference Series & Resident's Conference	
EVE		Vision Therapy	Direct care of patients			

CONTACT

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Visual Management of a Patient with WDR45 Gene Mutation

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BACKGROUND

WDR45-related gene mutations are very rare mutations which cause neurodegenerative and neurodevelopmental conditions in afflicted patients. These mutations are the cause of X-linked neurodegeneration with brain iron accumulation. There are three main categories of WDR45 related conditions: Beta-propeller Protein-Associated Neurodegeneration, WDR45-related epileptic encephalopathy, and Intellectual Disability only type. Patients such as ours with Beta-propeller Protein-Associated Neurodegeneration (BPAN) have many symptoms including epileptic seizures, movement dysfunction, behavioral issues, and can have visual dysfunctions, as well. BPAN affects girls more often than boys, likely because the mutation may be lethal to males prior to birth. Most patients with this condition do not live beyond middle age. See Table 1 for the Signs and Symptoms of BPAN.

CASE SUMMARY

Female patient, JG, first reported to our clinic at 3 years old with undiagnosed developmental delays and a history of epileptic seizures. She was found to have myopia and astigmatism OU and glasses were prescribed for full-time wear. Despite numerous neurology visits, scans, and specialists, JG was not diagnosed with a WDR45 mutation until she was 5 years old. At this point, she was diagnosed with WDR45-BPAN. She suffers from seizures, global developmental delay, autism, ataxia, and is non-verbal. Despite being given a diagnosis of cortical blindness, she currently wears her compound myopic astigmatic prescription regularly and her mother report's better function while wearing her glasses. At her most recent vision examination at the age of 7 she arrived to the clinic in a wheelchair, but was able to leave the wheelchair and walk unsteadily to the exam chair. Her mother reported good compliance with her glasses and noted no changes in her visual behavior. She was reported to use a computer approximately one hour each day, which she was reported to enjoy. Her clinical findings showed that her myopia had increased, no strabismus was present, and her dilated fundus exam was normal. She continues to successfully wear her glasses on a regular basis and works with visual stimulation at a nearby Lighthouse Center for Low Vision. She also continues care with a Neurologist on a regular basis. See Table 2 for our patient's most recent exam findings.

TABLE 1
Signs and Symptoms of BPAN

Epilepsy	May be the first symptom, frequency/intensity lessen with age
Developmental Delays	Global developmental delays, cognitive impairment which gets worse with age, speech and language delays
Movement Dysfunction	Ataxia, clumsy walking, fine motor defects, dystonia and Parkinson-like movements progress with age starting in adolescence
Behavioral Issues	Autism Spectrum, grinding teeth, repetitive movements
Abnormal Brain Imaging	Thinning of Corpus Callosum, hypomyelination, global atrophy and iron deposits apparent with aging
May also have Sleeping Difficulties	Difficulty falling asleep, difficulty maintaining sleep
May also have Feeding Difficulties	Poor oral motor control
May also have "Visual Difficulties"	Retinal degeneration, optic atrophy

TABLE 2
Comprehensive Eye Exam Findings

Visual Acuity with Previous Glasses	20/250 @ 55 cm with Cardiff Cards
Pupils	Equal, Round , Reactive, No APD OU
Stereoacuity, color vision	Unable to test due to poor understanding
Hirschberg, Kappa, Bruckner	No Strabismus noted
Post-Dilated Retinoscopy	OD -4.50-5.50X180, OS -4.50-5.00X005
Slit Lamp Exam	No anterior segment, lid, lash concerns
Dilated Fundus Exam	C/D ratio 0.4/0.4, no pallor, macular area normal, poor peripheral retinal views due to patient cooperation OU

TABLE 3
Management

Anti-seizure medications for epilepsy symptoms
Dopaminergic drugs if Parkinson type symptoms
Occupational Therapy for Fine Motor Issues
Physical Therapy for Gross Motor Dysfunction
Speech Therapy for speech and oral dysfunctions
Visual Stimulation Therapy for visual delays
Refractive Error Correction with Glasses for visual delays
May also have "Visual Difficulties"

TABLE 4
Different WDR45-associated Neurodegenerative Disorders

Name of Condition	Characteristics
β-Propeller Protein Associated Neurodegeneration (BPAN)	See Table 1, More common in females than males, iron accumulation in brain
Rett-like Syndrome	Seizures, motor abnormalities, abnormal hand movements, language disabilities, autistic type symptoms, likely female
Intellectual Disability alone	Female patients
Developmental and Epileptic Encephalopathy	Refractory seizures, EEG abnormalities, epilepsy, males
Early-onset Epileptic Encephalopathy	Severe epilepsies occurring in first 3 months of life, more likely female
West Syndrome	Infantile spasms, hypsarrhythmia, intellectual delay, males

CONCLUSIONS

Patients diagnosed with WDR45 gene mutations are described in the literature as having visual dysfunctions, with no further explanation. Since this condition is very rare, it is important for optometrists to evaluate these patients regularly to determine the nature of their visual dysfunction. Despite our patient having global developmental delays and poor visual prognosis, it is important to fully correct the refractive error for these patients. Proper refractive correction can help to improve the quality of life of these patients, and yearly comprehensive eye exams are an essential part of their care. See Table 3 for other Management Considerations.

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Not Feeling this Fresnel: Unexpected Responses to Prism in a TBI Patient

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INTRODUCTION

Patients with traumatic brain injury (TBI) often experience photophobia, accommodative and oculomotor dysfunctions, and visual perceptual issues. Patients may also experience behavioral effects such as anxiety, depression and PTSD. Optical treatment includes tints, near adds, prism and vision therapy to relieve symptoms and improve function. Behavioral treatment may also include talk therapy, lifestyle modifications and medications.

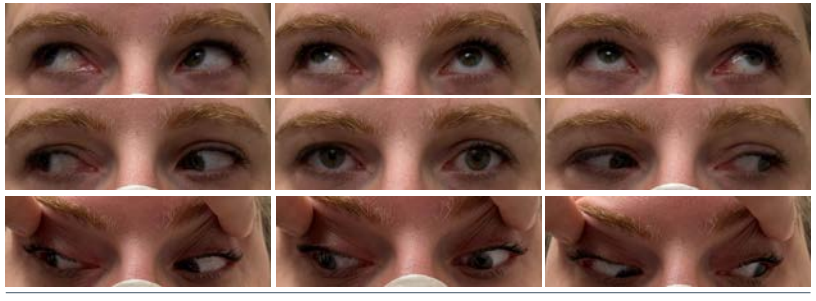
CASE HISTORY

Ocular	• 31-year old female presents with headaches when reading and driving after being kicked in the head • History of strabismus surgery at 1 year old, patched OD x 6 years, currently left with strabismic amblyopia OS
Medical	• History of anxiety, depression, and suicidal thoughts; was hospitalized last year due to a major depressive episode • Medications: Buspirone 10mg BID for anxiety, Subvenite 100mg QD for depression • Sees psychiatrist and talk therapist, reports good support system

CLINICAL FINDINGS

	OD	OS
VA cc	20/20	20/40
Refraction	+5.50 - 2.50 x 180	+5.50 - 2.50 x 180
Cover Test	Distance 20 CLXT c 4 CRHyperT Near 35 CLXT c 4 CRHyperT	
Stereopsis	Negative forms W4D deep suppression OS at all distances Ranges suppressed OS NPC unable	
Visuoscopy	2PD steady inferior eccentric fixation OS Anomalous correspondence	

FIGURE 1
Distance 20 CLXT c 4 CRHyper T, comitant in all gazes



TREATMENT

Vision Therapy

Successes	• Underwent 26 sessions of VT with the goal of breaking through suppression OS, improving control of strabismus and decreasing headaches. • Improved cover test, greater control of strabismus • Intermittently able to break through suppression OS
Limitations	• Unable to maintain simultaneous perception or fuse images • Still symptomatic for visual and emotional discomfort

Fresnel Prism

Associated phoria c Rx	• Underwent 26 sessions of VT with the goal of breaking through suppression OS, improving control of strabismus and decreasing headaches. • Improved cover test, greater control of strabismus • Intermittently able to break through suppression OS
Cover test c Fresnel Prism 1 BD OD, 1 BU OS	• Unable to maintain simultaneous perception or fuse images • Still symptomatic for visual and emotional discomfort
Initial Fresnel Fitting	• In-office, patient reported improved binocular comfort with prism • Given Fresnel on glasses to trial for 1 week

1 Week Follow Up

The patient reported depressive and suicidal thoughts, and the inability to do normal daily activities due to being significantly bothered by the blur. She denied binocular complaints, recent life changes or change to medications. The patient was taken off the Frenel prism immediately and other solutions were explored.

Yoked Prism and Tinted Lenses

Yoked Prism	• Trialed 10PD OD and 10PD OS to determine direction of greatest comfort • Pt reported greatest comfort with base right • Decreased magnitude in increments of 1PD OD and OS until good comfort with field of view and improved symptoms • Trial framed and allowed patient to walk around office • Greatest comfort with 3PD OD and 3PD OS yoked based right prism
Tinted Lenses	• Trialed different tint intensities • Greatest comfort with FL41 50% tint • Updated Rx with yoked prism base right and FL41 50% tint • RTC 1 month f/u

FIGURE 2
Yoked prism and FL41 50% tint

DISCUSSION

Effects and Treatments

Ocular	• TBI affects the afferent pathway which includes the accommodative pathway, oculomotor nerve, medial rectus muscles, and motor processing. • Symptoms may include photophobia, accommodative insufficiency, convergence insufficienct, oculomotor dysfunction, and perceptual and motion deficits. • Tints: FL41 commonly used • Adds • Prism: Improves visual communication for more efficient visual processing; improves behavior and attention in patients with autism, ADHD and anxiety • Vision therapy
Behavioral	• TBI also affects the autonomic nervous system by decreasing neurovascular coupling, leading to hormone dysregulation. • Symptoms may include anxiety, depression and PTSD. • Cognitive behavioral therapy, talk therapy • Lifestyle modifications • Medications

1 Month Follow Up

The patient reported significant improvement in emotions with yoked prism and FL41 tint. She reported decreased anxiety and denied headaches or ocular fatigue. She was released from in-office vision therapy and instructed to maintain home vision therapy three times per week. She was instructed to return to the clinic in 6 months for a follow up.

CONCLUSION

TBI-related damage may affect the visual system in a number of ways. Ocular treatments include tints, adds, prism and vision therapy. Behavioral effects are also significant, and treatment may include therapy, lifestyle changes, and modifications. It is important to take patient responses seriously as TBI patients are often sensitive to small changes. Thus clinicians must listen to concerns carefully in order to best care for the patient.

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Management of an Acquired Partial Third Nerve Palsy in a Pediatric Patient

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INTRODUCTION

Third cranial nerve palsies are uncommon among children. The most common etiology of this rare presentation in children is trauma, followed by neoplasia, vascular anomalies, infection, or idiopathic causes. Prior research has shown that third cranial nerve palsy is associated with reduced visual and sensorimotor outcomes in children under eight years old. In cases of partial nerve palsies, refractive correction with prism and vision therapy can often aid in minimizing visual symptoms and stimulating recovery.

CASE HISTORY

A six year old female presented for an evaluation of a partial right cranial nerve palsy following a traumatic brain injury (TBI) three months prior to this visit. The patient was an unrestrained passenger in a vehicle accident and was hospitalized for two months since the injury. She was symptomatic for constant horizontal diplopia, which was corrected with a low hyperopic prescription and 14 prism diopters of base-in Fresnel prism. Upon the first visual efficiency evaluation, the patient had reduced accommodative amplitudes, a minimally reactive dilated pupil in the right eye, severe saccadic insufficiency, and inability to fuse with the exotropic posture. In addition to Fresnel prism to alleviate diplopic symptoms, vision therapy was added to her treatment plan; the patient was already undergoing post-trauma speech, occupational, and physical therapies.

VISION THERAPY

Vision therapy for TBI patients is comprised of a patient-specialized plan and sessions are held with patience and guarded potential. This patient worked on several vision therapy activities such as Sanet Vision Integrator, pegboard rotator, Hart Chart saccades, and letter tracking to strengthen saccades and pursuits. The patient worked on sticker push-ups, randot-target multiple choice vergence with emphasis on base-out training, and brock string with minus lenses to stimulate convergence and promote fusion. The patient also worked on loading Hart Chart saccades with minus lenses to improve accommodation. Upon working on convergence, oculomotor, and accommodative techniques in weekly vision therapy sessions, the patient has shown gradual progress in fusion, accommodative and saccadic abilities. A longer program of vision therapy sessions may be indicated to track further repeatable progress; the patient has completed 14 sessions and continues therapy on a weekly basis. A third cranial nerve palsy may resolve partially or fully in children, however surgical treatment may be required if signs and symptoms are not overcome with sustained rehabilitation efforts.

TABLE 1
Pertinent Findings

	Initial presentation	VEE before VT#1	VEE after VT#12
Visual Acuity with Spectacle Rx	OD +1.25 -1.00 x180, 14^BI Fresnel 20/25 OS +0.50 -0.75 x180 20/20	OD +1.25 -1.00 x180 14^BI Fresnel 20/20-1 OS +0.50 -0.75 x180 20/20	OD +1.25 -1.00 x180 14^BI Fresnel 20/20-3 OS +0.50 -0.75 x180 20/20
Pupils	OD dilated pupil minimally reactive, 2+APD, 4.5mm OS round, reactive, no APD, 2.5mm	OD dilated pupil minimally reactive, 2+APD, 4.5mm OS round, reactive, no APD, 2.5mm	OD dilated pupil minimally reactive, 2+APD, 4.5mm OS round, reactive, no APD, 2.5mm
EOMs	Full 4+, endpoint nystagmus in R gaze OU	Full 4+, endpoint nystagmus in R gaze OU	Full 4+, endpoint nystagmus in R gaze OU
Stereoacuity	(-)RDS forms, no stereo	(+)RDS 500" 100" Wirt circles	(+)RDS 250"
Cover Test	D: 25^CRXT sc, 2^EP cc N: 20^ CRXT sc, 8^XP cc	D: 20^CRXT sc, 10^XP cc N: 20^ XP sc, 14^XP cc	D: 20^ CRXT sc, ortho cc N: 20^ CRXT sc, 14^ XP cc
NPC	26/41cm, OD out	x/x cm, constant diplopia	30/45cm (+)diplopia
W4D	Exo posture diplopia neutralized with 16^BI	Exo posture diplopia neutralized with 20^BI	Exo posture diplopia neutralized with 16^BI
Accommodative amplitude (pull away method)	6.0D OD, 6.0D OS	6.0D OD, 8.3D OS	7.0D OD, 8.5D OS
MEM	Not tested	+1.00 OD, +1.25 OS	+1.50 OD, +1.00 OS
DEM	Not tested	V:82s H:182s R:2.2	V:68s H:116.8s R:1.72

CONCLUSION

This case report highlights a rare presentation of partial oculomotor nerve palsy in a six year old patient following a TBI. The treatment plan comprises of Fresnel prism and vision therapy in conjunction with the patient's occupational, speech, and physical therapists to ensure holistic rehabilitation. It is crucial to conduct vision therapy sessions with a young pediatric patient following a traumatic event with patience and tolerance to promote good prognosis in visual acuity, stereopsis, vergence, accommodation, and oculomotor functions. This case report will contribute to the limited database for prognosis of vision therapy and Fresnel prism in a TBI-caused cranial nerve palsy management plan for pediatric patients.

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GSLS

5 ICO PRESENTATIONS

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Incorporating a Bi-Elevation Design For Improved Scleral Lens Centration

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INTRODUCTION

Inferior lens decentration is common when fitting scleral lenses in patients with keratoconus (KCN), as a greater sagittal depth is required to adequately vault the cornea. This results in a large central tear reservoir which can further decenter the lens. The inferior decentration can be further exacerbated by limbal toricity. This case highlights the use of a bi-elevation scleral lens design for improved lens centration in a patient with KCN and limbal asymmetry.

CASE HISTORY

A 17-year-old male presented for evaluation of blurry vision OU for the last few years in his habitual glasses. He had no prior h/o CL wear. In 2018, he was diagnosed with KCN OU and underwent corneal collagen cross-linking the same year.

- Manifest Refraction:
  OD: -1.25-1.75x055 20/100
  OS: -1.75-0.75x105 20/30
- Slit Lamp: central corneal steepening and thinning OU, (+)Vogt striae OU
- Corneal tomography confirmed bilateral KCN (Figure 1).

CONTACT LENS EXAMINATION

The patient was fitted in a 16.0mm Zenlens scleral (Bausch + Lomb Specialty Vision Products) which improved vision to 20/25 OD and 20/20 OS.

At a 2-week follow-up visit, the patient reported mild discomfort with lens wear. Inferior lens decentration was noted OU along with 1+ punctate staining at the superior limbus OU. Scleral profilometry revealed limbal toricity of 250um OD and 270um OS (Figure 2). To improve lens centration, a new pair of lenses was ordered which incorporated a bi-elevation design. Improved lens centration was noted at the time of dispense.

At a 1-week follow up visit, the patient reported wearing lenses 15 hours a day with excellent comfort OU and the superior limbal PEE had resolved OU (Figure 3).

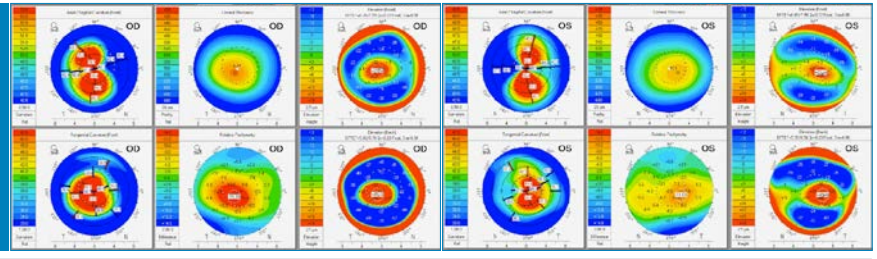

FIGURE 1 Tomography showing anterior and posterior corneal steepening OU.

