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Vision Care for the Brain-Injured Patient, p. 73

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VOL. 150 NO. 3 ■ MARCH 15, 2013

IN THE NEWS

The **FDA** has approved the first **"bionic eye,"** actually called the **Argus II Retinal Prosthesis System** (Second Sight Medical Products), a device designed to provide electrical stimulation of the retina to induce visual perception in blind patients with **retinitis pigmentosa**. While the Argus II will not restore vision to patients, it may allow them to detect light and dark, and aid them in identifying the location or movement of objects or people. The company expects the device to be available later this year.

Despite a strong preference for **paper books**, older readers actually have an easier time reading **electronic tablets**, or e-readers, such as the **Kindle** or **Nook**. When researchers evaluated eye movements and brain activity measures, older adults fared better with backlit digital readers than with paper books, according to a study in the open access journal *PLOS ONE*. Based on the physiological measures, the researchers suggest that older readers may benefit from the enhanced contrast on electronic reading devices due to better text discrimination on the backlit displays.

Ten days of **complete darkness** restored visual acuity in subjects with **amblyopia**—however, the subjects in this experiment were **kittens**. Researchers in Canada investigated the possibility that a period of total darkness might "reset the central visual pathways to a more plastic stage and hence increase the capacity for recovery," they reported in the February 14 issue of *Current Biology*. It worked in kittens and, they theorize, short (10-day) periods of darkness may boost recovery from amblyopia in humans.

Children's Vision Health Benefit Approved

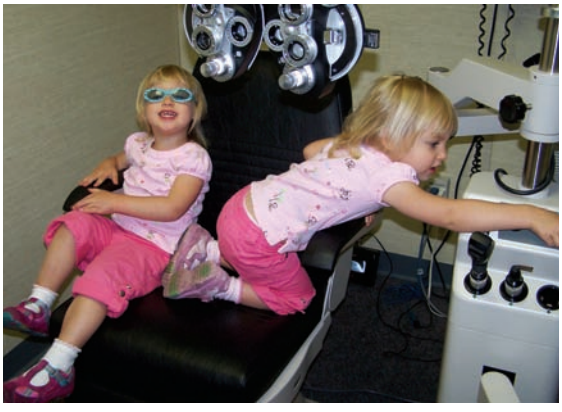
Starting in January 2014, millions of children will gain vision health coverage. **By John Murphy, Executive Editor**

The US Department of Health and Human Service (HHS) announced on February 20 its final rule on essential health benefits covered under the Affordable Care Act. The good news for children, parents and eye doctors: The pediatric vision essential health benefit is going to include an annual comprehensive eye exam and treatment, including medical eye care and materials.

In addition, all new small group and individual health plans must offer pediatric eye health care as a distinct benefit from well child care. And, according to the AOA, all such plans must recognize optometrists as medical eye care providers.

"Millions of children [through age 18] will gain health insurance coverage … that includes direct access to their local optometrist for a comprehensive eye exam and treatment, including medical eye care," the AOA stated.

Opponents of this measure—including the American Academy of Ophthalmology, America's Health Insurance Plans, Blue Cross and Blue Shield Association and others—pushed for HHS to require that children should have to fail a vision screening before getting necessary eye care. "Instead, all optometrists should prepare for an influx of newly insured patients starting January 1, 2014," the AOA said.



Prepare for an influx of newly insured pediatric patients, starting in January 2014. Just don't schedule them all at the same time.

"After nearly a decade of determined advocacy by countless AOA members and staff, federal policymakers officially recognized what America's doctors of optometry and our patients have known all along: that early and periodic comprehensive eye exams and follow-up care are 'essential' to better ensuring the overall health, development, and academic success of our nation's children" said AOA President Ron Hopping, OD, MPH.

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US Supreme Court Rejects Optical Retailers' Appeal on Eye Exam Law

The US Supreme Court has rejected an appeal, brought by a group of optical companies, against a California law that prohibits optical retailers from conducting eye exams on-site in their locations.

The appeal was brought by two optical companies, Eye Care Centers of America and LensCrafters, and by the National Association of Optometrists and Opticians.

