CASE REPORT **Retina**

**Retinal detachment seals itself**

Binocular indirect ophthalmoscopy with scleral depression detects retinal detachment

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**CONTACT LENSES**

**THE MYOPIA EPIDEMIC Are new therapies in sight?**

By Y. Shira Kresch, OD, MS, FAAO

Myopia, as a widespread health concern, is old news.

After being listed as one of the five health concerns by the World Health Organization, and with an estimate that around 4.8 million people will have myopia in 2050, just 30 years away, progressive myopia is high on the radar of optometry and ophthalmology.

Termed a disease, and even an epidemic, it is of no dispute that myopia is an area of high importance on a national as well as international level. Progressive eye growth may lead to visual impairment from myopic maculopathy, myopic macular degeneration, retinal tears and detachments, chorioretinal atrophy, and glaucoma. Whether the statistics are correct in that we

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CHAIRMAN’S LETTER
Jump into great content with the February issue
BY MIKE HENNESSY, SR
Our February issue has arrived: offer our readers insight and information to help their practices.

We dive deep into technology in this issue with content from sister publication Ophthalmology Times as well as a solid look into how technological advancements have changed glaucoma management.

New author Terry Waggoner, OD, presents an interesting case of a patient whose retinal detachment sealed itself. The fact that the patient is a candidate for flight training adds more interest to the case.

Another case report by Chief Optometric Editor Ben Casella, OD, FAAO, looks at the retina, this time with a difficult diagnosis of Coats’ disease in a child.

Also in this issue our authors examine patients’ non-compliance with contact lens replacement schedules; how to help glaucoma patients with concomitant ocular surface disease; the potential of gene therapy for myopia control; the collision of data; artificial intelligence, and optometry; and forecasting the future of the global allergy market.

As always, enjoy the issue and many thanks for reading.

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Optometry Times blogs

Every week, leading professionals in the optometric field write blogs for Optometry Times on eye care. If you haven’t read them, you’re missing out on the latest and greatest in glaucoma, retina, dry eye, refractive surgery, contact lenses, and practice management, just to name a few topics. Head over to OptometryTimes.com/topic/blog to check it out for yourself and catch up on the best ideas in modern optometry.

Hypochlorous acid: Harnessing nature’s germ killer

Should ODs embrace hypochlorous acid in patient care and disinfectant protocols? Margie Recalde, OD, FAAO, explores the pros and cons of this powerful germ killer.

OptometryTimes.com/hypochlorousacid

Common systemic conditions associated with dry eye disease

Systemic disease and autoimmune conditions are frequently associated with an increased risk of dry eye syndrome. These patients are often affected by a combination of both evaporative and aqueous deficient dry eye; therefore, cognizance of a patient’s entire health history can help lead ODs to the root cause of chronic DES.

OptometryTimes.com/systemicDE

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I hope everyone had a good and productive Glaucoma Awareness Month. It’s in January, just in case you needed a reminder for when to wear your green ribbon on the lapel of your lab coat.

Glaucoma Awareness Month is great to promote more public and policy awareness of the great silent blinder that is glaucoma, but, as with my post-Christmas mood, I am making an effort to keep the spirit of glaucoma awareness with me all year. Indeed, I am going to do my best to include this task as part of my obligation to inform and protect the public.

As part of my new-found vigor with respect to saving vision one IOP measurement at a time, I recently read over what the National Eye Institute has to say with respect to glaucoma.1 In optometry school and residency, I learned that about one in every 100 Americans has glaucoma. From a weather forecast standpoint, that’s not a whole lot. From a clinical standpoint, that’s a ton of people!

What’s more staggering is the fact that the number of Americans living with this disease is projected to increase to more than 4 million in 2030 and more than 6 million by 2060.

Of course, one would surmise that this increase has to do with the aging and growing population, at least in part, but are there any other variables at play with respect to such an increase?

Over the last several years, we at Optometry Times have shared numerous advances in glaucoma care and detection, and we will continue to do so in the future. However, I am charging myself with the task better conveying what contemporary science has to say about what, if anything, can be done to avoid glaucoma in the future.

So far, what we know about glaucoma prevention goes along with common sense: try not to treat your body like a garbage can and get some exercise—oh, and choose parents who don’t have glaucoma. Who knows what the future will hold, and, as an OD with a positive family history of glaucoma, I plan to stay informed.

The number of Americans living with glaucoma is projected to increase to more than 4 million in 2030 and more than 6 million by 2060.

For now, however, optometrists have to continue to help their communities to understand the importance of comprehensive eye examinations. This means getting out and spreading the word about this disease and what optometrists can do to help patients.

I am about to roll out a social media awareness campaign about glaucoma (and eye health in general) on behalf of my practice. I’ll keep you posted, and I hope you do the same. Email me with your ideas: bpcasella@gmail.com.

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ODs must raise awareness about glaucoma

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Refractive and pharmaceutical options

There are two clinical approaches to retard progression of myopia: refractive and pharmaceutical.

Refractive

Refractive modalities include:
- Multifocal soft contact lenses of center-distance design
- Orthokeratology
- Progressive or bifocal spectacles

Effectivity of these designs is hypothesized to be mostly secondary to inducing peripheral myopic—rather than hyperopic—defocus, in addition to decreasing accommodative lag.4

Refractive approaches to decrease axial growth progression have been attempted since the early 1900s and are discussed extensively across the literature. Briefly, emmetropization, the process whereby eye growth is matched to optical power, is largely driven by optical feedback.24-26

Hyperopic defocus (where light falls behind the retina) and myopic defocus (where light falls in front of the retina) have been shown to increase or decrease the rate of axial length growth, respectively. This has been studied in several animals, including primates, tree shrews, guinea pigs, mice, chickens, and fish.

The effect of optical defocus on emmetropization is theorized to be primarily a localized retinal phenomenon since experimental defocus caused changes in axial elongation even in eyes in which the optic nerve was severed,24-26 as well as in eyes subjected to segmental positive or negative defocus (where light falls behind the retina) and myopic defocus (where light falls in front of the retina) have been shown to increase or decrease the rate of axial length growth, respectively. This has been studied in several animals, including primates, tree shrews, guinea pigs, mice, chickens, and fish.

The effect of optical defocus on emmetropization is theorized to be primarily a localized retinal phenomenon since experimental defocus caused changes in axial elongation even in eyes in which the optic nerve was severed,24-26 as well as in eyes subjected to segmental positive or negative defocus. It is assumed that this balance of positive and negative defocus ultimately leads to the final axial length of the eye.

Pharmaceutical

In the pharmaceutical category, certain anti-cholinergic agents, most notably atropine, have been shown to be effective at slowing the rate of axial elongation.

Atropine has gained increasing popularity recently because of the success it showed in the Atropine in the Treatment Of Myopia (ATOM) 1 and ATOM 2 studies, and it has even attained Level 1 evidence in slowing the growth of myopia, according to the American Academy of Ophthalmology.27 In spite of this, there are significant challenges with its implementation. Namely, we do not know the mechanism through which atropine slows axial growth. Does it have to do with the choroid? Dopamine? Accommodation? Increased sunlight exposure? This remains a mystery.

Additionally, there is limited evidence as to the most effective dosage in non-Asian children and no evidence on appropriate tapering schedules. This is complicated by the fact that there have not yet been biomarkers identified to aid in determination of which children of various ethnicities would do well with atropine as opposed to other modes of treatment.

Finally, although atropine 0.01% is associated with minimal to no side effects, higher doses of atropine are responsible for uncomfortable visual phenomena, such as photophobia and blurred vision.28

However, even with such concerns, atropine works and is considered by most to be the most effective modality at retarding axial elongation, with the strongest evidential support.

Potential gene therapy intervention

Given that the lack of additional pharmaceutical interventions is largely due to the uncertainties concerning the pathophysiology of optical development, the recently published work of Andrei Tkatchenko, MD, PhD, associate professor of ophthalmic sciences in ophthalmology, and pathology and cell biology, is of particular significance.29

Several previous theories have been suggested regarding the development of myopia. The conventional assumption has been that there is a single genetic pathway that is responsible for a general “defocus.” This single pathway is supposed to be inclusive of both hyperopic and myopic defocus just with opposite triggering signals. One pathway would need to be signaled appropriately with positive defocus in order to retard growth.

Dr. Tkatchenko has suggested that this is not the case. Through his laboratory research on common marmosets, he showed that the primate retina is not only able to distinguish between hyperopic and myopic defocus but does so by activation or suppression of distinct signaling pathways in response to the different signs of defocus. This is novel and has been deemed bidirectional emmetropization by the sign of optical defocus (BESOD).

Additionally, Dr. Tkatchenko’s lab identified key signaling pathways that may be responsible for the retinal responses to either positive or negative defocus and can therefore be potential therapeutic targets. Furthermore, 29 genes that were differentially expressed upon imposed defocus in this animal model are also found in myopia-related loci in humans, raising the possibility of potential gene therapy intervention.29

While progressive myopia is of serious concern, with potential visual impairment in a significant number of the world’s population, the vigilance of the optometric community to address this concern head-on, and a readiness to implement evidence-based interventions as they become available, remains of high importance.