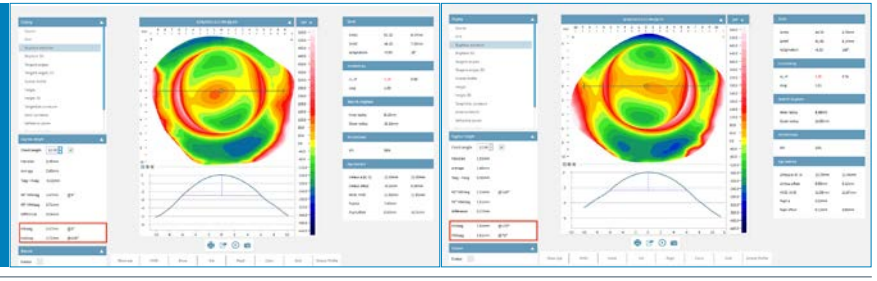

FIGURE 2 Profilometry displaying toricity of 250 microns OD and 270 microns OS at a 12-mm chord length.

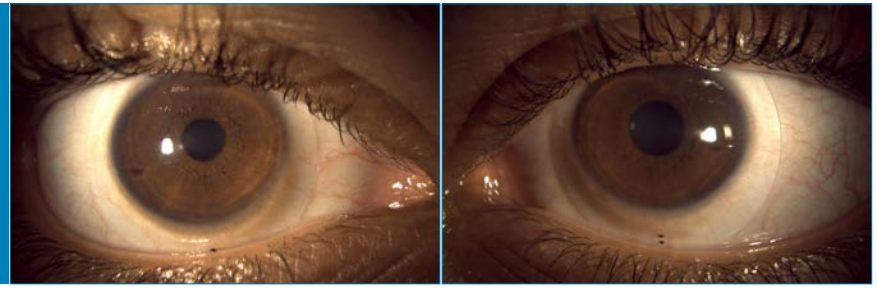

FIGURE 3 At a 1-week follow up visit, the patient reported excellent comfort when wearing scleral lenses OU and the superior limbal PEE had resolved OU.

DISCUSSION

Scleral lens centration is influenced by several factors including the corneal sagittal height, limbal shape, and scleral shape. All these factors can be assessed using corneal and scleral profilometry and should be taken into consideration to obtain an optimal scleral lens fit.

The Zenlens' bi-elevation design moves some of the advanced peripheral system (APS) toricity into the vault chamber. This widens the landing zone surface area, allowing the deeper, steeper meridian APS to land closer to the limbus, improving lens centration.

CONCLUSION

One major challenge to fitting a scleral lens is achieving proper centration. Decentration can result in an excessive fluid reservoir that could interfere with corneal physiology. A common reason for inferotemporal decentration is related to limbal shape and elevation. The limbus is often wider horizontally than vertically, and elevation differences also exist. Profilometry can highlight the need for a quadrant-specific limbal (bi-elevation) design upfront, improving overall centration of the first lens fit.

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Myopia Management Performance Comparing Spherical versus Toric Orthokeratology Lenses in a Set of Twins

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BACKGROUND

Spherical and toric orthokeratology (ortho-k) lenses have both been shown to be effective in myopia management by slowing axial elongation.[1,2] However, spherical ortho-k lenses tend to decenter more than toric ortho-k lenses when fit on patients with moderate to high corneal astigmatism (≥1.50D).[3] Many companies use corneal astigmatism and elevation data to determine when to fit toric ortho-k lenses to achieve a better centered treatment zone. There is a strong correlation between corneal toricity and elevation difference, with 1D of corneal astigmatism corresponding to 25um of elevation difference at an 8mm chord.[4]

The purpose of this case series was to compare clinical performance and myopia management efficacy between spherical and toric ortho-k lenses on a set of twins with similar initial corneal astigmatism and elevation difference.

CASE DESCRIPTION

Two 11-year-old twin males were referred for ortho-k myopia management. Their refractive errors OU were moderately myopic with with-the-rule (WTR) astigmatism ≤1.00DC on cycloplegic refraction. Corneal topography revealed regular WTR astigmatism OU. Baseline axial lengths were measured and Patients 1 and 2 were empirically fit into toric ortho-k and spherical ortho-k lenses, respectively.

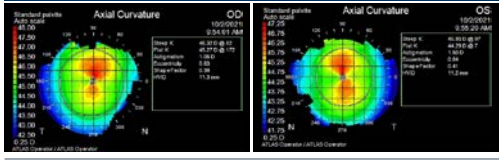
PATIENT 1

Cycloplegic manifest refraction
OD: -4.00 -0.25 x135 VA 20/20 • OS: -3.50 -0.75 x180 VA 20/20

TABLE 1: Patient 1 Pre-treatment Data

	Right Eye (OD)	Left Eye (OS)
Corneal astigmatism (D)	1.05	1.50
Elevation difference (um)	26	33
Axial length (mm)	24.77	24.78

FIGURE 1: Pre-treatment axial topography maps for Patient 1 show mild WTR astigmatism OD and moderate WTR astigmatism OS



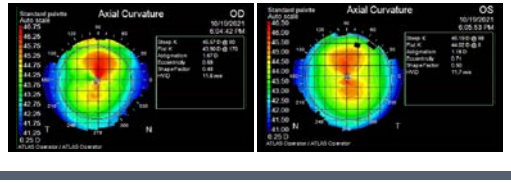
PATIENT 2

Cycloplegic manifest refraction
OD: -2.00 -1.00 x180 VA 20/20 • OS: -2.75 -0.50 x165 VA 20/20

TABLE 2: Patient 2 Pre-treatment Data

	Right Eye (OD)	Left Eye (OS)
Corneal astigmatism (D)	1.67	1.16
Elevation difference (um)	28	22
Axial length (mm)	24.60	24.83

FIGURE 2: Pre-treatment axial topography maps for Patient 2 show moderate WTR astigmatism OD and mild WTR astigmatism OS



RESULTS

PATIENT 1

Follow-up at 9 months and 2 weeks after dispensing toric ortho-k lenses OU, with an 8 hour nightly wear time, resulted in good uncorrected VAs and well-centered treatment zones OU. Axial length change was stable OD (-0.10mm difference) and OS (-0.11mm difference), showing adequate myopia management.

TABLE 3: Patient 1 toric ortho-k lens parameters and results at 9 months, 2 weeks of nightly wear

	Design	Power	BC	Dia	OZ	Uncorrected VA	Axial length
OD	Euclid MAX Toric (0.75D)	+0.75	8.33	10.6	6.2	20/20-2	24.67 (Δ -0.10)
OS	Euclid MAX Toric (0.75D)	+0.75	8.43	10.6	6.2	20/20-1	24.67 (Δ -0.11)

FIGURE 3A: Patient 1 toric ortho-k lens evaluation

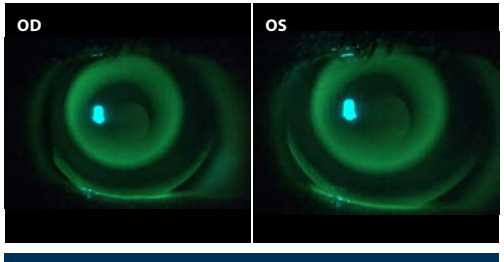
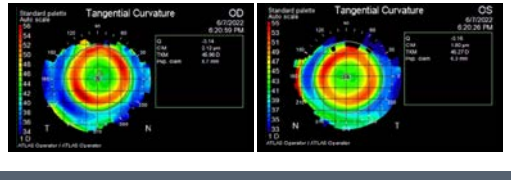


FIGURE 3B: Patient 1 toric ortho-k tangential topography maps show well-centered treatment zones OU at 9 months, 2 weeks of nightly wear



PATIENT 2

Follow-up at 10 months after dispensing spherical ortho-k lenses OU, with an 8 hour nightly wear time, resulted in good uncorrected VAs and well-centered treatment zones. Axial length change was within age norms OD (0.11mm difference) and stable OS (-0.13mm difference), showing adequate myopia management.

TABLE 4: Patient 2 spherical ortho-k lens parameters and results at 10 months of nightly wear

	Design	Power	BC	Dia	OZ	Uncorrected VA	Axial length
OD	Euclid MAX (sphere)	+0.75	8.25	10.6	6.2	20/20-1	24.71 (Δ +0.11)
OS	Euclid MAX (sphere)	+0.75	8.38	10.6	6.2	20/20-2	24.70 (Δ -0.13)

FIGURE 4A: Patient 2 spherical ortho-k lens evaluation

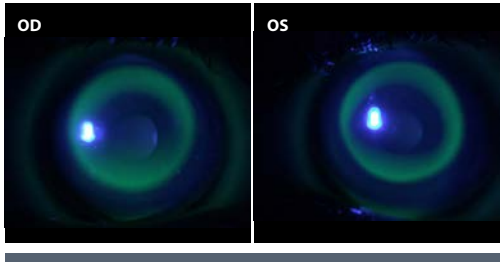
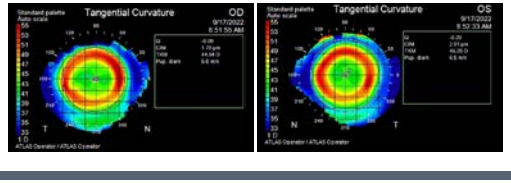


FIGURE 4B: Patient 2 spherical ortho-k tangential topography maps show well-centered treatment zones OU at 10 months of nightly wear



CONCLUSION

Toric ortho-k lenses result in improved centration versus spherical ortho-k lenses when fit on corneas with moderate to high astigmatism.[3] This limited case series compared spherical and toric ortho-k results on a set of twins with mild to moderate WTR astigmatism. The lens manufacturer used in this report applies the criteria of elevation difference >25um, which both patients met, to consider a toric ortho-k design. Both the spherical and toric ortho-k lenses showed similar clinical performance, with acceptable uncorrected VAs and well-centered treatment zones, and similar myopia management efficacy, with stable axial length measurements or growth within age norms. Future studies would be useful to determine industry standards for how much corneal toricity or elevation difference requires toric ortho-k lenses.

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Improving Glare and Haloes in Adult Orthokeratology

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BACKGROUND

Haloes and glare are a common side effect of orthokeratology treatment. Common reasons for this to occur include having a small treatment zone relative to pupil size, a decentered treatment zone, or a patient with large pupils. Attempts to rectify this could include increasing the treatment zone diameter, reducing the lens sagittal depth (by reducing sagittal depth of reverse curve and/or flattening alignment curve), or prescribing off-label brimonidine to reduce pupil size.

CASE DESCRIPTION

A 23-year-old female patient with h/o mild dry eye presented for an orthokeratology fit OU in 2021. Manifest refraction was OD -3.00-0.75x180 and OS -2.25-0.25x180, with VA 20/20 OD, OS. Pupil size was 6.3mm OD, 6.2mm OS; increasing to 6.8mm OD and 6.9mm OS in dim light. An empirically designed Emerald Toric OD 8.38/10.6/6.2 (1.0D toric) and Emerald OS 8.54/10.6/6.2 (Euclid Systems, Sterling, VA) gave good results and was worn successfully for >12 months, though the patient did notice haloes and glare at night.

ONE YEAR FOLLOW-UP

At annual evaluation in 2022, the patient had persistent symptoms despite compliance with dry eye therapy. These changes were made:

1. increase posterior optic zone from 6.2mm to 6.6mm OU
2. increase overall lens diameter from 10.6mm to 11.1mm OU
3. flatten first alignment curve 0.05mm OU (standard if increasing OAD to >11.0mm to ensure not too tight)
4. flatten second alignment curve 0.1mm OU (also a standard change when increasing OAD to >11.0mm).

After 1 week of wear, the patient was still experiencing glare and haloes. Examination revealed good lens centration and excellent topographic result, but slit lamp showed mild exacerbation of her dry eye and she noted she had been lax on treatment since starting the new lenses. After 6 more weeks of wear, and with regular use of artificial tears, the glare and haloes improved and she was very happy with the result.

In comparing the maps, you can see the treatment zone size increase with the new lenses (Fig 2).

Figure 1: Topography maps (with 2021 lenses) - symptomatic

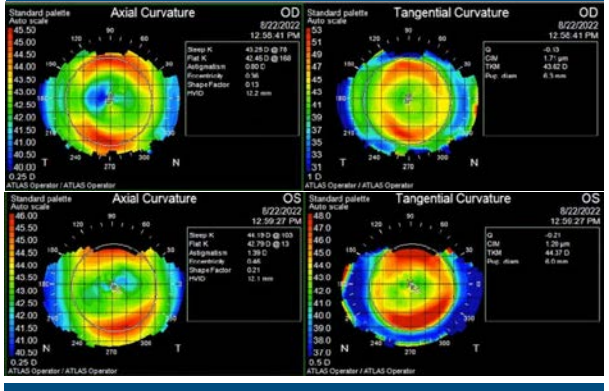
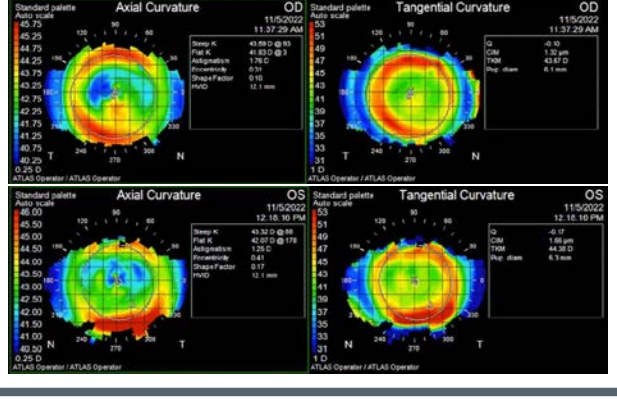


Figure 2: Improved topography maps (2022 re-designed lenses)



CONCLUSIONS

One major challenge to fitting orthokeratology lenses in adults can be subjective symptoms of glare and haloes, especially in patients with larger pupils. Symptoms can be especially bothersome with night driving or in dim illumination. An increase in overall lens diameter paired with an increase in posterior optic zone can improve the treatment zone size and reduce subjective symptoms of glare and haloes. Accompanying alignment curve adjustments compensate for a lens OAD greater than 11.0mm to ensure proper fit without binding.

It is also critical to ensure any underlying dry eye is properly treated in adults who wear orthokeratology lenses to ensure optimal visual outcomes.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge assistance in lens design and consultation from Abbey Cantolina, Senior Director of Consultation & Customer Relations at Euclid Systems.

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Contact Lens Correction in Microspherophakia

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BACKGROUND

Microspherophakia is a rare congenital condition caused by a lack of nutritional support to the tunica vasculosa lentis, which causes poor development of secondary lens fibers and leads to weak zonules with a lack of tension. This causes the patient to have a small spherical crystalline lens with an increased thickness[1]. Microspherophakia leads to high lenticular myopia and can lead to other complications such as lens subluxation and secondary glaucoma[1].

CASE DESCRIPTION

A 17-year-old male presented for a contact lens fitting. The ocular history was remarkable for microspherophakia that was diagnosed at age five. He reported always having "thick glasses" and poor vision. He had never tried contact lenses as he was told he was "not a candidate" due to his high refractive error. Entering spectacle-corrected distance visual acuity (VA) was D 20/50+2, improving to 20/30-2 with pinhole, and OS 20/40+1 with no improvement on pinhole. Entrance testing was unremarkable. Manifest refraction was OD -18.00-3.50 x 023 with VA 20/30 and OS -15.25-2.50 x 137 with VA 20/30-1. Slit lamp exam prior to dilation revealed bilateral iridodonesis. Intraocular pressures were OD 18 mmHg and OS 19 mmHg. Simulated keratometry values were OD 40.90/42.10@117 and OS 40.50/41.90@065 (Figures 1 and 2). Axial length by optical biometry measured OD 27.17mm and OS 26.11mm. The patient was fit in a monthly soft toric contact lens with an extended parameter range (Table 1). Distance VA with contact lenses improved to OD 20/20-1 and OS 20/25+1. Dilated fundus examination was unremarkable excepting the presence of a small crystalline lens OU (Figure 4). The patient has successfully worn the soft toric contact lenses for the last eight months.

FIGURE 1
Axial map OD showing with-the-rule corneal astigmatism and SimK values: 40.9/42.1@117.

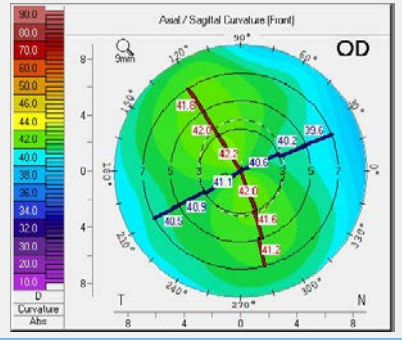

FIGURE 2
Axial map OS showing with-the-rule corneal astigmatism and SimK values: 40.5/41.9@065.

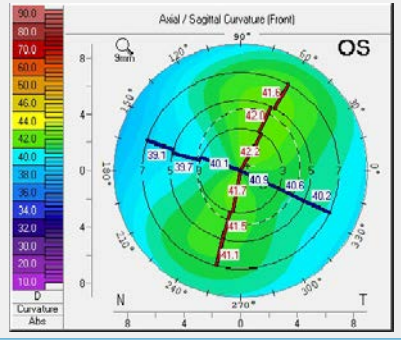

FIGURE 3
Follow-up visit demonstrates appropriate fit of extended range soft toric contact lens OD. The OS fit was identical. There was no lens rotation in either eye.

FIGURE 4
The patient's small, round crystalline lens is visualized within the aperture of a dilated pupil.