The California law allows optometrists and ophthalmologists to sell eyeglasses in their offices, yet forbids opticians and optical retailers from providing eye exams in their locations. The law also prohibits opticians and optical stores from leasing space to or employing optometrists and ophthalmologists on-site, and prevents optical retailers from advertising that glasses and eye exams are available at the same location.

The US Supreme Court wouldn't hear an appeal by optical groups on Calif. law.

In the appeal, the optical petitioners argued that the law discriminates against opticians and optical chains because it prevents them from offering patients "one stop shopping." It also hinders interstate commerce, they said.

But the state attorney general's office argued that eye doctors may be "pressured by optical companies ... to act in a manner that promotes the optical store's commercial interests" if opticians or optical chains lease space to eye doctors.

Last year, a federal appellate court in California also upheld the law, ruling that it had the legitimate purpose of protecting California's eye doctors from takeovers by large businesses. After that, the optical plaintiffs took their appeal to the US Supreme Court.

But now that the highest court in the land has rejected their case, the plaintiffs have no recourse for further appeal.

Final Rule Issued on Sunshine Act

Manufacturers of drugs, devices, biological and medical supplies covered by Medicare, Medicaid or the Children's Health Insurance Program will have to begin gathering information on payments or other transfers of value they make to physicians and teaching hospitals starting August 1, 2013, according to the recently published final rule of the Sunshine Act.

Companies will need to report gifts, consulting fees, research activities, speaking fees, meals and travel arrangements they give to doctors in addition to disclosing to the Centers for Medicare & Medicaid Services ownership or investment interests held by physicians (or the immediate family members of physicians).

Companies will have to report this data to CMS by March 31, 2014. CMS plans to release this data on a public website by September 2014. The companies, as well as the physicians and teaching hospitals, will have an opportunity to review and correct reported information prior to its publication.

The Sunshine Act, officially called "The National Physician Payment Transparency Program: Open Payments," was designed to increase public awareness of financial relationships between drug and device manufacturers and health care providers, and to create greater transparency in the health care market, according to CMS.

"You should know when your doctor has a financial relationship with the companies that manufacture or supply the medicines or medical devices you may need," says Peter Budetti, MD, CMS deputy administrator for Program Integrity. This increased transparency is intended to help reduce the potential for conflicts of interest that physicians or teaching hospitals could face as a result of their relationships with manufacturers.

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Fight Continues in Fla. 'Eyeball Wars'

In Florida, the longstanding, so-called "eyeball wars" between optometrists and ophthalmologists is waging on.

Last month, an optometry bill (HB 239) that would allow ODs to prescribe oral medications—including Schedule III drugs—scored a minor victory in its first round of the legislative process. It was approved by a 10-to-3 vote within the Health Quality Subcommittee in the state House of Representatives.

"This proposal has been around longer than I've been alive," said 31-year-old Rep. Matt Caldwell (R), who had introduced the bill in the House. A similar bill (SB 278) was introduced in the Florida Senate by Senator Garret Richter (R).

"We are thrilled that House Bill 239 is moving forward and that it gained wide support in today's House Subcommittee on Health Quality," said Ken Lawson, OD, legislative chair of the Florida Optometric Association.

The next legislative hurdle for HB 239 had not yet been scheduled at press time.

Meanwhile, Rep. Jeanette Nuñez (R) has introduced an ophthalmology-backed bill (HB 443) that enumerates a number of limitations on optometrists. For one, an optometrist could no longer be referred to as a "physician" or as "board certified" if the bill passes.

Nomenclature aside, the bill stipulates a number of more serious limitations regarding patient care:

- If an optometrist diagnoses a patient with angle closure, neovascular, infantile/congenital or progressive glaucoma, the OD must immediately refer the patient to an ophthalmologist.
- Optometrists would be forbidden from performing surgery, including lasers. In this sense, "surgery" means using an instrument—laser, scalpel, probe or needle—to cut, burn, vaporize, remove or otherwise alter by incision, injection, ultrasound, laser, radiation, infusion, cryotherapy, probing, scraping or any other means. However, certified optometrists would be allowed to remove superficial foreign bodies.
- If a patient experiences an adverse incident from an optometrist's care, the OD would be required to report it to the health department.