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Dr. Kreshch is the clinic lead for the myopia control clinic at Columbia University Irving Medical Center. sk4254@columbia.edu

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As an independent optometrist, you know the value of employees who are engaged, productive and committed to business success. IDOC has the tools you need to attract, manage and develop the best people for your practice—and give you the proven leadership skills that will help every employee excel.
Experts offer advice to ODs starting dry eye subspecialty

From developing an office protocol to screening all patients, read these supportive tips

By Ernie Bowling, OD, FAAO

There is a lot of dry eye information available to ODs by a variety of channels. Lectures, articles, workshops—all for us to improve our dry eye diagnosis and treatment skills. But how do you get started? Often the first steps in any process are the hardest.

I had the good fortune to discuss just this with four leaders in the dry eye field: - Whitney Hauser, OD; director of clinical affairs at Keplr Vision, founder of Dry Eye Coach and Signal Ophthalmic Consulting - Scott G. Hauswirth, OD, FAAO; assistant professor, department of ophthalmology at the University of Colorado School of Medicine - Tracy Swartz, OD, FAAO; in group practice in Madison, AL - Crystal Brimer, OD, FAAO; in private practice in Wilmington, NC

To each of them I posed one question: What advice would you give to an OD wanting to start a dry eye subspecialty in their existing office?

Passion
A passion for the topic was mentioned by both Dr. Hauser and Dr. Swartz.

ODs have no idea how many people are suffering from dry eye in their practices. A lot is missed because the patient isn’t complaining

“Don’t treat dry eye because everyone else is,” offers Dr. Hauser. “Don’t be peer pressured into it. Have an interest in dry eye and want to pursue it, otherwise you’ll quit.”

“You have to have a passion for dry eye,” adds Dr. Swartz. “You sincerely have to want to make the patient better.”

Test your commitment
Every person in the practice needs to be on board with adding dry eye treatment.

“Commitment takes a team effort,” says Dr. Hauser. “You need staff buy-in to the project. What are you going to do internally?”

Dr. Hauswirth suggests that ODs first train themselves to be an observant clinician before fully jumping into treating dry eye.

“There is dry eye, and then there are a lot of masqueraders,” he says. “You have to become a good problem-solver.”

Dr. Brimer made an interesting point: “What one thing am I going to do that is so easy I can’t say no to it? Create a space and time for it,” she says.

Develop a protocol
Several ODs suggested that the first step in starting with dry eye testing is developing an office protocol.

Dr. Hauswirth recommends ODs interested in treating dry eye should begin with improving skills.

“Use your vital dyes, use your eyes, and perhaps invest in one or two things to get started. Don’t invest a ton of money into diagnostics until you get good at the basics,” he says.

Dr. Hauser agrees. “Spending money isn’t hard,” she says, “but don’t do that at first.”

“I use staining patterns, InflammaDry (Quidel), Standard Patient Evaluation of Eye Dryness (SPEED) scores, topography, and meibomography,” adds Dr. Swartz.

The docs also recommended the use of a patient questionnaire to track symptoms.

Says Dr. Hauser: “I use the SPEED survey, but the important point is to make use of a patient survey,” Dr. Schwartz says.

“The majority of offices do not make use of surveys,” adds Dr. Brimer.

Dr. Hauswirth suggests that ODs become familiar with gland expression and closely examining lids, glands, and the ocular surface in general.

“Understand what environmental stressors contribute,” he says. “Evaporative stress may be different in Colorado than in South Florida, for example.”

Screen every patient
The doctors agree that screening patients is a great way to get started in treating dry eye.

“Play in your own sandbox before seeking referrals,” says Dr. Hauser. “Primary-care patients have dry eye. Don’t let your normal patient flow camouflage the dry eye patients in front of you.”

Dr Brimer agrees that most practices have untreated dry eye patients already there.

“Doctors and staff have to realize how prevalent dry eye is in their offices,” she says. “Doctors have no idea how many people are suffering from dry eye in their practices. A lot of dry eye patients are missed because the patient isn’t complaining. A consistent screening process of every patient will identify those patients.”

Dr. Brimer recommends that ODs screen every patient for dry eye.

Dr. Hauswirth agrees: “You have to look for dry eye,” he says. “Optometry—like most of medicine—is a reactive profession. To treat dry eye well, ODs have to be looking for changes before the patient has symptoms.”

Keep it simple
The ODs recommend starting small initially.

“Don’t overthink it,” recommends Dr. Brimer, “and don’t be overwhelmed, either.”

Dr. Hauswirth suggests ODs attempt to learn from every single case in order to become a dry eye expert.

“Learn to keep an open mind when approaching a patient,” he says. “Dry eye is a puzzle, and you have to get good at problem solving.”

Dr. Swartz says ODs need to really listen when talking with patients.

“Plus, eyecare practitioners are constantly changing what they think about dry eye. You have to be willing to adapt,” she says.

Remember that what works for one practice may not work for another, according to Dr. Hauser.

“Figure out what fits into your practice, then make it work,” she says.
Looking into the future: Forecast of the global ocular allergy market

A new age of highly customized therapeutic care is coming to the allergy treatment market

By Michael S. Cooper, OD

looking into the future: Forecast of the global ocular allergy market

A new age of highly customized therapeutic care is coming to the allergy treatment market

By Michael S. Cooper, OD

After writing the allergy department for the past five years, I have come to appreciate the subtle nuances within this sphere of influence. Invariably, optometrists (ODs) tend to get bogged down in the trenches of their busy schedules despite realizing there is no shortage of interesting scientific discoveries and pearls to glean from the journals and our clinical experience.

Switching gears though, it would be prudent to take a step back for a moment to appreciate what the economic Magic 8-Ball might portend for trend analysis.

State of allergy market

With a continually increasing incidence over the past 40 years in the United States (US) affecting over 20 percent of the population as the sixth leading cause of chronic illness, ocular symptoms have begun to make a lasting impact in the narrative of our country’s health.1

Bielory et al broke down the experience of ocular symptoms further categorically into mild (25 percent), moderate (53 percent), and severe (22 percent).1 In US households, 32 percent of children exhibit ocular allergy symptoms.6 While many readers may hail from the Americas, the expansion of the disease state extends globally with many EU (European Union) nations registering increased prevalence, including Germany along with emerging markets in the Middle East and Southeast Asia.7-10

When taking a deeper dive, significant market dynamics revolve in the background. The mechanisms of action are parsed out in the three areas, including drivers, restraints, and opportunities.

Drivers are defined as motivating factors such as government funding, prevalence of the disease state, or how rich the pipeline might be.

Although world-class institutions such as Ora (Andover, MA) are working feverishly with industry partners to develop new products, there are restraints to construction.

As experts in the field, ODs assume patients have been exposed to certain treatments to manage the condition. Unfortunately, this is simply not true. Consistently throughout multiple source analyses, there is a larger volume by usage of artificial tears and ocular decongestants followed by allergy eye drops.8,10

While this might be disheartening to hear, in many respects, it is an opportunity to both industry and clinicians. By listening to the marketplace, mega trends have begun to occur and will continue to be explored in development research with respect to efficient drug delivery. Examples include nanotechnology (soon to be picotechnology) and unique physical chemistry to increase ocular tissue penetration.

These innovations will need to meet or exceed the thirst of the public for on-demand care whether it be a genetic therapy, a specialized design drop, nasal spray, or a sublingual method.

Forecast for next decade

So, what is the forecast for next decade?

The distilled answer is significant acceleration of growth year on year. Based on multiple source analyses, the compound annual growth rate is between 4.14 and 5.3 percent with a yield of approximately $707 million to $2 billion across a timeline of 2023 to 2028.8,10

As expected, North America will lead the way with approximate sales growth of 36 percent.8 Conversely, emerging markets will continue to expand their influence due to shifting environmental factors such as pollution from industrial modernization along with the ever-present global warming trend. While perennial and seasonal allergic conjunctivitis will continue to reign supreme for the foreseeable future, vernal conjunctivitis will be the second lucrative growth segment, especially in the male population.4

What next?

As we adapt to mainstream self-driving/autonomous vehicles, quantum artificial intelligence (AI) advancements, and scroll phones in the 2020s, doctors will need to be just as agile in the evolving business environment.

The world is changing rapidly beyond our comprehension in a myriad of ways. In essence, the allergy forecasting exercise above is a microcosm of what is to come for the rest of medicine.

It will require us all to have keen focus and flexibility in how we approach a new age of highly customized therapeutic care.

REFERENCES
Technology

Technological advancements in glaucoma management

By Thomas A. Wong, OD

The modern practice of optometry is rapidly progressing in the 21st century, and its success will depend on advanced clinical outcome support.