TABLE 1
Soft Contact Lens Parameters

	Brand	Type	Sphere	Cylinder	Axis
OD	CooperVision	Biofinity XR Toric	-13.50	-2.25	020
OS	CooperVision	Biofinity XR Toric	-12.50	-1.75	140

CONCLUSIONS

Microspherophakia is a rare congenital condition that causes high lenticular myopia leading to high ametropia. These patients are optimal candidates for contact lenses, even from a young age, as lenses can improve their visual acuity and optimize visual function by providing fewer minification effects, better peripheral vision, and improved cosmesis[2].

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Avoiding A Corneal Transplant in a Young Patient

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BACKGROUND

Corneal opacity is the fifth leading cause of blindness worldwide[1]. A common cause of corneal opacity is infectious keratitis. In developed countries contact lenses are the leading cause of infectious keratitis while in developing countries it is from corneal trauma during agriculture work[1]. The most common organism responsible for microbial keratitis in contact lens wear is *Pseudomonas aeruginosa*[2]. When the visual axis is involved, a cornea transplant may be required to improve vision. Corneal transplants have a higher rate of rejection in younger patients[3].

CASE DESCRIPTION

- 19-year-old Hispanic female presented for a gas permeable contact lens fitting
- History of decreased vision OS following microbial keratitis caused by Pseudomonas following extended wear of an unknown monthly soft contact lens.
- Entering visual acuities were 20/20 OD with correction and 20/200 OS without correction which improved to 20/40 with pinhole.
- Entrance testing: unremarkable
- Slit lamp examination: 6 mm round central stromal scar with significant stromal thinning OS (Figure 1).
- Simulated keratometry measurements: 40.75/43.0 @ 89 OD (Figure 2), 33.75/35.50 @ 99 OS (Figure 3).
- Manifest Refraction: -7.00-1.50x170 OD with a distance acuity of 20/20 and +2.00 sphere OS with a distance acuity of 20/80.
- Diagnostic lens fitting OS (Table 1A): Showed excessive central fluid reservoir clearance (Figure 4A). VA improved to 20/30 with an over-refraction.
- Final lens order OS (Table 1B): Oblate design to reduce central fluid reservoir clearance (Figure 4B).
- The patient was given specific instructions on proper wearing schedule and cleaning regimen. The patient was followed closely over the first three months of scleral lens wear to ensure appropriate wear.

FIGURE 1
Slit lamp photo showing a 6mm round central stromal scar OS secondary to microbial keratitis.

FIGURE 2
Axial map showing with-the-rule astigmatism in the right eye.

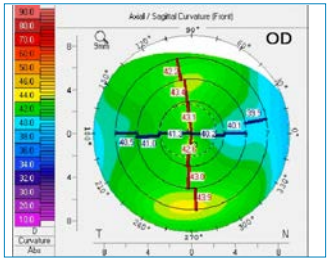

FIGURE 3
Axial map showing central corneal flattening secondary to microbial keratitis in the left eye.

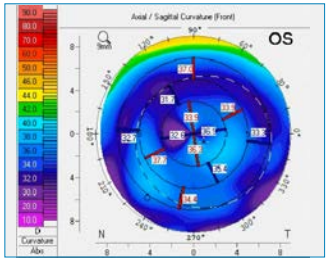

FIGURE 4A
An AS-OCT of a prolate diagnostic scleral lens OS showing excessive central vault with adequate midperipheral vault.

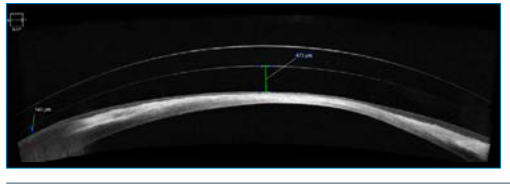

FIGURE 4B
An AS-OCT of an oblate scleral lens design OS showing adequate central clearance after ~6 hours of wear.

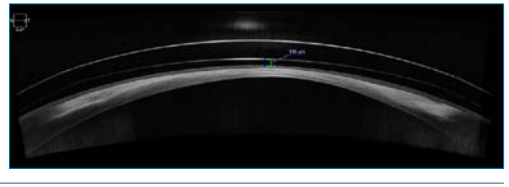

TABLE 1A
Initial diagnostic scleral lens OS that showed excessive central clearance

Type	Power	BC	Diameter	Edge	Design	Material
Onefit 2.0	plano	8.4	14.9	std	Prolate	Optimum Extreme

TABLE 1B
Final scleral lens design OS

Type	Power	BC	Diameter	Edge	Design	Material
Onefit 2.0	+6.50	8.4	14.9	std	Oblate – CCR 230	Optimum Extreme

CONCLUSIONS

Corneal scarring after microbial keratitis leads to vision loss secondary to corneal opacity and irregular astigmatism[4]. The two most common options to improve vision in these cases are corneal transplantation or a specialty contact lens. Corneal gas permeable or scleral contact lenses should be considered if they are able to provide the patient with functional vision as was demonstrated in this case.

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HEART OF AMERICA

12 ICO PRESENTATIONS

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A Case of Atypical Retrobulbar Optic Neuritis

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INTRODUCTION

Optic neuritis (ON) is an inflammatory condition of the optic nerve that demyelinates and degrades vision. The typical triad includes unilateral vision loss, periocular pain, and impaired color vision. The presentation of optic neuritis is either typical or atypical. Typical ON is idiopathic demyelination, commonly associated with multiple sclerosis. Typical ON occurs predominantly in females aged 20-40 and has a good visual prognosis. Atypical optic neuritis results from an inflammatory, infectious, or autoimmune disorder. Additionally, antibody mediated ON is considered a distinct entity of ON. Antibody-medicated ON includes the presence of serum antiaquaporin4 or antimyelin oligodendrocytes antibodies. Atypical ON differs in clinical presentation, management, visual prognosis, and treatment with IV corticosteroids or plasma exchange for visual recovery. Thus, prompt examination and diagnosis of atypical ON are crucial for improved visual recovery.

CASE

A 31 y/o AAF was referred to the Urgent Care Clinic by an ED provider, to which the patient was referred by an outside eye care provider for a suspected CRAO OD 3 days prior. The patient reported a sudden and constant reduction in vision upon awakening OD x 2 weeks. She denied any associated pain, flashes, or floaters, and this was the first occurrence. Serology, CT scan, and a carotid doppler were performed at the ED, all unremarkable. The patient was started on hydrochlorothiazide for blood pressure control. The patient denied muscle weakness, fatigue, tinnitus, headache, numbness or tingling sensations, or change to memory or speech.

Pertinent Clinical Findings

	OD	OS
Visually Acuity (cc)	20/600, PH 20/500	20/20
Pupil Testing	PERRL, (+) APD	PERRL, (-) APD
Red-Cap	10%	100%
CVF	FTFC	FTFC
EOM	FROM, (-) pain	FROM
Vitreous	Clear	Clear
Lens	Clear	Clear
Optic Nerve	Flat, sharp, good color, (-)hemes, (-)edema C/D: 0.3H/0.3V	Flat, sharp, good color C/D: 0.35H/0.35V
Macula	Flat with normal foveal contour (Figure 3a)	Flat with normal foveal contour (Figure 3b)
Fundus	Flat x 360 degrees, (-)RD/holes/ tears (Figure 1a)	Flat x 360 degrees, (-)RD/holes/ tears (Figure 1b)

FIGURE 1A
Optos OD with magnified ONH view

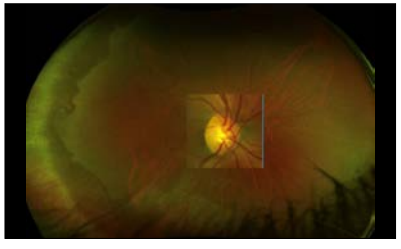


FIGURE 1B
Optos OS with magnified ONH view

FIGURE 3A
Cirrus macular OCT OD

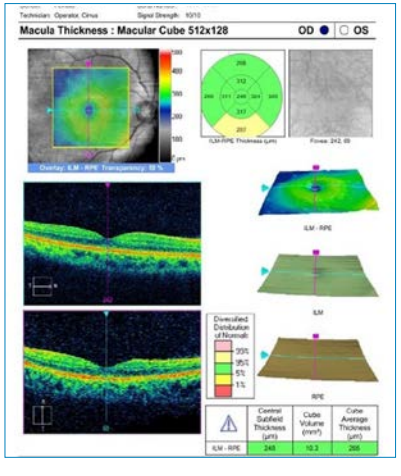


FIGURE 3B
Cirrus macular OCT OS

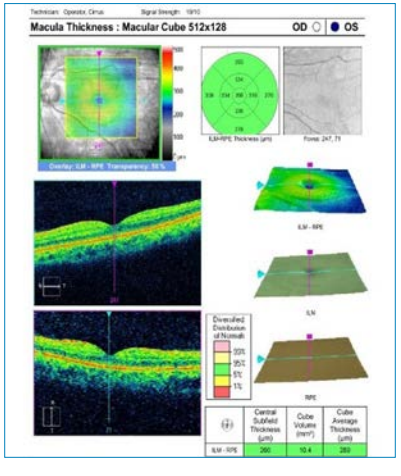
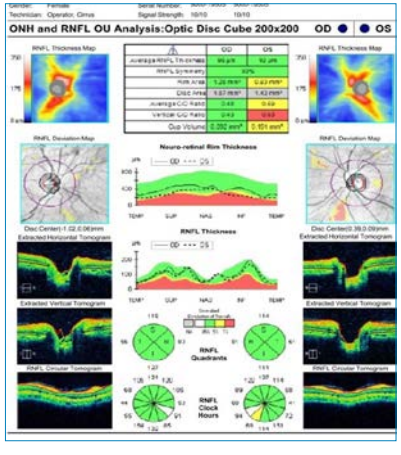


FIGURE 2
Cirrus ONH OCT



Radiology and Lumbar Puncture Results

MRI of Brain	No abnormal enhancement
MRI of Orbits	Asymmetric ON with thickened and increased signal OD Normal EOMs and globe morphology
LP	WNL, (-)Oligocolonal bands

DIAGNOSIS AND DISCUSSION

Optic Neuritis (ON) is an acute inflammatory process leading to the most common cause of acute unilateral vision loss in young adults. ON is clinically diagnosed based on a triad of symptoms, including unilateral vision loss, periocular pain, and impaired color vision. However, patients with atypical variations of ON may present with no pain, pallor at onset, complete and bilateral vision loss, and vision loss lasting more than 2 weeks without spontaneous visual recovery. Clinical findings include a loss of visual acuity or visual field that may vary, dyschromatopsia, a RAPD in unilateral or asymmetric bilateral cases, a normal nerve, or a swollen nerve in atypical cases. Optic disc hemorrhages, retinal exudates, and a macular star may be noted in atypical cases. Immediately following the clinical examination, the on-call ophthalmology department was contacted regarding an atypical ON presentation. A CRAO was ruled out based on clinical examination with normal posterior pole findings and normal macular OCT. The patient was referred the same day to the ophthalmology department for an MRI of the brain and orbits, serology testing, and lumbar puncture for CSF analysis for oligoclonal bands.

CONCLUSION

This case illustrates the importance of rapid clinical recognition of atypical optic neuritis and co-management with neuro-ophthalmology. A differential diagnosis of atypical optic neuritis should be considered in patients 20-40 years old presenting with variable vision loss or visual field loss, a RAPD, dyschromatopsia, and no pertinent pathology observed on clinical examination. Rapid and accurate diagnosis prevents the delay in treatment, thus, improving the patient's visual prognosis and preventing future neurological disabilities.

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Terson Syndrome: A Rare Presentation of Vitreous Hemorrhage

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INTRODUCTION

Terson syndrome is an oculocerebral syndrome that results in *intraocular* hemorrhage secondary to intracranial hemorrhage. The most common intracranial pathology associated with Terson syndrome is a subarachnoid hemorrhage (SAH). Patients with Terson syndrome may have one or both eyes affected. A diagnostic CT scan *without* contrast is typically required in acute presentations of subarachnoid hemorrhage because subarachnoid blood and contrast material both will appear white on the scan. Angiogram may be indicated to determine the presence and location of an arterial aneurysm, which can rupture, resulting in the subarachnoid hemorrhage.

Confirmation of intraocular hemorrhage may be performed by dilated fundus examination and B-scan ultrasound. Additionally, axial CT views of the orbit and globe may exhibit a half-moon shaped area of hyperintensity, which is indicative of a dense intravitreal hemorrhage. Many patients with Terson syndrome present with orientation, mobility, and/or cognitive impairment, which can create challenges for the patient to receive an accurate and timely diagnosis.

CASE HISTORY

A 37-year old female veteran presented to the VAMC Emergency Department due to "the worst headache imaginable". She was diagnosed with subarachnoid hemorrhage due to ruptured cerebral aneurysm. She underwent an 8-week admission following craniotomy and aneurysmal clipping.

Midway through her hospital admission, her mental status and perceptual abilities improved so much that she had become aware of decreased vision. She described this complaint as severe, painless, constant, and bilateral. Once discharged, the department of ophthalmology at the VAMC had a wait of several weeks before the next available appointment. As a result, she decided to call our external optometry clinic, which offered same-day appointments.

TABLE 1
Pertinent Examination Findings

	OD	OS
Visual Acuity	20/200	20/100 with EV
IOP	19	16
Slit Lamp	Unremarkable	Unremarkable
DFE	Dense vit heme	Dense vit heme
Continued...	Fleeting views of intact retina...	Fleeting views of intact retina...
B-scan	See Figure 1	See Figure 2

FIGURE 1
Dense vitreous hemorrhage of the patient's right eye

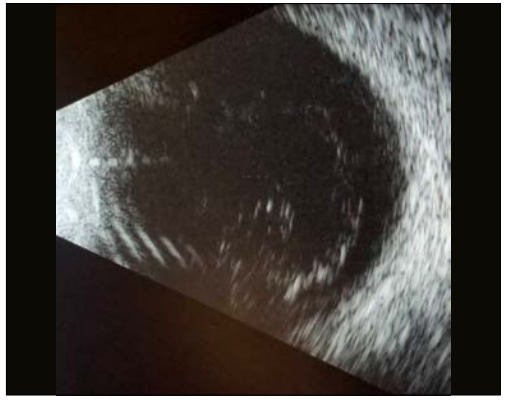
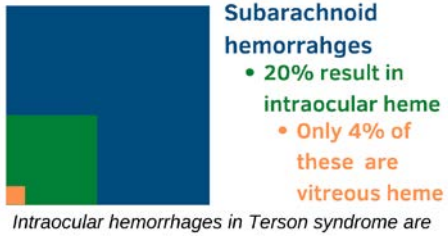
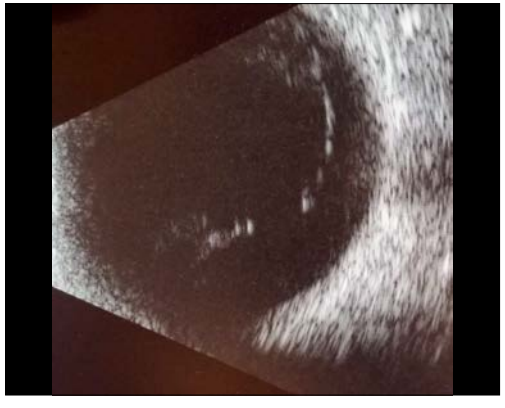


FIGURE 3
Frequency of ocular hemorrhages in SAH



Intraocular hemorrhages in Terson syndrome are either intraretinal, preretinal, or vitreous.

FIGURE 2
Dense vitreous hemorrhage of the patient's left eye



MANAGEMENT AND OUTCOME

This patient was diagnosed with bilateral vitreous hemorrhage secondary to resolved subarachnoid hemorrhage. She was referred to a retinal specialist who performed pars plana vitrectomy in the right eye 2 weeks later, followed by the left eye 4 weeks after the first surgery. Pinhole visual acuity during her final postoperative visit was 20/25 the right and left eye. She has since been referred back to the VAMC department of ophthalmology for continuity of care.

DISCUSSION

The frequency of intraocular hemorrhage secondary to subarachnoid hemorrhage is detailed in Figure 3. Aside from subarachnoid hemorrhages, 9.1% of Terson syndrome cases involve intracerebral hemorrhages, and 3.1% are the result of traumatic brain injury—which typically result in subdural hemorrhage. Terson syndrome is typically seen in adults but has been reported in babies as young as 7 months old.

The mechanism of vitreous hemorrhage secondary to subarachnoid hemorrhage is still controversial. The pathophysiology has been proposed as a "bleed-through" of subarachnoid blood into the vitreous via the subarachnoid space surrounding the optic nerve. The more widely accepted mechanism involves compression of the central retinal vein around the retrobulbar optic nerve and rupture of peripapillary capillaries due to increased intracranial pressure. There is still debate on the relationship between Terson syndrome and aneurysm location. There is no clear association between an aneurysm's location and the eye(s) affected in Terson's patients.

Cases of Terson syndrome that are intravitreal in nature that do not resolve spontaneously may require pars plana vitrectomy. There are long-term visual complications associated with Terson syndrome, with the most common being epiretinal membrane. Most patients with Terson syndrome have a visual acuity recovery better than 20/50 in 75% of cases.

CONCLUSION

Subarachnoid hemorrhage (SAH) is a devastating neurological event that can result in sudden death and increased mortality risk in the intermediate term. For mechanisms still under debate, SAH can lead to Terson syndrome, potentially resulting in long-term vision loss. This patient was fortunate in that she survived and had a favorable visual acuity outcome following vitrectomy.

REFERENCES

Available on request

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Importance of OCT imaging in a case of bilateral optic nerve head colobomas with an optic disc pit

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INTRODUCTION

Congenital optic nerve anomalies rarely co-exist with one another. This case highlights a bilateral optic nerve head coloboma with an associated optic disc pit and the importance of OCT imaging in order to properly diagnose and manage these patients to monitor for the development of maculopathy.