Core services in many primary-care optometry practices not only include refractions and contact lens services but also the medical management of anterior segment disease, retinal disorders, neuro-ophthalmic conditions, and other ocular diseases—especially glaucoma.

Today’s successful optometric practice relies on an optometrist’s understanding of important new technologies in the care of glaucoma patients.

Changing glaucoma treatment

Over the last few decades, regulations establishing glaucoma management privileges for optometry have changed nationwide. Schools and colleges of optometry have established state-of-the-art curricula for their graduates to utilize evidence-based models in the diagnosis and management of glaucoma.

Clinical externships and residency programs in ocular disease have provided additional training for optometric students and residents.

Advances in optical coherence tomography (OCT), visual fields, medical imaging, and progression analysis software have further revolutionized the optometric care of patients with glaucoma.

The Laser in Glaucoma and Ocular Hypertension (LIGHT) study provides objective evidence that ODs should re-think the traditional approach of initiating topical medications first and considering surgical procedures later when topicals are no longer as effective.

Also, new advancements in laser trabeculoplasty make the procedure quicker and safer with greater patient satisfaction.

Likewise, the development of minimally invasive glaucoma surgery (MIGS) procedures have changed conventional approaches of treatment.

Understanding surgical advancements in the care of the glaucoma patient is integral to clinical practice for the modern primary care optometrist.

Perspectives from the LIGHT study

In April 2019, the groundbreaking (LIGHT) study was published in The Lancet.

A European-based, multi-center, observer-masked, randomized, controlled trial—it provided evidence that selective laser trabeculoplasty (SLT) should be considered as a frontline treatment for many open-angle glaucoma (OAG) patients.

The study included 718 participants who were ocular hypertensive or had OAG. All had similar baseline ocular characteristics (central corneal thickness, intraocular pressure [IOP] and visual field mean deviations).

Some 356 participants were treated with 360-degree SLT treatment, whereas 362 were treated medically with a prostaglandin, beta blocker, alpha-2 agonist, and carbonic anhydrase inhibitors in a stepwise regimen.

Results showed that 93 percent of SLT-treated patients were at target IOP three years after the laser procedure, whereas 91 percent of patients who were treated topically were at target IOP in three years.

It is noteworthy to mention that none of those treated with SLT required a future trabeculectomy while 11 of the control members needed a trabeculectomy, seven of whom needed trabeculectomy revisions. In addition, the control group exhibited a higher need for cataract surgery. Participants were also surveyed about their quality of life using EQ-5D-5L questionnaires.

Overall, this study prompts the primary-care clinician to consider including SLT earlier in the typical OAG treatment regimen because it was effective in achieving IOP target goals. Study results also showed that SLT is a more cost-effective treatment and improves patient quality of life because SLT potentially reduces the need for invasive cataract surgery.

Micropulse laser trabeculoplasty (MLT) holds promise as a possible replacement for SLT

While SLT has been the standard of procedural care for laser trabeculoplasty after its inception in the late 1990s—replacing argon laser trabeculoplasty (ALT)—a newer procedure, micropulse laser trabeculoplasty (MLT), holds promise as a possible replacement for SLT.

In ALT, a high-powered argon laser was used...
to burn trabecular meshwork (TM) tissue. The resulting contraction of scar tissue improved trabecular outflow but with the downside of a non-repeatable procedure that created thermal damage to the TM. While ALT uses an argon green laser—the same laser used for retinopexy—SLT uses a Nd:YAG laser with a lower power density as a result of a larger (400 μm) spot size and very short (3 ns) pulse duration.

This means the procedure is easier to perform because the surgeon simply needs to aim for the TM as opposed to find the small junction between non-pigmented and pigmented TM demanded by the small, 50-μm spot size of ALT.

More importantly, SLT has non-thermal effects selective for pigmented tissue; it does not burn the TM. This makes it a safer procedure than ALT—and a repeatable one—while its effectiveness was found to be equivalent to ALT.

In MLT the laser is pulsed in 300-μsec bursts, resulting in “cooling off” periods between pulses. As such, similar to SLT, no thermal damage to tissue results from the procedure.1 MLT has been demonstrated to be as efficacious at lowering IOP as SLT with a similar safety profile and improved patient comfort. The procedure came about in the mid 2000s, though has not yet gained the same traction that SLT enjoys, likely because the gains in MLT compared to SLT are not as large as those in SLT compared to ALT.

Still, it is likely that MLT will become more mainstream. MLT is being introduced and utilized in retinal disease as well.3

Pre-operative management for laser trabeculoplasty involves instillation of apraclonidine to prophylactically treat IOP spikes and pilocarpine to open the angle. It often includes the use of prednisolone acetate (Pred Forte, Allergan Pharmaceuticals) 1% for five to seven days.

Understanding SALT

The use of topical anti-inflammatory post-operatively has been debated in the past; however, the recent Steroids after Laser Trabeculoplasty (SALT) trial suggests the use of steroids or non-steroidal agents (NSAID) is beneficial in the effectiveness of the procedure. The SALT trial was a multi-centered randomized control study comparing three study arms. The first group was given 1% prednisolone acetate, the second group was given 0.5% ketorolac (Acular, Allergan Pharmaceuticals) and the placebo group was given saline artificial tears. All groups were dosed four times per day for five days.

Patients were evaluated by a masked examiner for cells and flare on Day 1 and between five and seven days. IOP was measured by a masked technician, and IOP outcomes at six and 12 weeks showed a statistically significant lower eye pressure in those that were treated with either the steroid or NSAID compared to placebo.2

Trans-scleral SLT

Another interesting technological development being studied is applying the SLT laser directly onto the limbus versus the traditional method of applying the laser to the trabecular meshwork via a gonioscopic lens.3 From a technical standpoint, applying the gonio lens requires a topical anesthetic, dexterity, patient cooperation, and visualization of the trabecular meshwork.

ODs should rethink the traditional approach of initiating topical medications first and considering surgical procedures later when topicalans are no longer as effective. A thorough understanding of how technology impacts trends in the management of glaucoma and other ocular diseases should be supplemented by literature review and the study of evidence-based practices. In today’s world of value-based care and the trending patient-driven care models, it is more important than ever that optometrists embrace their roles as clinicians in healthcare teams. The modern practice of optometry is in an ideal position to provide advanced outcome support to patients with glaucoma.

This direct or trans-scleral SLT (DSLST) procedure would eliminate the need to use a goniars and can be performed quickly and safely, even in patients who have narrow angles, cloudy corneas, or other instances in which the trabecular meshwork is not easily visualized.

This method has yet to undergo FDA approval; however, the few double-blind, controlled, small studies that have been performed show it is effective in reducing IOP for at least one year.4

MIGS and modern glaucoma management

Recently, an array of relatively safe MIGS have been developed to decrease IOP. These procedures are typically performed in conjunction with cataract surgery.1

In a primary-care setting, it is beneficial to consider a MIGS procedure when glaucoma patients do not achieve target IOP goals, non-compliance becomes a challenge and/or visually significant cataracts develop.

Popular MIGS procedures target the trabecular outflow (Kaahook Dual Blade trabeculectomy and Hydrus and iStents implants), suprachoroidal outflow (Cypass), subconjunctival filtration (Xen) or aqueous production (endoscopic cyclophotoagulation (ECP)).1

It is imperative that pre-operative care includes a detailed gonioscopic exam prior to cataract surgery in order to select the most appropriate MIGS procedure.

For example, the Kaahook Dual Blade trabeculectomy is effective only if the full extent of the trabecular meshwork is visible.4 Therefore, this would not be a practical option for chronic angle-closure glaucoma patients. ECP is a more viable option in such patients.

Intracapsular cataract extraction (ICCE) with MIGS post-operative care does not significantly differ compared to routine ICCE without a MIGS procedure.

However, clinicians should be more vigilant for hypphemas, peripheral anterior synechiae, and hypotony as changes to the iridocorneal angle are made during the procedure.

Technology and outcomes

A thorough understanding of how technology impacts trends in the management of glaucoma and other ocular diseases should be supplemented by literature review and the study of evidence-based practices. In today’s world of value-based care and the trending patient-driven care models, it is more important than ever that optometrists embrace their roles as clinicians in healthcare teams.

To learn more, please refer to the following references.

REFERENCES


Indications and Usage

CEQUA™ (cyclosporine ophthalmic solution) 0.09% is a calcineurin inhibitor immunosuppressant indicated to increase tear production in patients with keratoconjunctivitis sicca (dry eye).

Important Safety Information

Warnings and Precautions

Potential for Eye Injury and Contamination: To avoid the potential for eye injury and contamination, advise patients not to touch the vial tip to the eye or other surfaces.
Change the outlook for dry eye disease

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IMPORTANT SAFETY INFORMATION
WARNINGS AND PRECAUTIONS
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To avoid the potential for eye injury and contamination, advise patients not to touch the vial tip to the eye or other surfaces.

ADVERSE REACTIONS
The most common adverse reactions reported in greater than 5% of patients were pain on instillation of drops (22%) and conjunctival hyperemia (6%). Other adverse reactions reported in 1% to 5% of patients were blepharitis, eye irritation, headache, and urinary tract infection.