CASE PRESENTATION

- Chief Complaint: 22-year-old African American Female presents for yearly eye exam with complaint of blurry vision at distance OU.
- Ocular History: Myopia OU, Congenital Optic Nerve Head Coloboma OS, Microphthalmia OS
- Medical History: No current systemic conditions
- Medications: No current medications

PERTINENT FINDINGS

- VAcc: 20/20 OD, 20/300 OS, PHNI
- Entrance Testing
  - Full range of motion OD/OS
  - CVF: Full to finger counting OD, Superior Temporal defect OS
  - Pupils: Equal, round, reactive to light OD/OS, 3+ APD OS
- Slit lamp exam: Unremarkable OD, Microphthalmia, Microcornea OS
- DFE:
  - OD: temporal and inferior optic disc excavation
  - OS: extensive optic nerve head coloboma
- Additional Testing:
  - Fundus photos:
  - OD: temporal and inferior optic disc excavation
  - OS: extensive ONH coloboma
  - OCT ONH:
  - OD: temporal optic disc pit, inferior optic disc coloboma
  - OS: extensive optic nerve head coloboma
  - OCT macula: no evidence of macular edema OD

FIGURE 1
Optos photo of right eye optic nerve showing temporal and inferior excavation

FIGURE 2
Optos photo of left eye optic nerve head coloboma

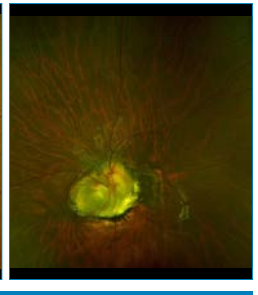


FIGURE 3
OCT of right eye optic nerve showing temporal optic disc pit and inferior optic nerve coloboma

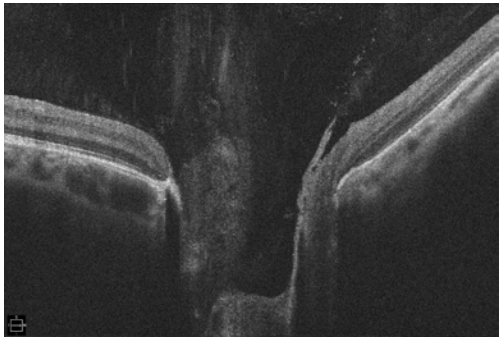


FIGURE 4
OCT of left eye optic nerve showing extensive areas of excavation and bare sclera consistent with optic nerve coloboma

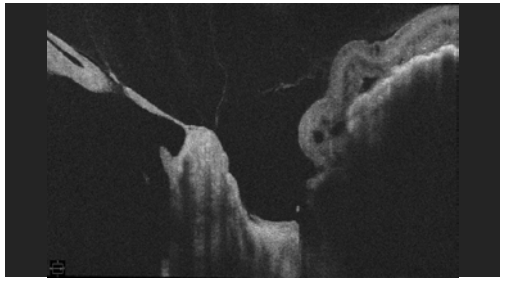
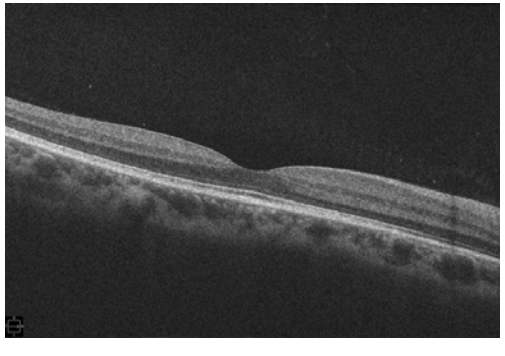


FIGURE 5
OCT of right macula demonstrating no maculopathy present



DIFFERENTIAL DIAGNOSIS

- Primary: Bilateral ONH coloboma with optic disc pit OD

DIAGNOSIS & DISCUSSION

- Diagnosis: Bilateral ONH coloboma with optic disc pit OD
- Discussion: Both conditions are rare, however they share a similar etiology: incomplete embryonic fissure closure, thus an overlapping presentation is possible. Due to a shared etiology, they can both result in maculopathy, which is seen more so with optic disc pits and affects two thirds of patients with them. OCT can aid in confirming congenital excavated disc anomalies and their complications.

TREATMENT & MANAGEMENT

New glasses prescription with polycarbonate lenses released to patient with education on monocular precautions. Reviewed proper Amsler grid use and education on signs and symptoms of retinal detachment. Continue to monitor yearly with OCT for the development of maculopathy.

CONCLUSION

Although rare, clinicians should be aware of the possible co-existence and potential sequalae of combined excavated optic disc anomalies. OCT should be used to diagnose and manage such presentations and clinicians should be knowledgeable in how to differentiate between optic disc anomalies on OCT.

REFERENCES

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Can You Believe It? A Case of Atypical Acanthamoeba Keratitis

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INTRODUCTION

- Acanthamoeba are free-living amoebas that are commonly found in aquatic environments
- This parasite, although rare, can cause vision-threatening keratitis most often in contact wearers who have come in contact with contaminated water
- `Acanthamoeba keratitis (AK) is often associated with pain out of proportion to signs and can take on appearances of other much more common pathogens
- Because of this, diagnosing acanthamoeba is difficult, especially when there is an atypical course of disease

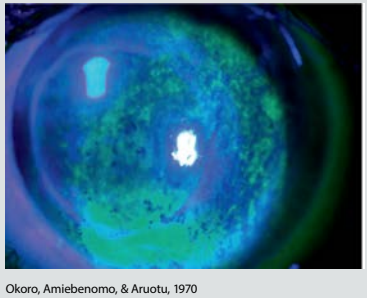
CASE HISTORY

A 52-year-old female unspecified keratitis OD x 6wks

HPI
- Decreased vision, no pain
- Previously treated with steroids, antibiotics, antivirals, and BCLs

Ocular History
- Daily CL wearer

FIGURE 1
Initial Presentation (not actual patient)



Okoro, Amiebenomo, & Aruotu, 1970

CLINICAL FINDINGS

	OD
VAcc	20/125
Cornea	3+ "dirty" PEK with faint branching pattern, white KPs (Figure 1)
Anterior Chamber	Deep and quiet

- Valtrex(1g) TID
- Moxi QID
- Pred QID

2 wks

	OD
VAcc	20/300
Cornea	Improved PEK, 2+ stromal edema, more distinct branching pattern
Anterior Chamber	Deep and quiet

- Prokerra
- Valtrex(1g) TID
- Moxi BID
- Pred BID

1 wk

	OD
VAcc	20/1000
Cornea	Improved PEK, improved edema, improved branching pattern
Anterior Chamber	Deep and quiet

- Valtrex(1g) TID
- Moxi BID
- Pred QD

2 wks

	OD
VAcc	20/1600
Cornea	Central ring infiltrate (Figure 2)
Anterior Chamber	0.5mm hypopyon

- PHMB q2hr
- Valtrex(1g) TID
- Moxi BID
- Pred QD

6 wks

	OD
VAcc	HM
Cornea	Central scarring vs infiltrate (Figure 3)
Anterior Chamber	Deep and quiet

Differentials:
- HSV, toxicity, bacterial, acanthamoeba
- High suspicion for HSV given dendritic PEK

- Overall improvement but decreased acuity
- Inserted amniotic membrane ring

- Much improvement in signs but decreased acuity
- Stabilized without amniotic membrane

- Acanthamoeba reveals itself
- Cultures taken, but were negative

- Improved signs
- Decreased acuity despite treatment

DISCUSSION

- Acanthamoeba exists in two forms[3]
  - Mobile trophozoites
  - Encapsulated cysts
- Acanthamoeba keratitis progresses in two phases[1]
  - Epithelial phase – more easily treated
  - Stromal phase – very difficult to treat
- Closely resembles other types of infections but in 95% of cases is set apart by severe pain out of proportion to clinical signs[2]

- Our patient did not report any pain during the course of her disease
- Symptoms and signs seemingly improved with various treatments however acuity was declining
- Acanthamoeba made its presence clear 11wks after initial symptoms

- Most common treatments include biguanides (PHMB and chlorhexidine), diamides (propamidine), antifungals (voriconazole) and antibiotics (neomycin)[1,3]
- Following correct treatment, inflammation worsens before improving[1]
- Treatment usually lasts for 1yr and commonly require keratoplasty

- Treatments showing promise include CXL and TTO

FIGURE 2
Central ring infiltrate

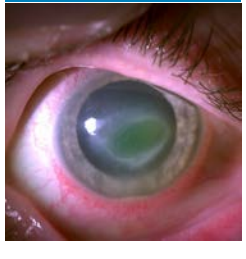
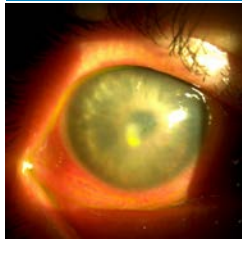


FIGURE 3
Central scarring vs infiltrate



CONCLUSION

- AK can closely resemble other types of keratitis in beginning phases
- Early treatment correlated with better prognosis
- Long course of medical and surgical treatment

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The Headache That Won't Go Away: Surgical Considerations in IIH

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CASE HISTORY

19 year old white female presented with progressive vision loss OD>OS, worsening migraines with associated nausea, emesis, and diplopia. Onset 5 days ago. Additionally, tinnitus starting 2 weeks ago. Patient was seen at the ER on the day vision loss started. Routine blood work came back negative, patient diagnosed with a migraine flare up and discharged. Patient admits to gaining about 60 pounds over last year due to uncontrolled celiacs disease for which she was recently diagnosed.

Pertinent Ocular, medical history, and medications
- Chronic migraines, not intractable, with aura
- Celiac disease
- Excedrin

EXAM FINDINGS

	OD	OS
BCVA	20/200	LP @ 5'
Applanation	15	14
Pupils	RRL, (-) APD	2+ APD
EOMs	Grossly full	Limited Abduction
CVF	Partial constriction 360	Full field constriction
Anterior Segment	Unremarkable	Unremarkable
Lens	Clear capsule, nucleus, and cortex	Clear capsule, nucleus, and cortex
Vitreous	Clear	Clear
Optic Nerve	Grade 4 papilledema, florid elevation of nerve, several parapapillary drance hemorrhages and CWS	Grade 4 papilledema, florid elevation of nerve, multiple parapapillary drance hemorrhages and CWS
Macula	Mild edematous spillover from optic nerve, nasal flame hemorrhages	Moderate edematous spillover from optic nerve, several dot hemorrhages

FIGURE 1
OD Fundus

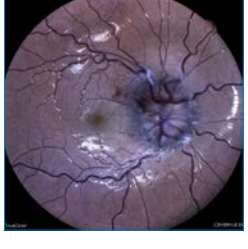


FIGURE 2
OS Fundus

Differential Diagnosis
- Fulminant idiopathic intracranial hypertension
- Venous sinus thrombosis
- Space occupying lesion
- Meningitis

Management
- Diagnosis: Fulminant Idiopathic intracranial hypertension
- Immediate referral to University of Minnesota ER for MRI/MRV, LP with opening pressure and CSF studies, and bloodwork
- LP opening pressure: 65cc
  - o Normal WBC count and CSF glucose
- MRV: Bilateral stenosis of transverse and sigmoid sinus
- MRI: ONH protrusion OS>OD
- Bloodwork: Elevated ESR, CRP and INR, CBC WNL

Treatment
- Patient admitted overnight, temporizing CSF drainage removed 343 mL
- Start Diamox 1000 mg BID
- Start IV methylprednisolone 250 mg Q6H
- Ventriculoperitoneal shunt scheduled for following morning
- 1 Week post-op
  - o Patient reports complete resolution of migraines and diplopia
  - o VA OD: 20/150-2 OS: 20/80
  - o OD: 1-2+ Disc edema OS: 2+ Disc edema

SURGICAL COMPARISON

	Overall Improvement					
	Papilledema	VA	VF	HAs	12-month failure rate	Complication Rate
VPS (142)	90.8%	57.8%	67.3%	90.8%	40.6%	9.4%
LPS (157)	86.6%	70.1%	72.3%	97.3%	37.5%	9.4%
VSS (825)	87.1%	64.9%	72.7%	72.1%	13.1%	2.3%
ONSF (818)	90.5%	44.1%	65.2%	49.3%	16.6%*	2.2%

VPS: ventriculoperitoneal shunt, LPS: Lumboperitoneal shunt, VSS: Venous sinus stenting, ONSF: Optic nerve sheath fenestration, * Required additional surgical intervention

FIGURE 3
Ventriculoperitoneal Shunt (VPS)

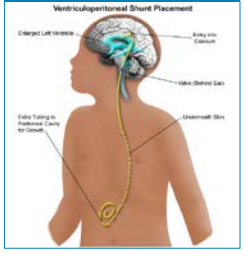


FIGURE 4
Lumboperitoneal shunt (LPS)

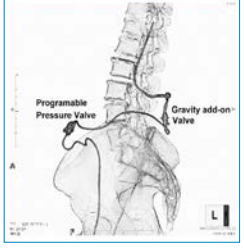


FIGURE 5
Venous Sinus Stenting (VSS)

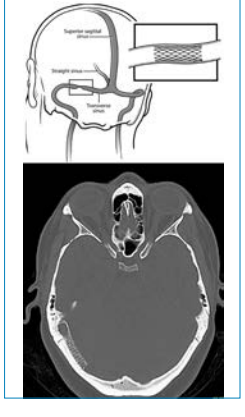
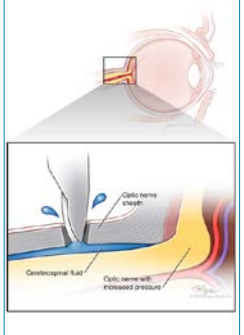


FIGURE 6
Optic Nerve Sheath Fenestration (ONSF)



DISCUSSION

- Idiopathic Intracranial Hypertension
  - o Intracranial pressure > 25cc and normal CSF studies in the absence of other identifiable pathology
  - o Most common in overweight females of childbearing age
  - o Often managed with oral CAI's and weight management
  - o Surgical indications
    - Non-responsive to medical therapy
    - Reduced vision
    - Visual field defects
    - Prominent symptoms — severe intractable headaches
- Fulminant Idiopathic Intracranial Hypertension
  - o IIH + severe vision loss within 4 weeks of symptoms onset and progressive vision loss over days
  - o Rare subtype present in only 2% of all IIH patients.
  - o Surgical intervention often imperative for visual preservation

CONCLUSION

- Fulminant IIH is a rare but serious subtype that can result in permanent vision loss if left untreated.
- Prompt surgical interventionis almost always required.
- Surgeon experience and supply availability often predicate chosen surgical modality
- Non-fulminant IIH cases are typically managed by oral medications and weight loss.
- Venous sinus stenting should be considered when resolution is not achieved with medical/lifestyle intervention alone.

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Bi-nasal Visual Field Defect due to a Pituitary Adenoma and Aberrant Visual Pathway Development in Patients with Albinism

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INTRODUCTION

Patient presented for a Low Vision Rehabilitation exam to renew bioptic driver's license. This case reviews the incidental finding of a rare visual field defect due to a pituitary tumor in a patient with Albinism.

CASE HISTORY

Patient WL, a 43-year-old Caucasian Male, presented for a vision rehabilitation evaluation for annual updated DMV forms with Bioptic telescope. Upon presentation, WL denies changes in functional vision or ocular complaints. His past medical history includes Oculocutaneous albinism, acquired hearing loss, hypertension, pituitary adenoma status post-surgical removal of approximately 85% of pituitary adenoma after diagnosis in 2020.

OCULAR EXAMINATION

	OD	OS
DVA cc	20/50+1	20/60+1
Pupils	Equal, round, reactive, (-) APD	Equal, round, reactive, (-) APD
CVF	Full to Finger Counting	Full to Finger Counting
EOMs	FROM, (+) congenital nystagmus	FROM, (+) congenital nystagmus
Biomicroscopy	(+) Transillumination Defects	(+) Transillumination Defects
DFE	Prominent choroidal vessels (see photos)	Prominent choroidal vessels (see photos)
Optic Nerve	Flat sharp, good color with robust NRR, CD 0.3	Flat sharp, good color with robust NRR, CD 0.25

FIGURE 1
Variable chiasmal organization of the optic chiasm in patients with albinism, notice that temporal fibers cross causing a nasal visual field defect with pituitary adenoma compression

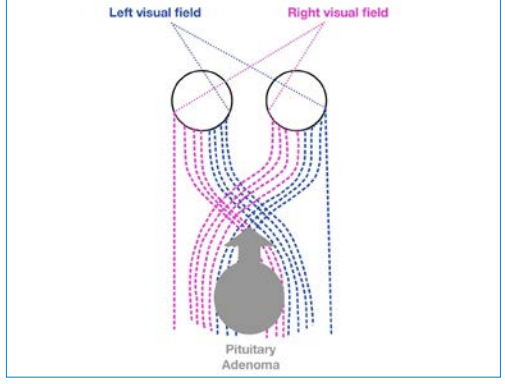


FIGURE 2
Kinetic visual field from 2019 shows full field prior to pituitary adenoma diagnosis

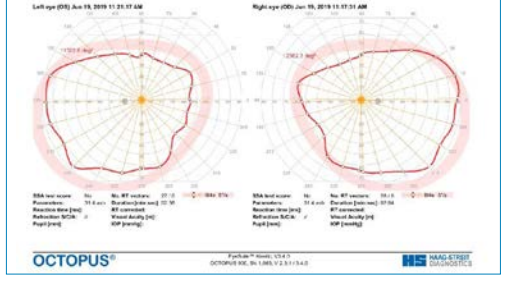


FIGURE 3
Kinetic visual field from 2022, shows inferior bi-nasal visual field defect which raised suspicion of tumor regrowth

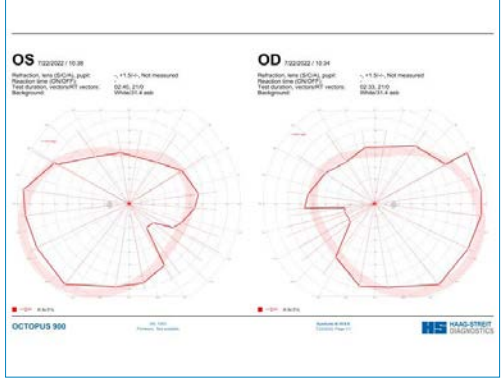
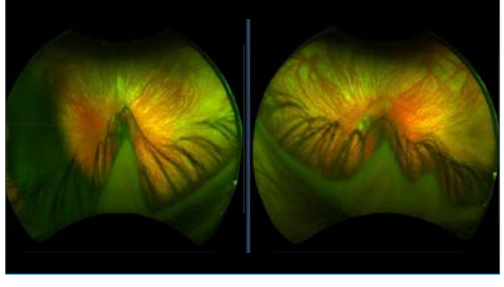


FIGURE 4
Blonde fundus photos due to the lack of pigment in patients with albinism



DIAGNOSIS & DISCUSSION

Albinism is defined by genetic anomalies in the process of making melanin and transport pathway, including the different variations at the crossing at the optic chiasm and differences in the cortex as seen on MRIs. Because of the aberrant visual pathway development in patients with albinism this patient's pituitary adenoma caused a bi-nasal visual field defect. Whereas patients with standard optic chiasm crossing would show a bitemporal visual field defect.