Please see brief summary of Full Prescribing Information on the adjacent page.

Use with Contact Lenses: CEQUA should not be administered while wearing contact lenses. If contact lenses are worn, they should be removed prior to administration of the solution. Lenses may be reinserted 15 minutes following administration of CEQUA ophthalmic solution.

ADVERSE REACTIONS
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Please see brief summary of Full Prescribing Information on the adjacent page.

Brief Summary of Prescribing Information for CEQUA™ (cyclosporine ophthalmic solution) 0.09%, for topical ophthalmic use

CEQUA™ (cyclosporine ophthalmic solution) 0.09%
See package insert for Full Prescribing Information.

INDICATIONS AND USAGE
CEQUA ophthalmic solution is a calcineurin inhibitor immunosuppressant indicated to increase tear production in patients with keratoconjunctivitis sicca (dry eye).

CONTRAINDICATIONS
None.

WARNINGS AND PRECAUTIONS
Potential for Eye Injury and Contamination
To avoid the potential for eye injury and contamination, advise patients not to touch the vial tip to the eye or other surfaces.

Use with Contact Lenses
CEQUA should not be administered while wearing contact lenses. If contact lenses are worn, they should be removed prior to administration of the solution. Lenses may be reinserted 15 minutes following administration of CEQUA ophthalmic solution.

ADVERSE REACTIONS
Clinical Trials Experience
Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

In clinical trials, 769 patients received at least 1 dose of cyclosporine ophthalmic solution. The majority of the treated patients were female (83%).

The most common adverse reactions reported in greater than 5% of patients were pain on instillation of drops (22%) and conjunctival hyperemia (6%). Other adverse reactions reported in 1% to 5% of patients were blepharitis, eye irritation, headache, and urinary tract infection.

USE IN SPECIFIC POPULATIONS
Pregnancy
Risk Summary
There are no adequate and well-controlled studies of CEQUA administration in pregnant women to inform a drug-associated risk. Oral administration of cyclosporine to pregnant rats or rabbits did not produce teratogenicity at clinically relevant doses.

Data
Animal Data
Oral administration of cyclosporine oral solution (USP) to pregnant rats or rabbits was teratogenic at maternally toxic doses of 30 mg/kg/day in rats and 100 mg/kg/day in rabbits, as indicated by increased pre- and postnatal mortality, reduced fetal weight, and skeletal retardations. These doses (normalized to body weight) were approximately 3200 and 21,000 times higher than the maximum recommended human ophthalmic dose (MRHOD) of 1.5 mcg/kg/day, respectively. No adverse embryofetal effects were observed in rats or rabbits receiving cyclosporine during organogenesis at oral doses up to 17 mg/kg/day or 30 mg/kg/day, respectively (approximately 1800 and 6400 times higher than the MRHOD, respectively).

An oral dose of 45 mg/kg/day cyclosporine (approximately 4800 times higher than MRHOD) administered to rats from Day 15 of pregnancy until Day 21 postpartum produced maternal toxicity and an increase in postnatal mortality in offspring. No adverse effects in dams or offspring were observed at oral doses up to 15 mg/kg/day (approximately 1600 times greater than the MRHOD).

Lactation
Risk Summary
Cyclosporine blood concentrations are low following topical ocular administration of CEQUA. There is no information regarding the presence of cyclosporine in human milk following topical ocular administration or on the effects of CEQUA on breastfed infants and milk production. Administration of oral cyclosporine to rats during lactation did not produce adverse effects in offspring at clinically relevant doses. The developmental and health benefits of breastfeeding should be considered along with the mother’s clinical need for CEQUA and any potential adverse effects on the breastfed child from cyclosporine.

 Pediatric Use
The safety and efficacy of CEQUA ophthalmic solution have not been established in pediatric patients below the age of 18.

Geriatric Use
No overall differences in safety or effectiveness have been observed between elderly and younger adult patients.

PATIENT COUNSELING INFORMATION
Handling the Vial
Advise patients to not allow the tip of the vial to touch the eye or any surface, as this may contaminate the solution. Advise patients also not to touch the vial tip to their eye to avoid the potential for injury to the eye.

Use with Contact Lenses
CEQUA should not be administered while wearing contact lenses. Patients with decreased tear production typically should not wear contact lenses. Advise patients that if contact lenses are worn, they should be removed prior to the administration of the solution. Lenses may be reinserted 15 minutes following administration of CEQUA ophthalmic solution.

Administration
Advise patients that the solution from one individual single-use vial is to be used immediately after opening for administration to one or both eyes, and the remaining contents should be discarded immediately after administration.

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Cranbury, NJ 08512
Exam findings
The following examination results were obtained.

Uncorrected visual acuity uncorrected was 20/20 OD and OS.

Refraction was:
OD: Plano-0.75 x 180 20/20
OS: Plano-0.50 x 140 20/20

Corneal topography was normal. Ocular coherence tomography (OCT) showed ocular nerve head and retinal nerve fiber layer OU analysis normal with minimal disc asymmetry noted. Field of vision was full with confrontation fields.

Stereo vision showed 40 seconds of arc. No tropia was noted, and phorias were within standards. Extraocular movements were full.

Slit-lamp examination with 78 D lens showed normal lids, conjunctiva, cornea, angles, anterior chamber, iris, lens, macula, vessels, and vitreous with minimal disc asymmetry noted. Waggoner Pseudoisochromatic Plates (PIP) 24 Plate Color Vision Test was normal.

Intraocular pressures with non-contact tonometry were OD 12 mm Hg, OS 15 mm Hg.

With further examination of this patient, a retinal detachment in the left eye was confirmed by Captain Matthew Rings, aerospace ophthalmologist at NAMI. In this particular case, the detachment had appeared to have stopped its progression (see Figures 1 and 2). The patient was referred to a retinal specialist. Dr. Rings said it was possible that the retinal surgeon might elect to perform retinal laserpexy even though the progression appeared to have stopped in order to prevent further progression under the duress of the flight environment and the fact that this patient may not be available to long-term follow-up due to military deployments.

Navy pilot screening
All aviator applicants are routinely dilated at NAMI using 1% cyclopentolate to rule out excessive hyperopia and to perform a routine dilated fundus exam with binocular indirect ophthalmoscopy. With ophthalmoscopy, I noted an anomaly in the far periphery next to the ora serrata in the left eye of this pilot applicant.

Keep in mind that if a pilot applicant is accepted for flight training, the military will invest millions of dollars in training. The custom-fitted helmet for the F-35 fighter costs $400,000 and features dual cameras for situational awareness in flight for both day and night vision. Because of these costs of training and equipment, the military routinely screens applicants for potential vision and eye diseases before they are accepted for flight training to avoid losing the aviator to progressive eye disease in the middle of a flying career. Such screening maximizes the government’s return on investment and reduces pilot shortages, which is a national defense priority.

Differential diagnosis
My first impression was that I was observing cobblestone degeneration, also known as paving stone degeneration. This retinal detachment (RD) case and paving stone degeneration have similar appearances (see Figure 3). The lesions were round to oval and had scalloped distinct margins. One can see the underlying large choroidal vessels and sclera. There was pigment hyperplasia at the edges of the lesion and pigment migration from atrophied retinal pigment epithelium into sensory retina within the lesion.

Paving stone lesions tend to be aligned in a row parallel to the ora serrata and are commonly found in between the ora serrata and the equator.1

The RD I observed was also in a roll next to the ora serrata. Another optometrist initially thought it might be due to previous laser treatment. How-
Retinal detachment

Continued from page 15

ever, the patient denied any laser treatment and there was no history of treatment or RD in his medical record.

What helped make the diagnosis of self-sealing RD was that the views of the retinal pigment changes were in focus but peripheral to it, nearer the ora serrata, and the retina was lifted up and out of focus.

Sourcing opinions

There are other options to help detect RDs besides binocular indirect ophthalmoscopy with scleral depression, which was used in this case. I asked for thoughts and techniques from members of online optometric community ODwire.

The members agreed that the OCT is limited to the posterior pole. Joe DiGiorgio, OD, said his spectral domain (SD)-OCT is useful for evaluating images in the posterior pole, but his daughter and practice associate is challenged when imaging anything further out than the posterior pole.

Scott Caughell, OD, mentioned that ultra-widefield imaging is great at picking up peripheral lesions, including retinal detachments. If he catches the edge of something, he performs eye steering to get even farther out. With patients coming in with RD symptoms, his staff knows that ultra-widefield imaging with eye steering is the first step before he performs a dilated fundus exam.

Lloyd Pate, OD, uses a B-scan to look for RDs, especially if there is blood in the vitreous. “Blood messes up OCT scans,” he said.

Dr. Pate routinely performs scleral depression and uses a variety of lenses at the slit lamp, including three-mirror for retina and a Volk HRR Wide Field.