TREATMENT, MANAGEMENT

Referral to Oncologist for MRI to rule out tumor growth since removal in 2020, continue care as directed by oncology including PET scans every 6 months to monitor. Patient education regarding vision loss as patient was asymptomatic.

CONCLUSION

It is important to understand the anatomical differences between patients with and without albinism including the misrouting at the optic chiasm as expected visual field defects associated with chiasmal pathology may be different in this population. Incidental findings while doing a vision rehabilitation exam led to catching a potential regrowth in a patient's pituitary adenoma.

REFERENCES

References available upon request.

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Ischemic Optic Neuropathy Secondary to Nocturnal Hypotension Associated with Furosemide Use

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INTRODUCTION

Non-arteritic anterior ischemic optic neuropathy (NA-AION) is the most common ischemic optic neuropathy and the second most common optic neuropathy following glaucoma. Patients usually present with acute, painless, unilateral vision loss, typically noticed upon waking. Hypoperfusion of the short posterior ciliary arteries, which supply the optic nerve head, leads to axonal swelling and ischemia of the optic nerve. This case demonstrates an atypical presentation of an NA-AION in a young patient associated with nocturnal hypotension as a result of her systemic use of furosemide.

CASE PRESENTATION

Case History

- A 42-year-old African American female presented for a CEE with a CC of sudden decrease in vision upon waking in her left eye five days prior. The patient's medical history was remarkable for obesity, managed with furosemide, which was initiated two weeks prior by her PCP to aid in weight loss. Since starting the medication, the patient reports extreme thirst, nausea, vomiting, dizziness, and dark urine. As a result, the patient self-discontinued the medication four days prior to presentation.

Additional Testing

- Blood pressure: 145/100 mmHg (manual)

TABLE 1

Entrance testing at initial visit. Over subsequent visits, patient's uncorrected VA improved to 20/50 OS, and CVF improved to full to finger count OS, while RAPD OS remained.

OD		OS
20/20-2	**VA (cc)**	20/300, PH 20/25
round, reactive to light, no APD	**Pupils**	round, reactive to light, 2+ RAPD
FROM	**EOMs**	FROM
FTFC	**CVF**	Constricted SN/IN
100%	**Red cap desaturation**	90%

FIGURE 1

Optos imaging depicting patient's optic nerve OD **(A)** and optic nerve OS **(B)** at initial visit. Optic nerve OS remarkable for diffuse C-shaped edema, indistinct margins, with absence of peripapillary hemorrhages.

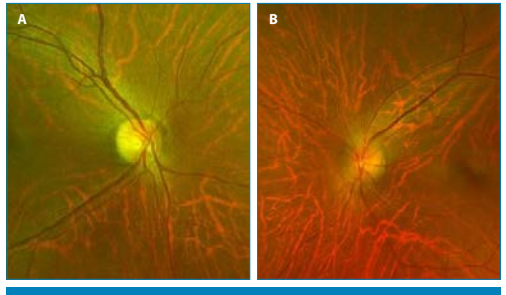


FIGURE 2

Cirrus optical coherence tomography of patient's OS at 5 days post-onset **(A)** and 6 weeks post-onset **(B)** showing initial diffuse RNFL thickening with subsequent RNFL thinning at follow-up.

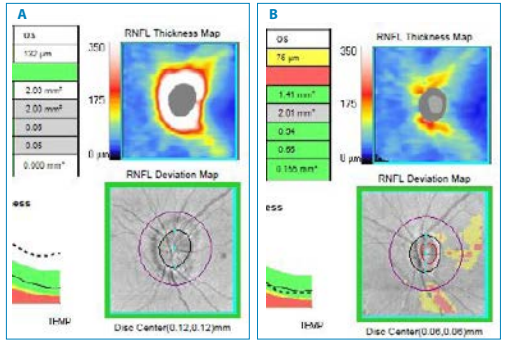


FIGURE 3

Cirrus optical coherence tomography optic nerve raster scan of patient's optic nerve OD **(A)** and OS **(B)** at initial visit. Red boxes depict the inward deflection of RPE/Bruch's membrane complex OS.

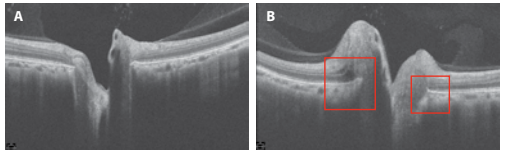
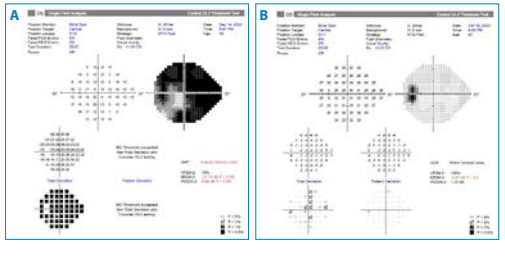


FIGURE 4

Humphrey visual field testing of patient's OS at 2 weeks post-onset **(A)** and 6 weeks post-onset **(B)** showing initial diffuse visual field constriction with significant improvement at follow-up. Note: incorrect trial lens used during initial test, likely overestimating true amount of visual field loss.



DISCUSSION

The annual incidence of NA-AION is 2.3-10.2/100,000, accounting for ~6,000 new cases annually. There is no gender predilection, and Caucasians tend to be affected more commonly than patients of other races. The average age of affected patients is 57-65 years old; however, cases in younger patients are not uncommon. Systemic risk factors for developing an NA-AION include hypertension, nocturnal hypotension, diabetes mellitus, hypercholesterolemia, and sleep apnea. Ocular risk factors include having a small/absent cup ("disc at risk"), conditions with markedly elevated IOP, and optic disc drusen. Development of NA-AION is fundamentally due to hypoperfusion to the ONH circulation, leading to ischemia.

In patients with a suspected NA-AION, it is important to distinguish from the arteritic counterpart, A-AION, which is due to giant cell arteritis (GCA). Patients with A-AION tend to be older than age 70, female, and may have associated symptoms of jaw claudication, scalp tenderness, headache, and loss of appetite/ weight loss.

Furosemide is a loop diuretic that acts by inhibiting the Na+/K+/2Cl- cotransporter in the thick ascending limb of the loop of Henle in the renal tubule. This inhibition leads to lower ion absorption, more fluid excretion in the urine, and reduced blood pressure. It is suspected that the patient experienced an episode of nocturnal hypotension secondary to her furosemide use, with subsequent ONH ischemia presenting as a NA-AION.

MANAGEMENT

No universally accepted treatment currently exists, although many avenues have been trialed (optic nerve sheath decompression, oral steroids, etc). Management includes controlling systemic risk factors to prevent recurrence in same eye and/ or fellow eye involvement. Additionally, co-management with the patient's PCP is essential to minimize risk factors.

CONCLUSION

NA-AION is a commonly encountered clinical entity and is most often due to hypoperfusion to the optic nerve head circulation. Because NA-AION is typically seen in older patients with vasculopathic disease, it is important to investigate alternative etiologies, especially a thorough review of systemic medications, in patients who do not fit the expected demographic and clinical profile. Collaborative care with a patient's PCP to manage risk factors is essential to preventing a recurrence and/or episode of NA-AION in the fellow eye.

REFERENCES

Available upon request

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A Rare Case of Tattoo-Associated Uveitis in the Absence of Systemic Sarcoidosis

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INTRODUCTION

There have been few reported cases in the literature of bilateral panuveitis with underlying etiology linked to the presence of bodily tattoos. Although rare, this report documents a case of bilateral panuveitis due to the presence of bodily tattoos obtained several years prior to clinical presentation in the absence of systemic sarcoidosis, confirmed with laboratory testing.

CASE HISTORY

Patient AA is a 29-year-old Hispanic male that presented to clinic with a chief complaint of decreased vision OS>OD that has been occurring gradually over the past three years. He reports his vision fluctuates depending on the light levels in his surroundings, and that brightly lit environments decrease his overall vision quality. Secondarily he complained of a singular, large, stationary floater in his left eye that first appeared 1.5 years ago that further obscures his vision.

Patient ocular history
LEE: 2 years ago. At this visit he received an updated SRx but reports no improvement in vision when wearing glasses. Patient reported he has never had a dilated eye exam.

POH remarkable for several instances of chemical exposure (calcium hydroxide, cadmium, lead, silica dust, chromium, and K061 dust) and ocular foreign body (aluminum shavings) while working at an environmental company. Patient denied seeking treatment for previous chemical exposures or ocular foreign bodies.

Patient medical health history
No known medical conditions. Patient reported he never had a physical examination by a primary care provider in his adult life.

Social history remarkable for daily IV drug use and heavy alcohol consumption for the past several years. He reported discontinuing drug and alcohol use approximately 2 months prior to clinic presentation.

TABLE 1
Entrance Testing

	OD	OS
Dist VA sc	20/250 PHNI	20/800 PHNI with eccentric viewing
Pupils	dyscoria, minimally reactive, no APD	dyscoria, minimally reactive, no APD
EOMS	FROM	FROM
CVF	FTFC	UTT

TABLE 2
Slit Lamp Examination

	OD	OS
Adnexa	normal	normal
L/L	normal	normal
Conjunctiva	white and quiet	white and quiet
Sclera	white and quiet	white and quiet
Cornea	granulomatous KPs greatest inferiorly, mild corneal haze	granulomatous KPs greatest inferiorly, mild corneal haze
Angle/PI	GR 3 N/T	GR 3 N/T
A/C	2+ cell, trace flare	2+ cell, trace flare
Iris	posterior synechiae 1:00-11:00, superior pupil margin spared	posterior synechiae 1:00-11:00, superior pupil margin spared
Lens	Clear lens capsule, cortex and nucleus	Clear lens capsule, cortex and nucleus
IOP mmHg	12	22

Due to nearly 360° posterior synechiae OU, the patient was unable to be dilated at the initial visit. The posterior segment was evaluated with Optos imaging and Cirrus OCT.

FIGURE 1
External slit lamp photos displaying posterior synechiae sparing the superior clock hours in both eyes.

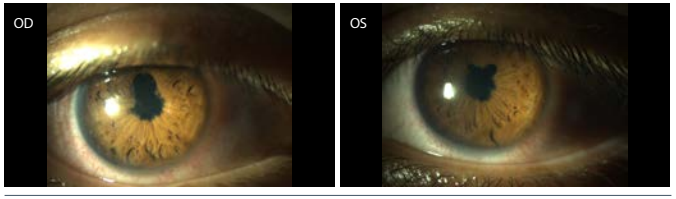


FIGURE 2
Optos image of right eye remarkable for active vitritis and indistinct margins of optic nerve.

FIGURE 3
Optos image of left eye remarkable for active vitritis.

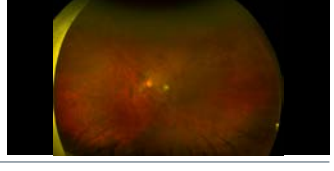
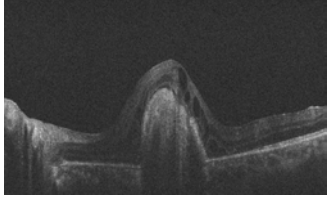


FIGURE 4
Macular OCT of left eye highlighting large sub-macular pigmented epithelial detachment (PED) with hyper-reflective material and intraretinal fluid with concurrent subretinal fluid superiorly.



LABORATORY TESTING

The serology performed included Quantiferon GOLD, Syphilis IgG, ACE, serum lysozyme, chest x-ray, HLA-B27, CBC with differential, ANA, Anti-proteinase 3 AB, metabolic panel, HIV antibody/antigen screen with reflex, Myeloperoxidase AB, and ANCA screen with reflex.

All serology results obtained were unremarkable/negative. Chest x-ray was remarkable for metallic fragments consistent with previous gun-shot injury reported by patient.

In addition to serology, further testing performed included EDI OCT, macular OCT, and Optos IVFA/ICG.

DIAGNOSIS AND DISCUSSION

Diagnosis: Tattoo-Associated Bilateral Panuveitis

Upon further case history, patient AA reported experiencing a severe skin reaction shortly after obtaining new bodily tattoos approximately 3 years ago. Since then, he has experienced occasional sporadic episodes of swelling and sensitivity/irritation of the tattooed areas. Patient reported the most recent skin reaction occurred in May of 2022. Given the exam findings, results of extensive serology, additional ocular imaging, and a comprehensive review of systems, a diagnosis of Tattoo-Associated Uveitis with possible CNVM OS was made.

It is important to consider the possibility for underlying systemic sarcoidosis in cases of tattoo-associated uveitis, as they share many similar clinical characteristics. Systemic sarcoidosis involves the presence of non-caseating granulomas that most commonly affect the lungs, eyes, and skin. Ocular involvement in systemic sarcoidosis is found in 25-80% of sarcoid patients, often manifesting in the form of uveitis. Ruling out the diagnosis of sarcoidosis involves a chest x-ray looking for lymphadenopathy. The diagnosis of tattoo-associated uveitis is further supported by a comprehensive review of systems, negative ACE serology, and an unremarkable biopsy of the non-caseating cutaneous granulomas. Skin reactions that occur within the areas of bodily tattoos can often be the primary clinical sign of systemic sarcoidosis. Very few cases of patients who test positive for non-caseating granulomas of the tattooed areas that also have concurrent uveitis, but the absence of systemic sarcoidosis have been reported in the literature. In addition to systemic steroids and immunomodulators, excision of the tattoo-containing granulomas can be considered and has been shown to decrease the severity of uveitis in some patients.

MANAGEMENT SUMMARY

Patient AA was monitored over the course of the next several months by a uveitis specialist. The therapies recommended for the condition included both topical and systemic steroids, intravitreal anti-VEGF OS, and systemic immunomodulators including methotrexate and Humira. Patient AA is currently being treated with the following therapies:

- Durezol QID OU with taper (QID x2 weeks, TID x2 weeks, BID x 2 weeks)
- Prednisone 20mg daily
- Methotrexate 15mg weekly with folic acid 1mg daily
- Humira 80mg sc x1 loading dose, then 40 mg for 2 weeks

Of note, intravitreal Anti-VEGF was halted after initial treatment from lack of improvement and limited visual potential for the left eye due to the presence of sub-foveal fibrosis. Patient AA plans to continue combined care with uveitis specialist along with rheumatology and will be monitored closely with repeat ocular imaging and routine monitoring labs.

CONCLUSION

Non-caseating cutaneous granulomas contained within bodily tattoos in the setting of concurrent bilateral uveitis may represent the initial signs of systemic sarcoidosis. Patients with this presentation require laboratory studies including chest x-ray and a comprehensive review of systems. If the absence of systemic sarcoidosis is confirmed negative, a diagnosis of tattoo-induced uveitis can be made. Coordination of care with ophthalmology and rheumatology is necessary to manage the ocular and systemic complications of tattoo-associated uveitis.

References available upon request.

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Bullous Keratopathy Secondary to Selective Laser Trabeculoplasty

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INTRODUCTION

A 79-year-old, African-American male presented for pressure check following uncomplicated selective laser trabeculoplasty (SLT) in the left eye 6 weeks prior (10/21). Patient complained of pain, redness, and excessive tearing OS for 3 weeks. Patient noted that he had recently been admitted to hospital for pneumonia when he first began noticing pain OS and was therefore unable to be seen for ocular exam sooner. Symptoms began 10 days following SLT with worsening since onset. Ocular history was positive for severe primary open angle glaucoma (POAG) OS. Medical history was positive for COPD, emphysema, and hypertension. In addition, patient noted longstanding history of cold sores.