Jay Desai, OD, performs scleral depression with binocular indirect ophthalmoscopy. For lateral views, for the temporal right eye, the patient looks at 9 o’clock, 10 o’clock, and 8 o’clock. For temporal left eye, the patient looks at 2 o’clock, 3 o’clock, and 4 o’clock eye positions. Nasal view right eye, the patient looks at 2 o’clock, 3 o’clock, and 4 o’clock positions. Nasal view left eye, the patient looks at 8 o’clock, 9 o’clock, and 10 o’clock positions.

Discussion

It appears that the general consensus of the ODwire community for suspected RDs is to use ultra-widefield imaging (if available) followed by a dilated fundus exam, binocular indirect ophthalmoscopy with lens of choice, and, when appropriate, scleral depression.

If the view is obscured with media opacities, such as vitreous hemorrhage, dense or posterior cataracts, vitreous inflammation, asteroid hyalosis, or the eye is swollen shut, ODs should reach for the B-scan.

The American Academy of Ophthalmology Preferred Practice Pattern guidelines call for examination of the vitreous for hemorrhage, detachment, and pigmented cells, and a careful examination of the peripheral fundus using scleral depression. The guidelines also state that slit-lamp biomicroscopy with a mirrored contact lens or a condensing lens may complement a depressed indirect examination of the peripheral retina.

The views expressed in this article are those of the author and do not necessarily reflect the official position of the Department of the Navy, Department of Defense, nor the U.S. government.

REFERENCES


Dr. Waggoner has 30+ years of practicing primary-care optometry at multiple military facilities. He is co-owner of Waggoner Diagnostics with his son, Dr. Waggoner was a Vietnam combat helicopter pilot who flew 960 combat assaults in 1968-1969 during the TET Offensive and received 47 Air Medals with two Air Medals for Valor. waggonert@waggonerdiagnostics.com

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Coats’ disease: A case study of a 4-year old boy

Early and correct diagnosis of this congenital retinal vasculopathy vital to improve visual outcomes

By Benjamin P. Casella, OD, FAAO

A 4-year-old African-American male presented for his first eye exam after failing a vision screening at his pediatrician’s office due to hyperopia and astigmatism OD.

Observation of the child walking to the exam room showed a normal gait and good attention to surroundings. Medical history was unremarkable with no medications and no known medication or environmental allergies. Family history was remarkable for cataracts, high blood pressure, and glaucoma.

Exam details
Entering uncorrected distance visual acuities by means of Allen pictures were 20/400 and 20/25 OD and OS, respectively. Near visual acuity was 20/20 with both eyes open. Color vision was normal OS and unable to be tested OD. There was no frank stereopsis present.

The patient was not fully cooperative for cover test assessment, but Hirschberg testing showed no overt strabismus. Pupil testing, extraocular muscle function, and visual fields with quadrant screening were unremarkable.

Anterior segment exam showed clear corneas, intact irides, open angles, and quiet lids, lashes, and conjunctivae. Anterior chambers were deep and quiet. Intraocular pressure measurements viarebound tonometry were 9 mm Hg OD and 10 mm Hg OS.

Consent was obtained from the parents for dilation, and wet retinoscopy revealed +0.75 DS OS and a highly variable reflex reading OD ranging from +3.75 DS to +1.00 DS with a small but variable degree of with-the-rule astigmatism.

Posterior pole examination of both eyes is shown as Figure 1. Note the raised nodular lesion underneath the fovea and the surrounding coalesced exudative retinopathy.

Diagnosis
I informed the child’s parents that my initial diagnosis was Coats’ disease and arranged for an urgent evaluation with a retina specialist.

I explained the guarded visual prognosis for the right eye given foveal involvement and prescribed spectacles with impact-resistant lenses to be worn full-time to protect the left eye. At the time this piece was written, I had not heard the results of the child’s consultation with the retina specialist.

Discussion
Coats’ disease is a typically congenital retinal vasculopathy characterized by retinal telangiectasia and subsequent exudative retinopathy. This condition is non-hereditary and is predominantly unilateral with a predilection for males.

As Coats’ disease progresses, the potential for poor visual prognosis increases. The most severe forms result in total retinal detachment, neovascular glaucoma, and phthisis bulbi, which are visually devastating and may necessitate enucleation.

Coats’ disease was first described in 1908 by George Coats as a unilateral vascular disease occurring in the retinas of young males. It can have a highly variable clinical appearance based on the severity of the disease process at presentation.

Coats’ disease (along with cataract, retinoblastoma, and persistent hyperplastic primary vitreous) is one cause of leukocoria and/or strabismus in a child. This is why patients with this condition may be referred for suspicion of retinoblastoma.

As far as visual function is concerned, one finding which leads to a more negative prognosis is the presence of a subfoveal nodule. Unfortunately, this patient has one of these nodules (see Figure 1).

Treatment of Coats’ disease is difficult and centers mainly around an attempt to lessen the retina’s demand for vascular growth. As such, laser photocoagulation and anti-vascular endothelial growth factor (VEGF) therapy have shown efficacy in the earlier disease process, and anti-VEGF therapy with vitrectomy have shown efficacy in advanced disease.

As with any ocular disease, early and correct diagnosis coupled with timely treatment is key in the hopes of achieving a more favorable ocular and visual outcome. Therefore, Coats’ disease is one of the reasons ODs advocate for comprehensive eye exams with dilation early in life, regardless of signs or symptoms of pathology.

REFERENCES

TAKE-HOME MESSAGE This case study highlights the importance of a comprehensive eye examination with pupil dilation early in life, regardless of the presence or absence of signs and/or symptoms of pathology.
Glaucoma

Your glaucoma patients also have ocular surface disease

Employ treatment strategies that control both conditions with less reliance on drops

By S. Wade Kimmell, OD

It is a fact: glaucoma patients are dry eye patients. Think about it. How many of your glaucoma patients don’t complain of dry-eye-related symptoms?

Glaucoma affects nearly 3 million Americans, including one in 50 people aged 40 years and older, according to the American Academy of Ophthalmology. Worldwide, an estimated 76 million people will have the disease in 2020. Many patients with glaucoma have signs and symptoms of ocular surface disease (OSD)—according to one study, about 56.9 percent of women and 45.7 percent of men.1

Considering that both glaucoma and OSD occur more often as patients age, and the most common form of treatment for glaucoma are drops preserved with benzalkonium chloride (BAK), this information is not a surprise. ODs have grown accustomed to seeing glaucoma patients with their injected conjunctivae and keratitis.

When treating glaucoma, ODs make every effort to control patients’ intraocular pressure (IOP) with as few drops and medications as possible. Practitioners dislike adding a twice-daily drop to an at-night drop and hate adding a third drop, knowing that each drop erodes compliance.

Complex drug dosing regimens are a significant barrier to patients’ adherence to therapy.2,3 For glaucoma in general, patients’ lack of compliance ranges from 23 percent to as high as 60 percent.4-8

Compliance challenge

Think about how this changes when it comes to OSD patients. Practitioners prescribe as if patients are compliance superheroes. We put these folks on artificial tears at least four times a day, plus prescription medications like cyclosporine (Restasis, Allergan; Cequa, Sun Pharma; Klarity-C, ImprimisRx) or lifitegrast (Xiidra, Novartis) twice a day, not to mention doxycycline for some. We tell them to use heat masks, hot compresses, and other interventions. Then we believe patients will follow through despite all the data to the contrary.

At least OSD patients have the advantage that treatments are likely to help them feel and see better. Unfortunately, this can’t be said for glaucoma patients. No matter how well ODs manage the disease—glaucoma patients can’t actually see or feel the difference. The result is that their disease doesn’t progress, which is not a tangible benefit for the patient.

Alter the treatment

Optometrists have a great opportunity to treat glaucoma patients’ OSD by offering therapy that provides results they can see and feel. We can get out of our prescribing rut with glaucoma medications by using innovative approaches that are less...
harmful to the ocular surface as well as incorporating effective therapies to maximize ocular surface health. When their OSD is well controlled, glaucoma patients are happier, which in turn strengthens the doctor-patient relationship.

We can do much to improve our patients’ OSD by altering their glaucoma treatment. Preservatives in glaucoma medications contribute to OSD, with BAK being the most common. As a patient uses more of these preserved medications, their exposure and therefore OSD risk increases. Newer, non-preserved topical glaucoma medications are an alternative, and multiple options exist. Zioptan (tafluprost ophthalmic solution; Merck), Cosopt PF (dorzolamide hydrochloride-timolol maleate ophthalmic solution; Akorn), Timoptic in Ocudose (timolol maleate ophthalmic solution) and Xelpros (latanoprost ophthalmic emulsion) are BAK free.

Another way to reduce preservatives is to eliminate a drop—or drops—entirely. Selective laser trabeculoplasty (SLT) has been available for years but continues to be underutilized. Research suggests evidence for considering laser as first-line treatment, although it estimates that only 15 percent to 20 percent of physicians take this approach. 9,10 Even the early Glaucoma Laser Trial (GLT) comparing the use of the old argon laser trabeculoplasty to medications as a first-line treatment found that patients starting with laser had better long-term outcomes than patients starting with medications. 11 Patients were also using fewer drops at the end of follow-up.