TABLE 1
Initial Examination

OD	Entrance Testing	OS
20/30-2 cc	**Visual Acuity**	Hand Motion cc *PH NI
Equal, Round, Reactive, (-) APD	**Pupils**	Equal, Round, Reactive, 1+ APD
Full Range of Motion	**EOMs**	Full Range of Motion
Full to Finger Count	**Confrontation Visual Fields**	Inferior Constriction

TABLE 2
Initial Slit Lamp Exam

OD	Anterior Segment	OS
adnexa normal	**Adnexa**	adnexa normal
2+ MGD	**Lids/Lashes**	2+ MGD ; 1+ edema LUL
white and quiet	**Conjunctiva**	1+ injection ; nasal pinguecula
white and quiet	**Sclera**	white and quiet
normal endothelium, epithelium, stroma and tear film	**Cornea**	3+ diffuse stromal edema w/ inferior epithelial bullae
3-4+ N/T	**Angles**	3-4+ N/T
deep and quiet	**Anterior Chamber**	grossly deep ; unable to assess
normal	**Iris**	grossly normal
PCIOL in good position (undilated)	**Lens**	2+ nuclear sclerosis (undilated) ; u/a to assess 2° to K-edema
17.8 mmHg	**IOP** (via ORA NCT)	18.1 mmHg

TABLE 3
Initial Visit Ancillary Testing

OD	Ancillary Testing	OS
595 microns	**Pachymetry**	1059 microns (measured infero-temp due to epi-bullae)
Normal epithelium/stroma/ endothelium without edema or breaks	**Anterior Segment OCT** (Figure 2)	Diffuse corneal edema with few small bullae visible inferior-central cornea. No obvious breaks in Descemet's membrane or endothelium
Regular anterior and posterior corneal surface CT Max : 534 microns CT Min : 532 microns	**Pentacam Tomography** (Figure 1)	Irregular posterior corneal surface 2° to edema + epi-bullae CT Max : 739 microns CT Min : 490 microns

FIGURE 1: PENTACAM
Irregular posterior corneal surface 2° to edema + epi-bullae ; CT Max : 739 microns ; CT Min : 490 microns

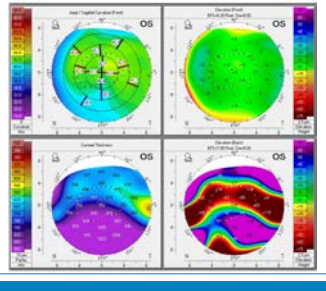

FIGURE 2: AS-OCT
Diffuse corneal edema with few small bullae visible inferior-central cornea. No obvious breaks in Descemet's membrane or endothelium

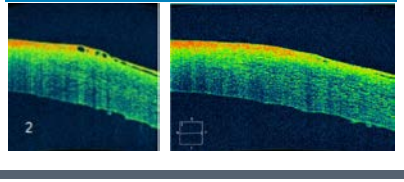

FIGURE 3: (1)
Ext. Slit Lamp Photos: A.) Follow-Up #1 - 3 days following initial exam – resolution of epithelial bullae and improved diffuse central edema via optic section. B.) Follow-Up #2 – 5 days following initial exam - new epithelial bullae over more focal area of edema C.) Follow-Up #3 – 10 days following initial exam – reduction in size of focal edema and complete resolution of epithelial bullae. D.) Follow-Up #4 – 14 days following initial exam – resolution of focal edema. Mild scattered overlying PEE remaining.

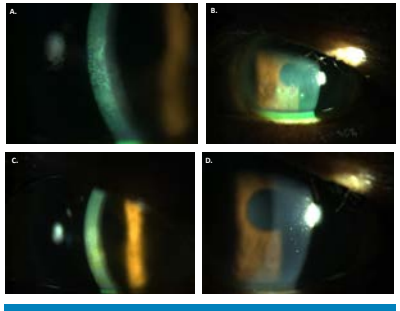

TABLE 4
Summary of Left Eye

Date	21-Oct	24-Oct	26-Oct	31-Oct	4-Nov	29-Nov
Visual Acuity (cc)	HM	20/200	20/150	20/80-	20/100+	20/100+
Cornea	•3+ diffuse stromal edema •1x inferior epithelial bullae	•2+ diffuse stromal edema •central endothelial folds	•2x inferior paracentral epi-bullae • 3.2x3.5 region of 1+ focal edema • central endo-folds	•Resolved epi-bullae today •2.2x2mm inferior 1+ focal edema	•Resolved focal edema today •Trace endo-pigment	•Trace PEE •Trace endo-

TREATMENT & MANAGEMENT

Diagnosis : Bullous Keratopathy secondary to SLT
DDx : Uveitis ; Herpetic Keratitis

TABLE 5
Follow up visits

	Initial Visit (10/21)	Follow-Up #2 (10/24)	Follow-Up #3 (10/26)
Treatment	•Prednisolone Acetate 1% QID OS •Muro 128 ung TID OS •Simbrinza TID OS	•Muro 128 ung TID OS •Simbrinza TID OS	•Prednisolone Acetate 1% 6x/day OS •Muro 128 ung TID OS •Simbrinza TID OS
Changes	N/A	• Increase prednisolone acetate 1% to 6x/day OS	• Add oral famciclovir 500mg TID x 10 days

	Follow-Up #3 (10/31)	Follow-Up #4 (11/04)	Follow-Up #5 (11/19)
Treatment	• Prednisolone Acetate 1% 6x/day OS • Muro 128 ung TID OS • Finish course of famciclovir PO TID x 10 days • Simbrinza TID OS	• Finish famciclovir PO course • Simbrinza TID OS	•Simbrinza TID OS
Changes	• Performed OCT-Macula – revealed CNVM vs central Vitelliform lesion • Referred to retina for consultation (1-2 weeks)	• Begin taper of Pred Acetate (4/3/2/1-weekly) • Reduce Muro 128 ung to QHS OS	• Discontinue Pred Acetate and Muro 128 ung RTC in 4-6 weeks for • IOP check Continue care with retina s/p IV-A injection in 1 month

DISCUSSION

After 20 years, SLT has established itself as an effective and safe modality for managing various types of glaucoma. It is simple to perform, with a well described side-effect profile, is long-lasting and repeatable. In addition, it is comparable to topical medication in its IOP lowering effect. It is important to understand the importance of patient selection and management of patients post-operatively.

The complication rate of SLT is exceptionally low. In the initial SLT study by the FDA (120 patients), the adverse events reported were anterior chamber inflammation (89%), pain/ discomfort (5%), redness (5%), and IOP elevation (6%). As the procedure has become more popular, there have been an increasing number of reported side effects described in the literature—such as, choroidal effusion, hyphema, macular edema, foveal burns, refractive shifts (hyperopic and myopic), and corneal edema. Our patient experienced diffuse corneal edema, ~10 days after his unremarkable SLT procedure. In the literature, there have been many case studies describing corneal edema status post SLT with an overall incidence of 0.8%. The etiology of this complication is widely debated. Studies have demonstrated corneal endothelial changes within 1-2 hours of SLT via specular microscopy, which have been deemed insignificant and reversible. There was no change in endothelial cell count or visual acuity in these cases. However, in extreme cases, these changes could result in endothelial dysfunction and subsequent edema. In addition, it has been postulated that reactivation of herpes simplex virus (HSV) may be related to etiology of acute corneal edema following SLT. Prostaglandin analogs (PGAs) have been associated with reactivation of HSV and it may be possible that SLT-induced inflammation combined with prior PGA use may precipitate a reactivation event, leading to corneal edema. Despite our patient not having a history of ocular HSV or PGA usage, he did report a long-standing history of oral herpes, which may be related to our case of acute corneal edema. It has been postulated that residual alcohol on the goniolens used in SLT may lead to epithelial toxicity and subsequent corneal edema. Another theory is that SLT may cause direct laser damage to the endothelium by inadvertent application to Sampaolesi's line—leading to edema.

Our case, along with previous reported case studies, shows that SLT may be complicated by corneal edema, which responds well to topical corticosteroids. HSV keratitis should be considered, and antiviral therapy initiated, as necessary. It is important to use caution in individuals who have pre-existing endothelial compromise, endothelial pigment, history of herpes simplex, or high myopia.

CONCLUSION

Bullous keratopathy following SLT is exceptionally rare and may indicate prior corneal compromise. Although our patient did not exhibit any signs of corneal compromise, it may be prudent to use caution in individuals who have pre-existing endothelial compromise, endothelial pigment, history of ocular herpes simplex, or high myopia. Fully understanding the patient's ocular and systemic history is important for patient selection prior to SLT. In addition, understanding all complications associated with SLT is important when referring patients for the procedure and managing these patients in the post-operative period.

REFERENCES

Available upon request.

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Diagnosing Polypoidal Choroidal Vasculopathy with Non-Invasive Optical Coherence Tomography Angiography in an African American Patient

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INTRODUCTION

An African American patient presented with decreased vision in her right eye. Ocular examination revealed findings suggesting presumed ocular histoplasmosis (POH), polypoidal choroidal vasculopathy (PCV), central serous chorioretinopathy (CSCR) and exudative age-related macular degeneration (AMD). OCT and OCT-A were performed, and findings were consistent with Asian population OCT-PCV studies, which led to the diagnosis of polypoidal choroidal vasculopathy. This case will highlight OCT and OCT-A interpretation in the setting of PCV.

CLINICAL FINDINGS

A 77-year-old African American female presented with decreased vision in the right eye for 2-weeks. Her medical history was significant for well controlled type 2 diabetes and poorly controlled systemic hypertension. Questioning later in the examination revealed she grew up in Mississippi.

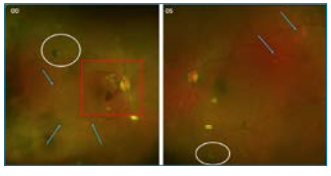
Entering acuities were 20/70 PHNI OD and 20/50 PH 20/25 OS. Entrance testing and anterior segment findings were unremarkable. Her dilated fundus findings of the right eye included a subretinal hemorrhage temporal to the optic nerve with an associated serous retinal detachment (SRD). Additional findings included, scattered drusen and chorioretinal punched out lesions (Figure 1). OCT demonstrated a serous retinal detachment with an adjacent pigmented epithelial detachment (PED) and subretinal blood (Figure 2).

DIFFERENTIAL DIAGNOSES

Based on clinical findings, age related macular degeneration, presumed ocular histoplasmosis (POH), polypoidal choroidal vasculopathy (PCV), and central serous chorioretinopathy were considered. The top two differential diagnoses were POH and PCV.

FIGURE 1

Fundus photos of the right and left eyes. The right eye shows a subretinal hemorrhage temporal to the disc with an associated serous retinal detachment (red box). Scattered drusen around the macula (several highlighted with blue arrows) and a chorioretinal lesion (white circle). The left eye shows scattered drusen (several highlighted with the blue arrows) and chorioretinal punched out lesions (white circle).



DISCUSSION

When evaluating the differential diagnoses, CSCR was considered due to the presence of the SRD and PED, and AMD was considered due to the presence of drusen. However, both differentials were placed lower on the list due to the patient's case history and demographics. Presumed ocular histoplasmosis was considered due to the presence of histo-spots, peripapillary changes and a history of growing up in Mississippi. Polypoidal choroidal vasculopathy was considered due to the case history, demographics and PCV is often active unilaterally. Thus, POH and PCV were considered as the top two differential diagnoses.

The gold standard for diagnosing PCV is indocyanine green angiography (ICG); however, it is invasive, expensive, and often inaccessible. OCT and OCT-A are more accessible, non-invasive and studies have shown that they can be used to diagnose PCV in the Asian population. OCT and OCT-A were performed on our patient, and findings were consistent with published data. Characteristic OCT findings such as double layer sign (Figure 3), sharp peak PED (Figure 4) and OCT- A findings such as branching vascular networks (Figure 5) and hypo-reflective lesions (Figure 6) were present and indicative of PCV. Additionally, the en-face OCT-A image at the level of choriocapillaris suggests multiple polyps (Figure 7).

FIGURE 2

OCT of the right and left eyes. The right eye demonstrates a serous retinal detachment with an adjacent pigmented epithelial detachment (PED) and subretinal blood. The left eye is unremarkable.

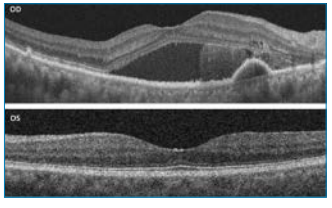


FIGURE 3

OCT of the right eye demonstrating double layer sign. This finding refers to the hyperreflective RPE with another hyperreflective layer beneath the RPE (white arrows). The hypo-reflective area found beneath the PED could indicate a polyp lumen (yellow arrow).

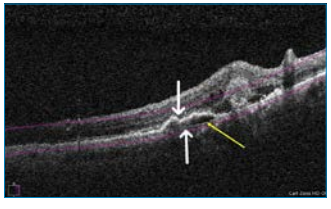


FIGURE 4

OCT of the right eye demonstrating a sharp peak PED with a notched PED. The hypo-reflective region beneath the PED could indicate the lumen of a polyp (red arrow).

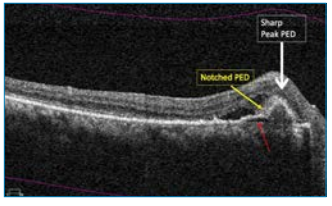


FIGURE 5

OCT-A image of the right eye taken at the level of the RPE and Bruch's complex where branching vascular networks (BVN) are found (yellow circle). They represent dilated choroidal vessels.

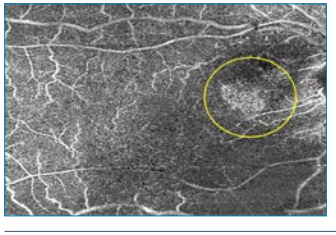


FIGURE 6

OCT-A of the right eye at the level of Sattler's layer of the choroid. The hypo-reflective lesion highlighted by the yellow arrow could indicate a polyp or hemorrhaging.

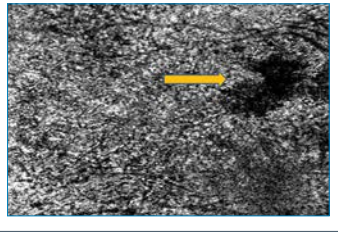
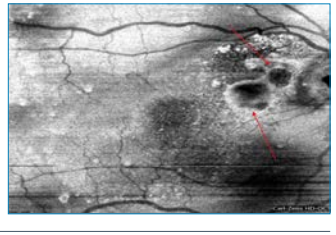


FIGURE 7

OCT-A enface image of the right eye at the level of the choriocapillaris. Hyper- and hypo-reflective regions indicate the presence of multiple polyps (red arrows).



TREATMENT/ MANAGEMENT

Research suggests that photodynamic therapy (PDT), monotherapy or in combination with anti-VEGF, be considered as first line treatment for PCV. However, PDT is not readily available or covered by insurance. The patient has been treated with multiple rounds of intravitreal Avastin injections and remains under the care of a retinal ophthalmologist.

CONCLUSION

OCT and OCT-A were effective tools to diagnose PCV in this African American patient as the findings were consistent with Asian population studies. The use of OCT and OCT-A may be considered when trying to diagnose PCV in patients that are not Asian and ICG is not available.

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2. Chi Y, Yang C, Cheng C. Optical Coherence Tomography Angiography for Assessment of the 3-Dimensional Structures of Polypoidal Choroidal Vasculopathy. *JAMA Ophthalmol.* 2017;135(12):1310–1316.

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A Case of Recurrent Panuveitis Secondary to Behçet's Disease

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INTRODUCTION

A patient presented with new onset floaters OS. Ocular examination revealed acute, recurrent panuveitis secondary to an unknown underlying systemic condition. It was later revealed that the patient had a previous diagnosis of Behçet's Disease.

CASE HISTORY

Patient SR, a 24-year-old Middle Eastern female, presented to Urgent Care complaining of new onset floaters OS x 1 day. She denied flashes/curtain or veil over vision/redness/light sensitivity OS. Her past ocular history was notable for myopia OU and a few episodes of "uveitis" OU (first occurrence when she was 12 years old). At presentation, patient SR denied any remarkable past medical history, or history of any oral/genital ulcers.

OCULAR EXAMINATION

OD	Exam	OS
20/20	**VA (cc)**	20/30, PH 20/25-
FTFC	**CVF**	FTFC
FROM	**EOMs**	FROM
PERRL (-) APD	**Pupils**	PERRL (-) APD
13 mmHg	**GAT**	14 mmHg
unremarkable	**SLE**	See Photos
unremarkable	**DFE**	See Photos

FIGURE 1
Slit lamp examination OS shows fine KPs inf, 2-3+ AC cells, (-) posterior synechiae

FIGURE 2
Posterior examination OS shows 1-2+ vitreous cells with vitritis overlying macula/ONH, distinct ONH margins, large snowball N, scattered peripheral hemes 360

FIGURE 3
ONH OCT shows artificial nerve elevation OS (confounded by overlying vitritis

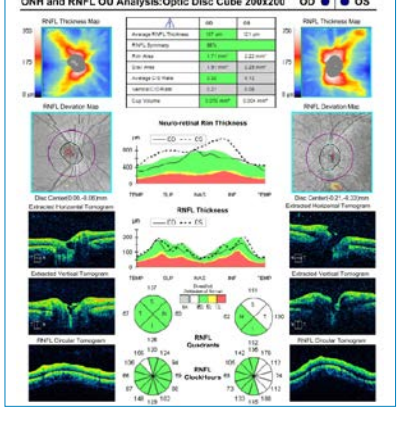


FIGURE 4
MAC OCT OS shows (-) SRF/IRF, marked vitreous cells/vitritis

DIAGNOSIS AND DISCUSSION

This patient was diagnosed with recurrent, acute panuveitis OS secondary to an unknown underlying systemic condition. It was recommended that she seek care with a retina or uveitis specialist, rheumatologist, and obtain blood work to r/o any autoimmune or inflammatory conditions. She elected to maintain care with her hometown OMD and scheduled an appointment with him 4 days later. A few days after presentation, patient SR called to update us on her systemic history, which was remarkable for Behçet's Disease (diagnosed at age 12).

Behçet's Disease is a rare, chronic condition consisting of relapsing and remitting systemic vasculitis. The etiology of this condition is unknown, and it more commonly affects Middle Eastern and Asian populations. The most common clinical features include oral aphthous ulcers (98-99%), genital ulcers (80-87%) and ocular involvement (70%). 3% of patients with Behçet's Disease do not have ulcers of any kind, including patient SR.