New developments in treatment are shifting away from topical drops as first-line treatment, replacing them with delivery systems that include punctal plugs, rings, contact lenses, and injections. It should also be routine to consider minimally invasive glaucoma surgery (MIGS) for any glaucoma patient having cataract surgery. The iStent (Glaukos) is FDA-approved only for implantation during cataract surgery; other MIGS devices are available. Xen gel stent (Allergan) and endocyclophotocoagulation (ECP) are options; although all of these are beyond the scope of this article.

Of course, some glaucoma patients will require dual and triple anti-hypertensive therapy to control their disease, and the toxic effects will need to be addressed. As with glaucoma therapy, we must consider new ways to treat OSD. Like glaucoma, the first line of treatment for patients with dry eye disease (DED) has been topical drops. In most treatment algorithms, patients start with artificial tears and lubricants; when found ineffective, topical prescription medication would be added. 12 Escalating treatment—paralleling glaucoma—would lead to moisture goggles, scleral lenses, autologous serum, and, in the most severe cases, tarsorrhaphy. 12,13

These treatments put a heavy burden on patients, especially those who are also being treated for glaucoma. We can expect the compliance on both fronts to suffer, with a negative impact on the efficacy of treatment for both conditions, not to mention the patients’ quality of life.

A fresh approach

With the development of InflammaDry (Quidel) testing for the inflammatory marker MMP-9, TearLab’s tear osmolarity testing, and the LipiScan Dynamic Meibomian Imager (Johnson & Johnson Vision), we can obtain more detailed information regarding patients’ corneal health. Using these new diagnostic tools combined with our
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FDA approves Horizon Therapeutics' therapy for thyroid eye disease

DUBLIN—The U.S. Food & Drug Administration (FDA) has approved Horizon Therapeutics’ Tepezza (teprotumumab-trbx) as a treatment for thyroid eye disease (TED), a rare autoimmune disorder that can lead to eye bulging and blurred and double vision. Before Tepezza, there were no approved therapies for TED.

The drug works as an antibody and targeted inhibitor of the insulin-like growth factor-1 receptor (IGF-1R). It is administered to patients once every three weeks for a total of eight infusions with a list price of about $200,000 for a six-month course of treatment.

Clinical improvements were noticed as early as six weeks, with continued improvement across a 24-week treatment period, according to the company. In a statement, Tim Walbert, CEO of Horizon Therapeutics, says the FDA approval of Tepezza is momentous for the TED community and has the potential to change the treatment paradigm for TED by providing new hope for people living with the vision-threatening disease.

Positive results from a phase 2 and phase 3 study support the FDA approval.

One study found that meaningful improvements in proptosis were found in significantly more patients treated with Tepezza as compared to placebo patients without deterioration at week 24. Secondary conclusions were also met, including a modification from baseline of at least one grade in diplopia in 67.9 percent of patients receiving Tepezza compared to 28.6 percent of patients receiving the placebo treatment at week 24.

In a related analysis of the phase 2 and 3 clinical studies, there were more patients with complete resolution of diplopia among those treated with Tepezza compared with those who were treated with a placebo.

Tepezza demonstrated a reduction of clinical symptoms along with an ability to ease double vision and improve patients’ quality of life, according to the company.

The majority of unfavorable outcomes experienced with Tepezza treatment were classified as mild to moderate and were controllable in the clinical trials, with a few terminations or therapy interruptions.

Horizon will conduct a post-marketing study to assess safety in a larger patient population. It will also calculate retreatment rates comparative to how long patients received the medication.

See Glaucoma patients on page 24
Glaucoma facts: Essential perspectives for long-term management

More knowledge helps dispel myths in diagnosing and treating this sight-stealing disease

By Greg Hill and Marek Biernacinski

There is a commonly held but false belief within the general public that glaucoma only affects individuals over the age of 50. Experience has taught optometrists (ODs) to spot that myth from a mile away, but other untruths catch even the most practiced ODs off guard.

Edward Chu, OD, FAAO, and David Hicks, OD, FAAO, explored glaucoma facts and myths with research and evidence-based theories for glaucoma management during their lecture at the American Academy of Optometry annual meeting in Orlando.

Assessing and diagnosing

When assessing for glaucoma, it is important to keep in mind that while optic nerve size and shape matter, they do not indicate an increased risk for glaucoma, and normal variations in disc size can explain normal variations in cup-to-disc (C/D) ratios. Asymmetry in C/D values doesn’t necessarily indicate glaucoma either, Dr. Chu says.

When it comes to diagnosing glaucoma itself, it is important to note that glaucoma definitions fall on a spectrum.

According to Dr. Hicks, there are many ways to define and diagnose glaucoma. Optical coherence tomography (OCT) imaging, visual fields, and physical inspections of the optic nerve heads all contribute to variations.

Most glaucoma cases detected by ODs fall within the asymptomatic disease category in which progression can be detected by imaging tools.

ODs need to understand a range of conditions to make the correct glaucoma assessment. For example, traumatic glaucoma is not as common as secondary glaucomas and features two peak incidences:

- Within one year of the initial trauma
- More than 10 years after the initial trauma

Risk factors

Glaucoma is complex with a myriad of risk factors, though some are less known than others.

Research suggests that obstructive sleep apnea is a risk factor for glaucoma. One study showed that 47.6% percent of patients with primary open-angle glaucoma had sleep-disordered breathing.1

Perhaps surprisingly, research on erectile dysfunction shows a link to open-angle glaucoma.2

These lesser-known risk factors underscore the need for ODs to take extensive case histories from patients during their initial evaluation before making glaucoma care decisions.

Visual field facts

ODs are well aware of visual fields’ varying results. However, false positives are a particular point of concern because they have a significant effect on visual field reliability. Patients may worry that they are underperforming visually. This could cause them to overcompensate and become trigger happy, leading to skewed test results.

This is just one contributing factor to another unfortunate glaucoma fact: determining progression through visual field tests is a challenge. Aside from reliability and variability concerns, rates of visual field change are often inconsistent.

As a result, available classification systems, event analyses, and trend analyses, are used to determine progression.

Clinicians must use their own judgement and apply evidenced-based approaches to their decisions, Dr. Hicks says.

Value of retinal fibers and ganglion cells

A patient’s retinal nerve fiber layer (RNFL) and ganglion cells can prevent data on glaucoma progression. For example, asymmetry in RNFL is common in glaucoma patients; however, increased age itself is not associated with increased RNFL asymmetry.

Furthermore, research indicates that ganglion cell analyses can detect glaucoma. Evidence shows that retinal ganglion cell counts are better than average RNFL thickness when detecting glaucoma with minimal visual field loss.3 And beyond that, the minimum ganglion cell inner plexiform layer (GCIPL) is the best parameter for early perimetric glaucoma detection, Dr. Hicks says.

Glaucma is manageable with right approach

Glaucoma diagnoses and treatment plans from iso-

REFERENCES


Aside from reliability and variability concerns, rates of visual field change are often inconsistent
Glaucoma patients

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InDispensable

Blackfin presents its 2020 spring/summer optical collection

Blackfin’s new Spring/Summer 2020 optical frames maintain the brand’s essence—titanium construction, and quality design—while expressing unique configurations of this year’s trends.

The Anfield style is part of the Blackfin One line. Bold and richly hued, this model’s front is produced from a single piece of pure titanium with super flexible beta titanium temples and tilting nose pads made of PVC. These frames are 100 percent biocompatible, hypoallergenic, and nickel free.

The Cortes style is part of the expanded Blackfin Aura collection. It reflects a cross between beta titanium and cellulose acetate infused with light and color. With generous oval rims, this style defines a graceful, feminine shape.

The Tortuga style is part of the expanded Blackfin Aura line which morphs Blackfin’s core material. The front is produced from a single piece of ultra-flexible beta titanium with beta titanium temples and cellulose acetate rims. These frames are available in an array of colors including blue/streaked blue-pink, pink/brown-pink Havana, green/crystal, purple/gradient blue, and brown/gradient burgundy.

Dr. Kimmell received his Doctor of Optometry degree in 2006 from Indiana University School of Optometry. His specialties include surgical comanagement for cataracts and the diagnosis and treatment of ocular diseases. In his free time, Dr. Kimmell enjoys motorcycles and shooting sports, and is involved in his church. He has no financial disclosures for the products mentioned.

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How Johnson & Johnson Vision is Advocating for Eye Health

The U.S. population is changing rapidly, and the landscape of eye health with it. How can optometrists meet the challenges of widespread digital handheld devices, increased rates of myopia, or prescription alteration—at the same time embracing benefits that market disruptors bring to patient and provider alike?