TREATMENT AND MANAGEMENT

Treatment: Pred Forte q1hr OS at initial presentation. See Figure 5 for detailed historical treatment.

Management: Continue care with OMD and rheumatologist as directed. Treatment of Behçet's Disease involves treating the various complications caused by systemic vasculitis. Patients who present with posterior segment involvement are recommended to take systemic glucocorticoids in combination with systemic immunosuppressants (incl. azathioprine, cyclosporine A, INF-α, or monoclonal TNF-α inhibitors). Patients who present with initial or recurrent acute sight-threatening uveitis are recommended to take high dose systemic glucocorticoids in combination with Remicade (infliximab, IFX) or INF-α.

FIGURE 5
Historical treatment timeline for patient SR.

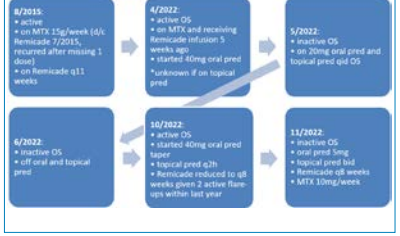
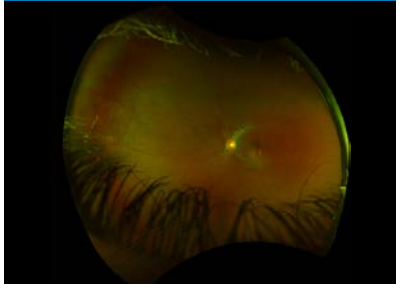


FIGURE 6
At the most recent follow-up examination (12/2022), patient SR was quiet OS.



CONCLUSION

Behcet's Disease is an uncommon systemic condition that has potentially severe ocular complications and requires co-management with ophthalmology and rheumatology. Given the plethora of Behçet's-related ocular complications and the unpredictable relapses and remissions, a concrete prognosis of visual outcomes is difficult. Prompt diagnosis and initiation of both ocular and systemic treatment is crucial in maintaining good visual function.

REFERENCES

References available upon request.

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Retrospective Case Series: Recurrent Anterior Uveitis Following Uncomplicated Cataract Extraction with Underlying Herpes Simplex Virus Etiology

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INTRODUCTION

The reactivation of herpes simplex virus (HSV) keratitis following refractive and cataract surgery is well documented, however there is limited evidence of HSV reactivation manifesting as anterior uveitis following cataract surgery. Although anterior segment inflammation is an expected and common finding following uncomplicated cataract surgery, certain clinical signs and symptoms may lead clinicians to suspect a herpetic etiology rather than a standard post-surgery or inflammatory etiology. This case series reviews three patients that were diagnosed with an acute non-granulomatous anterior uveitis secondary to HSV following cataract extraction, with resolution only seen after the introduction of anti-viral medications.

CASE SUMMARIES

Three patients of the Illinois Eye Institute underwent uncomplicated cataract extraction with clear cornea phacoemulsification and a posterior chamber intraocular lens implant. Prior history of uveitis was denied by all patients.

Patient #1: 64-year-old African American male. 1-day post-op OS, IOP was 41mmHg with 2+ anterior chamber cells. Initial treatment included topical steroids, NSAIDs, and IOP lowering agents. The uveitis and increased IOP persisted for five months despite aggressive treatment. Oral antiviral medication was introduced with the IOP normalizing and the anterior uveitis resolving within four weeks of treatment initiation.

Patient #2: 73-year-old African American female. IOP at 1-day post-op OD was 32mmHg with 2+ anterior chamber cells. Topical steroids, NSAIDs, and IOP lowering medications were started. IOP remained elevated with chronic anterior uveitis for four months. Anti-viral medication was then started; IOP normalized and anterior uveitis resolved within six weeks.

Patient #3: 77-year-old African American female. IOP was 20mmHg at 1-day post-op OD. Topical steroids were used with a tapering dose for one month. At three-months post-op, the IOP was 40mmHg with 2+ anterior chamber cells. Topical steroids were restarted and topical IOP lowering drops were initiated. IOP remained between 40-52mmHg for four months. Oral anti-viral medication was started and IOP reduced to 19mmHg within one week. Due to advanced glaucoma and maximal topical IOP lowering medications, a tube-shunt was performed. Oral anti-viral medication was maintained for three months post-op tube shunt. IOP stabilized at 10-16mmHg without IOP lowering medications for two years.

FIGURE 1

1-day post-op IOP (mmHg)

Range of intraocular pressure at the 1-day **post-op visit, averaging 31mmHg**.

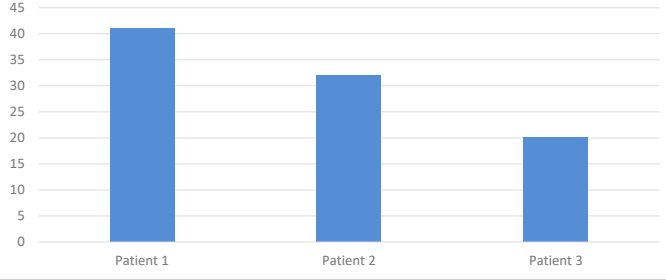


FIGURE 2

Duration of inflammation and elevated IOP before anti-viral medication was initiated (months)

Range of time elevated intraocular pressure and anterior chamber inflammation persisted before antiviral medication was initiated, averaging 4.33 months.

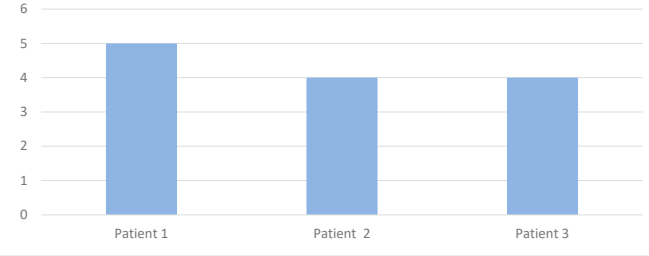
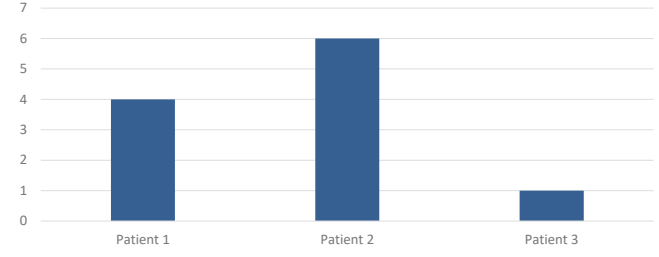


FIGURE 3

Time to resolution following initiation of anti-viral medication (weeks)

Range of time for normalization of intraocular pressure and resolution of anterior chamber resolution, averaging 3.67 weeks.



DISCUSSION

The presence of uveitis and increased IOP after cataract surgery are well established. These can be attributed to normal surgical related trauma or inflammation, retained viscoelastic, and a possible steroid response. However, clinical signs including extremely elevated and chronic IOP and uveitis that do not respond to traditional and aggressive treatments may hint at a HSV etiology. With cataract surgery being performed in a majority of older patients and with over 90% of adults over the age of 50 having antibodies to HSV, it is likely that surgically induced trauma led to HSV re-activation and the aforementioned signs and symptoms. Clinicians should consider empirical treatment with oral antiviral medications in the presence of such clinical findings to ensure timely and complete resolution.

CONCLUSION

Although HSV anterior uveitis can be confirmed with PCR testing, this would require paracentesis of the anterior chamber which is not routinely performed. Therefore, a viral cause should be suspected in cases of unilateral anterior uveitis with elevated intraocular pressures. HSV should be considered in uncomplicated postoperative cataract surgery patients with elevated intraocular pressure and recurrent anterior uveitis, especially those compliant with post-operative ophthalmic medications. Judicious use of corticosteroids is indicated if aqueous analysis (PCR) is not available. Empirical treatment with oral antiviral medications should be considered in patients with recurrent anterior uveitis to rule out herpetic etiology and ensure resolution of inflammation.

REFERENCES

Available upon request.

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1 ICO PRESENTATION

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Ensuring access to universal health care through clinical experience and professional education for current and future providers by an interdisciplinary group of providers through educating current and future providers

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Steve Perlman, DDS, MScD, DHL(HON)
Matthew Holder, MD, MBA, FAADM
Vicki Tilley, PT, GCS
Donna Bainbridge, PT, EdD, AT-RET
Melina Willems, Audiology
Mary Pittaway, MA, RDN, LND
Beth Lannon, EdD
Allen Wong, DDS, EdD, DABSCD
Stefan Schwarz, FAAO
Alice Lenihan, MPH, RD, LDN
Priya Chandan, MD, PhD, MPH
David W. Jenkins, DPM, FACFAS, FAAPSM

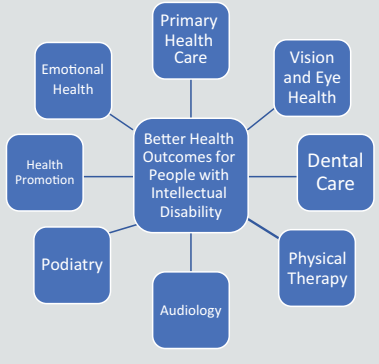
Background/Rationale

Over 1 billion individuals have disabilities. Included in this number are those with intellectual and developmental disabilities (IDD). Persons with IDD are a diverse and vulnerable group who often face barriers and discrimination when accessing health services. Many have health conditions resulting in poor health and extensive health care needs. Individuals with IDD need access to equitable integrated health care.

Methods/Methodology

A group of professionals came together under the Special Olympics International (SOI) umbrella to create clinical assessments/screenings to identify/address health problems. These Global Clinical Advisors (GCA) represented eyecare, dentistry, medicine, audiology, physical therapy, nutrition, podiatry, and psychology. The GCA's began focusing their discipline to develop programs to improve access and provide clinic skills in their peers to address individuals with ID. Initially there were only 2 disciplines but that expanded to 8.

Eight Disciplines



Primary Health Care

Developmental Medicine is a specialty focusing on patients with IDD across the lifespan. Not that long ago the average life expectancy for people with IDD was < 20 year. Today, the life expectancy of a person with IDD is > 60 years. The medical fields have not kept pace with this demographic shift. The American Board of Developmental Medicine (ABDM) was formed to recognize physicians who have significant expertise in this field. In addition, NICHE, founded by the American Academy of Developmental Medicine and Dentistry (AADMD) in 2009, was started under the project name "National Curriculum Initiative in Developmental Medicine" (NCIDM). The program defines and integrates concepts of Developmental Medicine into medical school curriculum in the United States. Bringing the NICHE to its current state involved more than financial support from Special Olympics, Walmart Foundation, the Florida Developmental Disabilities Council, the North Carolina Mountain Area Health Education Center, the Working for Inclusive and Transformative Healthcare (WITH) Foundation and the Society for Teachers of Family Medicine. It has involved the collaboration of organizations including: the American Association on Intellectual and Developmental Disabilities, the Association of University Centers on Disabilities, the International Association for the Scientific Study of Intellectual and Developmental Disabilities, the Australian Academy of Developmental Disabilities Medicine, and the Developmental Disabilities Nurses Association and clinical experts in the field, academicians, and thousands of learners. ***(Matt Holder and Priya Chandan)***

Vision and Eye Health

The Opening Eyes program originated from the American Optometric Association Sports Vision Section, 1991. It was transferred to Special Olympics in 1997 and later was renamed Special Olympics Lions Clubs International Opening Eyes. The program realized that the prevalence of vision and eye health problems occurred in people with intellectual and developmental disabilities is higher rates than found in neurotypical populations. In addition, there were so many barriers that were identified that prevented early detection, diagnosis and treatment for vision problems leading to visual impairment and blindness. Sadly, some of which were preventable if found early and others were able to correct the vision simply with a pair of glasses.

The program focused on providing a comprehensive assessment at Special Olympics events globally and served to provide a non-intimidating environment to eye care providers (both optometry and ophthalmology) to "open their eyes" to the importance of providing vision care, the positive impact of sharing their knowledge and skills with a vulnerable population and an opportunity to realize people with ID/DD are a pleasure to serve.

Over the years, the program has shown techniques that cross verbal limitations, communication ability, and cognitive skills barriers. The goals were to reduce the magnitude of preventable visual impairment and blindness by including both practitioners and health professional students to offer care routinely in their practices.

More recently, schools and colleges of optometry in the US have been exposed to the importance of teaching that everyone should be entitled to the same level of eye care. The intent is to expose students early on to vulnerable populations so they realize that it is expected that they will serve patients with disability throughout their careers. ***(Sandy Block, Stefan Schwarz, and Christine Allison)***

Dental Care

Special Olympics, Special Smiles since its inception in 1993 has tried to address the issues responsible for this through advocacy, policy ,and education of health care professionals.

In 1997 working together with Special Smiles , the Centers for Disease Control and Prevention (CDC) developed the screening protocol specifically for the program so the data they collect through their screenings is standardized and can be used for health care reform throughout the world.

With well over 300,000 screenings by calibrated clinicians, throughout 7 regions of the world , we have documented that the burden of oral disease is significantly greater in people with Intellectual Disabilities than the neurotypical population.

The National Council on Disability will release a report in March, 2023 describing the crisis in the oral health of children and adults with Intellectual Disabilities with information collected from the American Academy of Developmental Medicine and Dentistry and

Special Olympics International that is a potential game changer. ***(Steve Perlman and Allan Wong)***

Physical Therapy - FUNfitness,

FUNfitness, a fitness screen, was developed by American Physical Therapy Association in 1999, and subsequently revised and updated for specific use with people with IDD. Physical therapists, physical therapist assistants, and students in physical therapy participate in various aspects of the event.

FUNfitness is designed to:
- assess flexibility, strength, balance, and aerobic fitness
- teach exercises to address identified needs;
- educate participants, families and coaches about the importance of these components in overall fitness;
- provide a hands-on opportunity to learn how the physical therapist can help with fitness.

The tests utilized in FUNfitness are evidence-based with reliability and validity data. Most tests have been normed in sedentary elders or large populations. All tests are designed to protect those who may have other issues like osteopenia or osteoporosis.

Education is provided to improve areas identified as issues. The Athlete Fitness Scorecard can be used as an action guideline when working with clients. Referral to physical therapy or fitness programming is provided as indicated.

Data has demonstrated that athletes have greatest issue with flexibility and balance, and less concern with strength and overall aerobic fitness.
(Donna Bainbridge and Vicki Tilley)

Audiology

The Healthy Hearing program offers people with an intellectual disability (PWID) an audiological screening to identify ear as well as hearing problems. The occurrence of ear (e.g. excessive ear wax and middle ear problems) and hearing problems is significant higher in PWID compared to the general population.

A hearing loss, even a mild one, can create speech, language and communication problems, which influences a person's social life and can lead to isolation. Also, (untreated) hearing loss affects cognition, behavior, physical and social functioning, and increases the risk of depression and dementia. Hearing loss in PWID is, in most cases, unknown and undetected. This makes the population even more vulnerable. ***(Melina Willems and Beth Lannon)***

Podiatry

The Fit Feet exam is a basic foot screening that looks for dermatological pathology as well as structural and mechanical conditions. This screening is especially important for persons with intellectual disability because this population experiences a number of conditions not typically found in the general population. Therefore, an emphasis on looking for these more unusual conditions takes place. Because many of the conditions that we look for can create discomfort, it is especially important to remedy these so the individual will have reduced discomfort and in the case of the athletes' better performance. One of the major things that we address is a proper shoe fit has a poor fit can lead to not only a poor performance but a great deal of discomfort as well. Certain of the structural and even dermatological conditions that we see can be further exacerbated with a poor fitting shoe.

Besides finding a great percentage of ill-fitting shoes in the intellectually disabled population, we also see a great deal of structural problems related to hyperflexibility such as flat feet and bunions for example. We will also find order quite rare in the general population structural problems such as brachymetatarsia and syndactylylism. ***(Dave Jenkins)***

Health Promotion

According to the WHO, Health Promotion is described as the process of enabling people to increase control over, and to improve, their health. It moves beyond a focus on individual behavior towards a wide range of social and environmental interventions. There is a tendency among some public health officials, academics, and clinicians to the concept to just developing personal skills (health education) and social marketing campaigns focusing on changing behavioral risk factors. Current thinking and evidence suggest that attitudes about public health policies are less about personal abilities or health messaging than about an individuals' access to social determinants of health philosophical, the settings where their life unfolds (school, work, family, peers, friends, service and care providers and recreation opportunities). The power on the environment to shape health behavior is now a clear focus of interdisciplinary care. ***(Mary Pittaway and Alice Lenihan)***

Results/Findings

They worked as a team under SOI health to integrate health issues. They had moved beyond addressing the only athletes from SOI highlighting healthcare needs of people with IDD. Their effort was carried out through programs within SOI Health but by integrating disciplines to provide more of a universal approach to health care under the auspices of the American Academy of Developmental Medicine and Dentistry. Several individuals have been instrumental in developing/disseminating curriculum addressing the health needs of people with IDD. The academic curriculum has been approved by three disciplines: medicine, physical therapy, and dentistry. There is a continued effort to push acceptance of the curriculum in other disciplines.

Conclusions/Implications

The group of healthcare providers has collaborated for more than 25 years to improve access to equitable integrated health care through changing health professional's curriculum and offering clinical opportunities to learn how best to provide quality health care focused on the individual with IDD. There is a long way to go but the path has been started.

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NEUROSCIENCE

1 ICO PRESENTATION

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The gasserian ganglion, a true honorific

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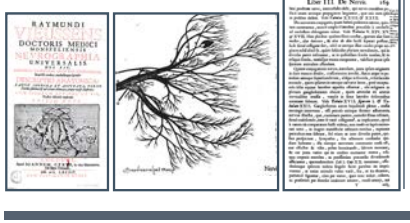
INTRODUCTION

The trigeminal (or semilunar) ganglion is the collection of pseudounipolar neuron cell bodies on the sensory root of the 5th cranial nerve.[1] It is situated in the trigeminal (or Meckel) cave, a cleft within the dura mater, located on the anterior surface of the petrous portion of the temporal bone. This ganglion gives rise to the 3 main branches of the trigeminal nerve: ophthalmic, maxillary, and sensory part of the mandibular. An eponym is associated with the trigeminal ganglion: Gasser or gasserian. This eponymous term is a true honorific since Johann Lorentz Gasser (1723-1765) had very little to do with the discovery or description of the ganglion that bears his name.

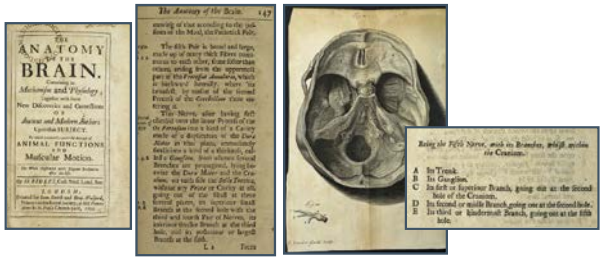
RAYMUND DE VIEUSSENS

The fifth nerve ganglion was discovered by Raymund de Vieussens (1635-1715) in 1684.[2] His work entitled *Neurographia Universalis* is considered one of the most important contributions to the field of neuroanatomy in the 17th century.[3] In it he described the "plexus ganglio-formis" (the ganglion) that a foveola (small pit) encompassed within thick meninges. However, he noted only 2 major branches - ramus major anterior and ramus posterior major (mandibular nerve) emerged from the ganglion. He went on to state that the former branch divided into the ramus minor superior (ophthalmic nerve) and ramus minor inferior (maxillary nerve).



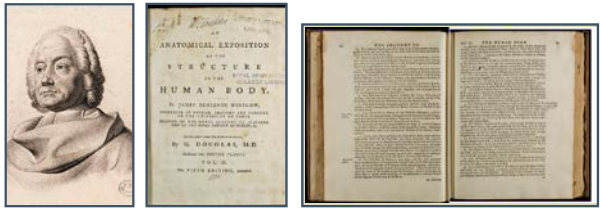
HUMPHREY RIDLEY

In 1695, Humphrey Ridley (1653-1708) wrote: *The Anatomy of the Brain. Containing its Mechanism and Physiology; Together with some New Discoveries and Corrections of Ancient and Modern Authors Upon that Subject.*[4] It is the first book about the brain to be written in English.[5-6] In it he correctly identified that 3 branches arise from the fifth nerve ganglion but only described the ganglion as "a kind of thickness".



JACOB BENIGNUS WINSLOW

Several decades later, Jacob Benignus Winslow (1669-1760) in 1732 regarded the ganglion as an irregular structure in his book entitled: *Exposition Anatomique de la Structure du Corps Humain.*[7] This work was translated into English that same year by G. Douglas.[8] Winslow also coined the term "nerf trijmeaux" after which the term "trigeminal nerve" started appearing in anatomical books.[9]

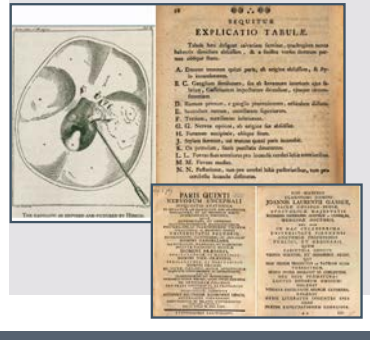


JOHANN LORENZ GASSER

The Austrian born Johann Lorenz Gasser attended the University of Vienna.[10] He was awarded a doctorate of medicine without passing an examination – a case of sui generis and appointed professor of anatomy. In late 1764, Dr. Gasser contracted a lung disease. At that time, he had a student named Antonius Balthazar Raymundus Hirsch (1744-1778), and the 2 of them discussed the trigeminal ganglion and its further study. Dr. Gasser briefly recovered and resumed working but died on April 3, 1765.

ANTONIUS BALTHAZAR RAYMUNDUS HIRSCH

All during Dr. Gasser's illness, Hirsch had been methodically studying the trigeminal nerve and ganglion and finished his dissertation, *Paris Quinti Nervorum Encephali Disquisitio Anatomica, in Quantum Ad Ganglion Sibi Proprium, Semilunare, et ad Originem Nervi Intercostalis Pertinet*, on February 7, 1765.[11] Dr. Gasser died before Hirsch could defend his thesis on July 31, 1765, and receive his doctorate in medicine on August 9, 1765. Even though he did the vast majority of the work, Hirsch chose to honor his teacher and mentor by crediting his work to Gasser and naming the fifth nerve ganglion the gasserian ganglion. Hirsch included references for 23 authors that had done previous work on cranial nerves and explained the meticulous dissection method he used to study the fifth nerve and its ganglion. He described and illustrated the ganglion in detail with near modern precision, including its semilunar shape. After failing to receive an appointment in the Department of Anatomy at the University of Vienna, Dr. Hirsch went into private practice. Unfortunately, he experienced a financial crisis and accumulated a large debt. Dr. Hirsch died on June 23, 1778, under mysterious circumstances with some references suggesting suicide.



Hirsch's description of the fifth nerve ganglion (translated from Latin into English).[10] This diagram describes the skull of a 40-year old woman, in cross-section, which goes from the left to the right at a slant. A: Denotes trunk of the fifth pair cut away from its origin. It is resting on the stylus. B and C: Semilunar ganglion, or Gasserian ganglion – hereafter named for the discoverer of its internal structure – and its circumference. D: First branch coming out of the ganglion, called orbital. E: The second branch, the upper jaw. F: The third branch, the lower jaw. G: The optic nerves cut from their origin. H: Occipital foramen, diagonally situated. J: Iron stylus "on which the trunk of the fifth pair is resting." K: Os petrosum, denoted by dotted lines. L: two anterior fossae where the anterior lobes of the brain go. M: Middle fossae. N: Posterior fossae, where both posterior lobes of the brain and cerebellum go.

CONCLUSION

Dr. Gasser left no writings, and there is no evidence that Dr. Hirsch wrote any other books.[12] In fact, there has been confusion well into the 20th Century regarding the identity of the Gasser after which the ganglion was named.[13] Possibly because of the relative lack of notoriety of these gentlemen, the term gasserian ganglion does not appear to have been used in any publications until 1811 by Charles Bell in his famous text: The *Anatomy of the Human Body.*[14] Since that time, this term has been commonly used. Although, with the recent trend in decreasing the general usage of eponyms in anatomical terminology, the term gasserian ganglion and the story behind it may be destined to return to obscurity.

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VISION BY DESIGN

1 ICO PRESENTATION

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Agreement of Axial Lengths Measured by Two MYAH Machines

Fione Yip ICO 2027 & Dr. Sherman Tung OD, FAAO, FIAOMC, IACMM

Introduction

MYAH is a device that can be used to acquire axial length (AL) measurements and allows clinicians to monitor and compare AL values to built-in growth curves.[1] It is an efficient and accurate tool for monitoring eye elongation and will become the standard of care for myopia management.[1] Each MYAH device comes with a calibrator that is unique to the machine, demonstrating that variability exists between individual MYAH machines.[2] Thus, it is necessary for clinicians to confirm that the values obtained by two separate MYAHs are comparable. In this study, we confirmed the agreement of ALs measured by two separate MYAH machines.

Purpose

To determine whether AL values captured by two MYAH machines are different.

Methods

AL values of both eyes were measured in 18 patients using two MYAH machines on the same day by a single investigator. The two MYAH machines used were serial number 139210228, referred to as "A" onwards, and serial number 139220605, referred to as "B" onwards. Patients included both Ortho-K and non-Ortho-K users. Inclusion criteria required patients to have all AL measurements with a standard deviation less than or equal to 0.03 mm. The mean AL values were compared using the nonparametric Wilcoxon matched-pairs test because the data did not follow a Gaussian distribution.

Results

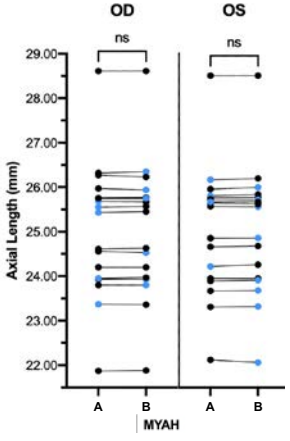

Figure 1. Axial lengths of right (OD) and left (OS) eyes of patients (n = 18) measured using MYAH "A" (S/N: 139210228) and MYAH "B" (S/N: 139220605). Blue data points indicate the greater value of the pair. Black data points are used for both values of the pair if the values are equal. Statistical tests were performed separately for each eye. Wilcoxon matched-pairs test was used to compare the means measured by two different MYAH machines. ns = P > 0.05. (OD: P = 0.9243, OS: P = 0.2422).

The mean AL values measured using MYAH "A" and MYAH "B" were not significantly different (P > 0.05). For the right eye, 7, 5, and 6 values captured by MYAH "B" were greater than, equal to, and lower than ALs captured by MYAH "A", respectively. For the left eye, 9, 5, and 4 values captured by MYAH "B" were greater than, equal to, and lower than ALs captured by MYAH "A", respectively. While MYAH "B" appears to return larger AL values overall, the increases were between 0.01 mm and 0.04 mm and was not statistically different when analyzing left and right eyes together (P = 0.3169, data not shown) or separately (OD: P = 0.9243, OS: P = 0.2422).

Conclusion

AL values measured by two separate MYAH machines are not significantly different. Our results suggest that clinicians can compare values measured by two different MYAHs and also switch seamlessly between MYAHs on the occasion that one machine malfunctions. However, when switching between interferometers manufactured by different companies, we suggest clinicians to perform comparisons similar to this study beforehand.

Limitations

The data presented was obtained from only two machines. Additional testing should be performed to confirm that these results are representative of all manufactured MYAHs. Future studies can investigate potential differences in other parameters and between machines manufactured by different companies.

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ICO

WCO

2 ICO PRESENTATIONS

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The Basics of Infant and Toddler Examinations

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TABLE 1
Basics of the Exam

- Visual Acuity
- Extraocular Motility
- Pupils
- Binocular Posture
- Stereo & color (toddlers)
- Retinoscopy
- Anterior Segment Evaluation
- Intraocular Pressures
- Dilated Fundus Evaluation

TABLE 2
What Questions Do We Ask in the Case History

- Chief Complaint
- Ocular History
- Developmental History
- Pre-natal, peri-natal, post-natal
- Family Eye History
- Medications/allergies

TABLE 3
Visual Acuity Techniques

- OKN Drum
- Teller Acuity Cards/Patti Stripes Grating Paddles/ LEA Grating Paddles
- Fixate and follow (Central Steady Maintained)
- Cardiff Acuity Tests
- LEA Symbols
- Broken Wheel Cards

FIGURE 1
Teller Acuity Cards with a Toddler

FIGURE 2
Using Broken Wheel Cards with a Toddler

TABLE 4
Ways to Assess Binocular Posture

- Hirschberg/Kappa (1mm = 22 pd), Krimsky
- Cover test with interesting targets
- Bruckner
- Near Point of Convergence with a toby

FIGURE 3
Hirschberg- look at the reflexes- are they centered?

FIGURE 4
Cover Test Can Be Performed with your Thumb to Cover the Eye Instead of a Paddle. If the resistance to occlusion varies between eyes, this may be the first indication that they do not see equally well.

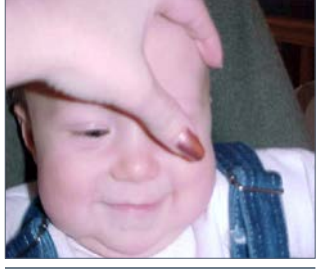


TABLE 5
Stereoacuity and Color Vision Testing

- Stereo Fly/ Reindeer
- Lang I and II
- Randot E
- Stereo Smile Test
- Worth 4 Dot
- Any History of an eye turn – TRY TO DO THIS FIRST!
- Ishihara tracing
- HRR Standard Pseudoisochromatic Test
- Color Vision Made Easy
- Color √ Color Vision Screening Plates

TABLE 6
Stereoacuity and Color Vision Testing

- Retinoscopy using Sciascopy bars
- Retinoscopy with Loose Trial Lenss
- Mohindra Retinoscopy- Dark Room, 50 cm working distance, add -1.25 to findings
- Cycloplegic Retinoscopy

FIGURE 5
Retinoscopy using Sciascopy Bars with Toddler watching a Distance Video

TABLE 7
Anterior Segment Evaluation & IOP

- Hand-held slit lamp
- Burton Lamp
- 20 D Lens for magnification
- Tonopen
- iCare Tonometer
- Non-Contact Tonometry
- Tactile Digital Pressure- soft & equal

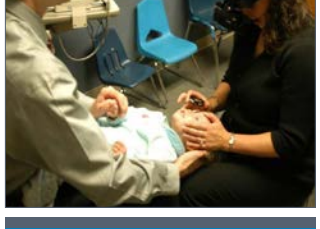
FIGURE 6
Using the Tonopen

FIGURE 7
iCare Tonometry

TABLE 8
Dilated Fundus Examination Tips

- Let the infant sleep or eat as needed
- Use toys with sounds to get them to look
- Move their head with the video

FIGURE 8
Binocular Indirect Ophthalmoscopy on a Toddler



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World Council of Optometry Focuses on Addressing Dry Eye Disease

Sandra S. Block, OD, MEd, MPH [1,2] Saleel Jivraj OD MBA [2,3]

[1] Illinois College of Optometry [2] World Council of Optometry [3]Calgary Dry Eye Clinic

Introduction

Dry eye disease (DED) is a chronic, painful condition affecting around 1.4 billion people. The World Council of Optometry (WCO) presented a series of 4 DED education webinars in partnership with Alcon.

The purpose of the webinars was to deliver practical, evidence-based resources that optometrists can use for patients in their practice regardless of the breadth of their current legislated scope of practice. Webinars were each presented in each of 3 time zones at no cost.

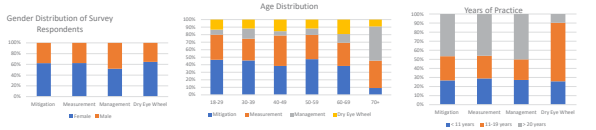
Methods

In an effort to ascertain the value of the webinar series on DED, WCO surveyed the participants about their knowledge about DED and clinical skills before and after the webinars.

Three dry eye experts (Professors James Wolffsohn, Jennifer Craig, and Lyndon Jones) were invited to discuss dry eye disease and share resources focused on the 3 pillars addressing DED: mitigation, measurement, and management. The first three webinars each focused on one pillar. The last webinar brought the pillars together with the introduction of the WCO Alcon Dry Eye Wheel.

The online survey was developed to measure the impact of the educational content from the program on clinical practice. The same surveys were used for each of the four webinars. Questions sought to capture demographics of the audience, participants' level of engagement with DED and changes to attitudes following the seminar.

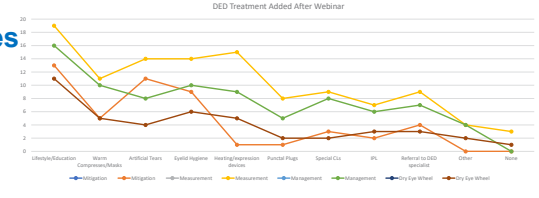
Subject Demographics (pre-surveys)

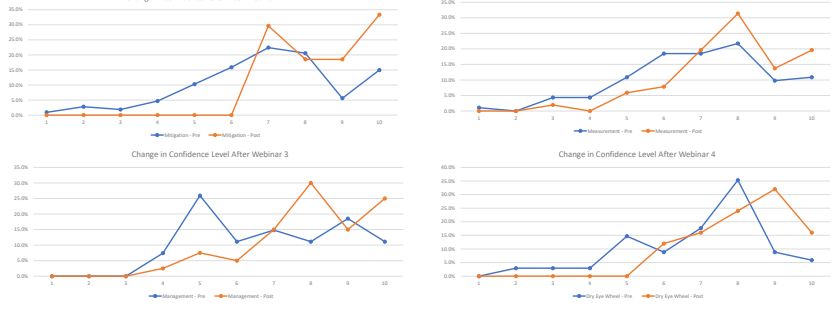


	Webinar 1	Webinar 2	Webinar 3	Webinar 4	
Topic	Mitigation	Measurement	Management	Dry Eye Wheel	Total registrations
Registration	1592	1175	767	842	4376
Attendance	430	390	270	275	1365
	31.2% of those registered attended				
	1,020 unique attendees across the 4 webinars				

(https://dryeye.worldcouncilofoptometry.info/interactive-dry-eye-wheel/).

Post Survey Responses





Discussion

A review of the demographics of all 4 webinars reflected more women than men in addition the respondents were primarily optometrists, and primarily experienced clinicians. The demographics presented here represent only the respondents from the pre-surveys for each of the webinars.

The overall attendance included 31.2% of those registered and represented all 6 WHO regions.

The participants did demonstrate significant use of DED symptom surveys prior to the webinar along with some knowledge of appropriate question to ask and treatments to offer.

There was a change in behavior to increase the types of treatments recommended for patients after the webinar along with significant improvement in confidence to address DED in their practices. The most significant change post webinar was the respondent's using lifestyle/education solely to address DED (pre-75.6% post-37.3%). No other change in treatment reached significance after the first two webinars.

Conclusions

The results suggest clinicians globally are aware of DED and focused more on lifestyle than on evidence-based tools initially.

The responses indicated education on DED helps clinicians know about evidence-based tools to address the problem practice and increase their confidence level.

WORLD COUNCIL OF OPTOMETRY

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