In this Optometry Times® podcast, Michael Mayers, OD, FAAO, outlines the principles behind Johnson & Johnson Vision’s advocacy, and describes strategies used to educate, involve, and empower optometrists.
Laser vision correction: Look backward to move forward

There is a lot to learn from the history of LASIK if ODs are willing to unearth it

By Jim Owen, OD, MBA, FAAO

Listening to Joe Rogan and Robert Downey, Jr. discuss laser vision correction in a recent episode of the “Joe Rogan Experience” podcast was both surreal and amusing. To paraphrase Rogan, “LASIK corrects vision, but it does not fix vision for things like we have, like macular degeneration.”

What they have is presbyopia, so he is correct to some degree. Unfortunately, I have had conversations with optometrists who are also confused about laser vision correction, mostly due to the evolution of knowledge surrounding laser in situ keratomileusis (LASIK). This article will cover a few common misconceptions.

A history of laser correction

About 15 to 20 years ago, every laser center was equipped with a Covalard pupillometer and measuring pupil size in scotopic conditions was necessary. Prior to wavefront -and topography-guided methods of treatment, night vision problems were a significant side effect and concern for those seeking surgery for myopia.

It was believed that scotopic pupil size was a significant contributor to night vision problems. A 2013 article published in the Journal of Refractive Surgery reviewed 19 papers that evaluated pupil size and night vision symptoms.

In the conclusion, Dr. Schalhorn stated, “Modern LASIK has negated the role of the low light pupil in predicting adverse visual outcomes after LASIK outside of the early postoperative period.”

The majority of studies found no correlation between the low light pupil’s role in predicting visual outcomes after LASIK. Those that found a slight correlation were either evaluating night vision in the early post-operative period or were using optic zones of less than 6 mm.

Night vision after LASIK

So, what should patients be told about night vision symptoms after laser vision correction?

I suggest ODs first ask their patients about night vision problems with their current method of correction. I have found that patients who experience night vision symptoms with their glasses and/or contact lenses will likely experience the same symptoms after laser vision correction.

Additionally, as the tear layer is getting back to normal, patients will experience night vision symptoms more often than not.

The easiest way to glean that diagnosis from a patient is to ask about vision right after the instillation of an artificial tear. If it clears up, even just for a few seconds or so, then the culprit is the tear layer. If it does not clear, then uncorrected refractive error is more likely culprit.

While a refraction of +0.25-0.50 x 175 does not impact daytime vision for some patients, it can have a significant effect on the quality of night vision, despite uncorrected visual acuity (UCVA) of 20/20.

In my clinic, pupil size does not have an impact on determining whether or not a patient is a good candidate. Patients who make poor candidates are those who want laser vision correction to eliminate glare they have with glasses or patients who indicate they never need to wear glasses, especially if they have current night vision challenges.

The ideal candidate

Another confusing topic within the optometry world is enhancement surgery. In the days of the microkeratome, surgeons would brag about how far out they could successfully lift a flap.

I remember being curious when a surgeon talked about lifting flaps that were seven years old and the procedure itself had been approved for only five years.

Over time what we learned was that not all flaps behaved the same when lifted and not all flaps were made equally. Surgeons would lift flaps that they, themselves, created but not those of other surgeons, and that practice became the norm. The greatest concern with this was epithelial ingrowth.

ODs would sometimes encounter that one patient, usually an older hyperope, who had recurrent ingrowth so problematic that amputation of the flap was the only feasible treatment option.

This led to photorefractive keratectomy (PRK) becoming the preferred and most common method of enhancement because PRK eliminated the risk of ingrowth.

The pendulum has swung so far away from where it started, in fact, that some surgeons will not risk lifting a flap, even if it is less than three months old and they, themselves, created it.

Modern laser correction

The good news is that laser vision correction has become very accurate and the enhancement rate is around 2 percent or less for quality surgeons. A study from the Journal of Refractive Surgery has shown us that outcomes from PRK enhancement is significantly poorer than outcomes from flap lift enhancements. Only 72.5 percent of patients achieved 20/20, compared to 91.5 percent who achieved 20/20 with the flap lift three months after the enhancement.
Even more alarming, these patients started with a SE of 1.20 D. One would expect better results from the PRK group, considering the procedure is the current best practice.

The study postulated that epithelial hyperplasia was the likely cause of poor outcomes. The rubric for our clinic has shifted to where we lift all flaps from the original surgeon of myopes under the age of 50.

The risk factors for epithelial ingrowth have always been microkeratome (who don’t do any), hyperopes, and older patients. Following this guideline we have not had any of the disaster epithelial ingrowth patients from earlier years.

**Chronological age is not what limits success with laser vision correction as much as the clinical findings that often accompany increased age**

More and more, I hear patients tell me they have been told they are “too old” for LASIK. Often, the patient is 45 years old. Chronological age is not what limits success with laser vision correction as much as the clinical findings that often accompany increased age.

The first ocular age-related change that occurs is presbyopia. Laser vision correction does not correct this. For low hyperopes and high myopes, presbyopia doesn’t even confound the laser correction discussion.

For single-vision myopic contact lens wearers, the discussion about reading glasses should have already occurred, leaving the successful multifocal contact lens wearers and glasses wearers to address. While telling these patients they are “too old” for LASIK shortens the conversation, it won’t stop them from seeking it, particularly if they are fed up with glasses. It is better to spend the extra time explaining the pros and cons rather than letting the patient decide which method of correction is best.

There are many types of age-related, ocular pathologies that should affect decisions to forego or undergo LASIK. One common challenge are cataracts, and more specifically, determining when a cataract is a cataract.

Certainly, a decrease in best corrected visual acuity is a valid reason to move from a cornea-based surgery to a lens-based procedure. Also, patients who glare test to a level where insurance will consider covering cataract surgery may be best suited for a lens-based procedure. A grayer area is when a patient experiences a myopic shift, but visual acuity remains 20/20. That is not a refractive error I would want to chase with laser vision correction.

As laser vision correction improves and lasers become more precise, ODs are able to better identify great candidates. And if, during that process, ODs remain open minded about old beliefs and conventional wisdom regarding refractive surgery, it will allow for happier patients.

**IN BRIEF**

**Eaglet Eye unveils scleral profiler and ability to enter over-refraction information**

LAS VEGAS—Eaglet Eye announced two new major features for the company’s Eye Surface Profiler (ESP) corneal topographer.

ESP provides profiling of the cornea as well as across the limbus and over a large portion of the sclera, according to the company. The topographer offers 20 mm diameter of measurements and accuracy to generate 3D height maps of the ocular surface.

The first new feature is the Scleral Profiler, allowing practitioners to quickly and easily determine if they should pursue a spherical, toric, quad, or fully custom scleral periphery.

According to the company, the Scleral Profiler should make the scleral contact lens fitting process even faster. Eaglet Eye’s second new feature is the ability to enter the over-refraction information to allow for more seamless interaction with the lab of choice.

This is one more step to help reduce the complications when ordering scleral lenses, according to the company.

Eaglet Eye aims to improve eye care around the world through innovative devices both for the eye care providers as well as for their patients.

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Prevention, artificial intelligence, and the future of optometry

Optometry’s success in the future will depend on the ability of ODs to overcome new challenges

O ptometry’s success in the coming years will depend on the ability of optometrists to overcome challenges like economic competitiveness and utilize and grow alongside technological advances that are changing the way business is conducted.

There are now 20 million medical publications, freely accessible as abstracts and full publications within the National Library of Medicine (NLM). Some two million publications are added each year for clinicians to reference in examination rooms, at home, or anywhere they’d like on smart devices. NLM sends more than 10 terabytes of data to nearly five million users and receives more than 100 terabytes of data, representing approximately 5,500 publications of exchanged, peer reviewed, reading material every day.1

There is incredible research waiting to be discovered and applied within this data, and few ODs rolling their sleeves up to unearth it.

The reasons why? Stressful modern practice demands, educational debt, and competing family priorities lead to physician burnout.

Practice demands, physician burnout
In 1975, an average physician visit was 60 minutes long, and a follow-up visit was 30. Today, an average office visit is 12 minutes long, and return visits are seven.2

Modern healthcare specifically demands the treatment of increasingly diverse and aging populations, which creates the “perfect storm” for physician burnout, especially when it comes to primary-care doctors and their associated teams of practitioners.

The question of how to maintain quality healthcare standards while forging ahead into new discoveries and developments is baffling.

The question of how to maintain quality healthcare standards while forging ahead into new discoveries and developments is baffling. In 1975, an average physician visit was 60 minutes long, and return visits are seven.1 In his book *Deep Medicine*, Eric Topol, MD, presents this idea: the physician of today is living in a world of insufficient presence, insufficient time, insufficient data, and “shallow medicine.”3 In his classic book, *The Biology of Belief*, neuroscientist Bruce H. Lipton, PhD, claims that one third of all healing is due to patient belief, not drug or nutrient chemistry.4 Whether you subscribe to this belief or not, all practicing clinicians should realize that there is no substitute for face-to-face time with our patients, regardless of the increasing prevalence of Al.

Missed opportunities
The US has world-class health care for individual segments of medicine such as emergency medicine, neurosurgery and, indeed, ophthalmology with all of its sub-specializations. However, five iterations of universal United States Department of Agriculture (USDA) dietary recommendations have failed to take into account the tide of cellular insulin insensitivity, non-alcoholic fatty liver disease, and the growing diabetes epidemic that currently plagues our most vulnerable citizens.5,6 According to the Centers for Disease Control, more than 100 million U.S. adults are living with diabetes or prediabetes.4 Our own experience as patients and optometric physicians suggest a broken “disease management system,” inconsistent with scientific data available through NLM. We know that genetics plays a role in chronic disease such as age-related macular degeneration (AMD), but the story does not end there, even if the way we tell it does. Epigenetics plays a much larger role.7 Furthermore, there is no single magic diagnostic test, pharmaceutical, or nutrient for progressive retinopathy/choroidopathy. Lifestyle, which encompasses a broad range of ancient nutrients and minimization or modulation of modern stressors, is the task at hand as exemplified by my own life’s work and more recently by ophthalmologist Chris Knobbe, MD.8,9

Perspectives of residency educator
My challenge as a residency coordinator is to cover the medically essential information first, then the chronic ocular disease aspect of the teaching program. That is, I must emphasize to new optometrists their responsibilities to detect, diagnose, and manage (i.e., appropriately refer) life- and vision-threatening diseases.

The most prevalent challenges include an aging population and the resulting high clinical traffic in medical emergencies, chronic oculo-vascular disease, and eye cancers. All contemporary optometric institutions embrace this approach. This is no small task for even seasoned practitioners.

<table>
<thead>
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<th>TABLE 1 ‘Must-know’ conditions</th>
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<tr>
<td>Retinal detachment and acute vitreoretinal disease</td>
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<td>3rd nerve palsy</td>
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<td>Giant cell arteritis</td>
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<td>Mass lesions, primary cancer and metastasis</td>
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<td>Subarachnoid hemorrhage</td>
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TAKE-HOME MESSAGE The question of how to maintain quality healthcare standards while forging ahead into new discoveries and developments is baffling. In his book *Deep Medicine*, Eric Topol, MD, presents this idea: the physician of today is living in a world of insufficient presence, insufficient time, insufficient data, and “shallow medicine.” In his classic book, *The Biology of Belief*, neuroscientist Bruce H. Lipton, PhD, claims that one third of all healing is due to patient belief, not drug or nutrient chemistry. Whether you subscribe to this belief or not, all practicing clinicians should realize that there is no substitute for face-to-face time with our patients, regardless of the increasing prevalence of Al.

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The most prevalent challenges include an aging population and the resulting high clinical traffic in medical emergencies, chronic oculo-vascular disease, and eye cancers. All contemporary optometric institutions embrace this approach. This is no small task for even seasoned practitioners.
Several “must know” conditions for residents are listed in Table 1.

Problems and opportunities

Employment of ODs is projected to grow 10 percent from 2018 to 2028, faster than the average for all occupations. Science in all medical disciplines has revealed that patients and their physicians must begin treatments early to prevent cell loss. Nutritional supplements play a role earlier, while pharmaceutical drugs are best used later. "It is not time to move independently of ophthalmology in providing preventative eye care? All primary-care medicines are facing the same realities. It is not a matter of science in 2020, but the adoption of bold new strategies that will best shape the future. AI can make health care human again, allowing optometrists to embrace our rooted tradition of face-to-face encounters as we get on with the business of preserving vision. The soon-to-be-released feature-length documentary, “Open Your Eyes” delivers the resounding message that the eye holds the secrets to health. It explores how America became so sick and how optometrists can now see almost 300 diseases in the eye.

Kerry Gelb, OD, travels throughout North America and Europe and explores in contrast the Centurians in Costa Rica, who for the most part have no disease and live beyond 100 years without the major cause of blindness seen in the US. Interviews with medical experts, PhDs, researchers, and journalists convey the emerging importance of eye doctors, how they have a major impact on disease prevention, and why they should stand at the forefront of health and wellness.

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How ODs should handle non-compliance with contact lens replacement

Doctors should not blame themselves but look to better patient education and daily disposability

By Ernie Bowling, OD, FAAO

For years I have jokingly referred to contact lens wearers as “the junkies of eye care.” I mean, these patients have a tendency to abuse just about every aspect of contact lens wear—care regimens, replacement schedules, wearing time. You name it, they ignore it.

And for that same amount of time I have blamed myself for these patients’ failings. Perhaps I am not explaining the importance of compliance, I thought, or perhaps I am not emphasizing how serious the complications of abusing their contacts could be.

Study data

So, to help clear up my angst about this situation I decided to do some quick online research.

The first study I found was among a group of young, university-based contact lens users in South India. Two hundred and sixteen young soft contact lens wearers with an age range of 18 to 22 years were questioned regarding their compliance with soft contact lens care with a focus on contact lens wearing habits, cleaning and disinfecting procedures, and maintenance of lens care accessories.

DISEASE LOAD ON CONTACT LENSES IS REDUCED BY 60-70% BY AVOIDING OVERNIGHT LENS WEAR

Only 34 percent of the subjects maintained a satisfactory level of compliance. Twenty-three percent of those who participated in this study reported that they wore their lenses longer than the recommended daily wearing time. Some 5.6 percent of the contact lens wearers studied admitted they ignored the prescriber’s recommendations.

This mirrors the results of another study conducted around the same time in which 24 percent of wearers reported overnight wear of their contact lenses. It has long been recognized sleeping in contact lenses carries a five times greater risk of microbial keratitis compared with daily wear of lenses.

More current research

These studies were five years old. Surely things have improved since then.

The most current numbers I found were from a study conducted in Ohio, and the results were not much different. Of 297 subjects participating in this study, non-compliance with replacement schedule was reported in 38.7 percent of subjects. Non-compliance with prescribed overnight wear was reported in 23.9 percent of subjects in the report.

In yet another study, a total of 40 percent to 74 percent of contact lens wearers did not replace reusable contact lenses on time and in recommendation with the manufacturer’s recommended replacement frequency. In that same report approximately 6 percent of patients reported intentional overnight contact lens wear in lenses that were not designed or approved for extended wear.

I find these results amazing because eye care professionals know the disease load is reduced by 60 percent to 70 percent by simply avoiding overnight lens use.

To add insult to injury, subjects who were non-compliant with lens replacement were more likely to be non-compliant with overnight wear. Daily replacement wearers were most likely to be compliant with contact lens replacement, but all subjects, including daily replacement wearers, had similar overnight wear non-compliance.

There is also a disconnect between what the patient sees as acceptable compliance with contact lens wear and care and what the practitioner sees as acceptable behavior. In both of the 2014 studies, survey respondents considered themselves to be compliant.

A common problem

I have figured out that patients’ non-compliance with contact lens wear isn’t my fault.

Although the industry has seen remarkable advances in contact lens science, noncompliance with lens-wearing schedules, replacement schedules, and lens care regimens remains a significant problem. Noncompliance is present across demographic groups and patient types. Because it is obviously impossible to convince all contact lens wearers to replace their lenses according to manufacturer recommendations, it is up to the contact lens practitioner to find some way to reduce the risks of contact lens overwear.

The first step is proper patient education and training. As the studies show what we feel is acceptable is quite different than what the patient believes and subsequently what the patient actually does. Constant reinforcement at the time of exam and at all follow-up visits is the first step. Asking the patient to demonstrate how he cares for his lenses often reveals care errors.

Consider switching non-compliant patients to a daily disposable lens. The 2019 Ohio Study showed daily replacement wearers were more compliant than two-week and monthly replacement wearers with prescribed lens replacement.

Combine this with the fact daily disposable lenses are associated with a 12.5x lower risk of corneal infiltrative events compared with reusable lenses, and it seems the first step is to get patients to a daily modality.

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6 hours live-cell imaging of Acanthamoeba castellanii trophozoites.**

* In an in-vitro study between competitive brands and ACUVUE™ RevitaLens MPDS, time-lapse measurements were taken to accurately document the time course for eradication of Acanthamoeba castellanii trophozoites. The live-cell methodology visually demonstrates the efficacy of each of the contact lens solutions in eradicating Acanthamoeba castellanii trophozoites.

¹ UV Data on File 2018. ACUVUE RevitaLens Multipurpose Disinfecting Solution Packaging Claims

ACUVUE™ RevitaLens Multi-Purpose Disinfecting Solution is indicated for the care of soft (hydrophilic) contact lenses, including silicone hydrogel lenses. Use this product as directed in the product carton to disinfect, clean, rinse, store, remove protein and condition contact lenses. Do not use this product if allergic to any ingredient in ACUVUE™ RevitaLens MPDS. Problems with contact lenses and lens care products could result in corneal infection and/or ulcers and lead to loss of vision. It is essential that patients follow the directions and labeling instructions for proper use of lenses and lens care products, including the lens case.

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