A substantial portion of the bill spells out the proper procedures for the comanagement of postoperative care between an optometrist and an ophthalmologist, and that the patient be fully informed and provide consent to comanaged postop care.

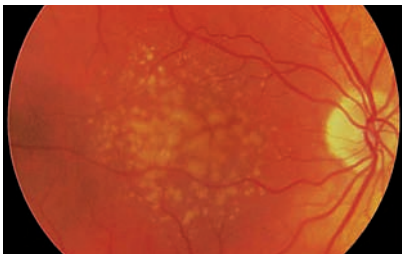
At press time, HB 443 was in committee awaiting consideration.

CRP Test Shows Risk for AMD

Elevated levels of high-sensitivity C-reactive protein (hsCRP)—a common blood test—can predict future risk of age-related macular degeneration, according a new study published online in *JAMA Ophthalmology*.

The study's research team, which included scientists from Harvard, Johns Hopkins University and the University of Utah, evaluated blood samples from approximately 2,000 participants from five previous cancer and heart disease studies.

The researchers found that people with high levels (more than 3mg/L) of hsCRP—a biomarker for inflammation related to heart disease, cancer and other conditions—have a 49% greater risk of all forms of AMD compared to people with low levels of hsCRP (less than 1mg/L). High levels of hsCRP were also associated with an 84% increased risk for wet AMD.



Elevated levels of C-reactive protein indicate a higher risk for AMD.

These findings "add further evidence that elevated levels of hsCRP predict greater future risk of AMD," the authors concluded. "This information might shed light on underlying mechanisms and could be of clinical utility in the identification of persons at high risk of AMD who may benefit from increased adherence to lifestyle recommendations, eye examination schedules and therapeutic protocols."

Mitta VP, Christen WG, Glynn RJ, et al. C-reactive protein and the incidence of macular degeneration: Pooled analysis of 5 cohorts. JAMA Ophthalmol. 2013 Feb 7:1-7. [Epub ahead of print]

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ASCRS: Complications With LASIK and PRK

The American Society of Cataract and Refractive Surgery (ASCRS) issued an alert concerning anecdotal reports of complications, such as flap slippage and diffuse lamellar keratitis, associated with the use of topical medications immediately prior to and during LASIK and PRK.

The problem seemingly stems from the drugs' vehicles. These topical meds—including antibiotics, NSAIDs, steroids and artificial tears—are known to contain vehicles that, in isolated cases, may get sequestered beneath the LASIK flap or a bandage contact lens following PRK, and may remain unabsorbed, according to ASCRS. Anecdotal reports of complications cite delayed epithelial healing and inflammation.

"The ASCRS Medication Alert was issued to remind eye care professionals to not use these next-generation medications on the refractive bed immediately prior to or during LASIK or PRK," says Eric Donnenfeld, MD, ASCRS's president-elect.

But don't call off a patient's procedure just yet. "Refractive surgery has never been safer or more effective," Dr. Donnenfeld says. While these meds should not be used just before or during surgery, they can still be used afterward, he says.

There have been no problems documented with the use of these medications after the LASIK flap has been properly positioned, ASCRS reports.

"I have used these advanced formulations on all of my LASIK and PRK cases, and have never had a single medication problem when they are used according to the guidelines in the ASCRS alert," Dr. Donnenfeld says. ■

Don't Use These Meds Right Before or During LASIK or PRK

- **Acuvail** (ketorolac 0.45%, Allergan), vehicle includes carboxymethylcellulose sodium.
- **AzaSite** (azithromycin 1%, Merck), vehicle includes polycarbophil, edetate disodium, sodium chloride.
- **Besivance** (besifloxacin 0.6%, Bausch + Lomb), vehicle includes polycarbophil, edetate disodium, sodium chloride.
- **Durezol** (difluprednate 0.05%, Alcon), vehicle incudes castor oil.
- **Ilevro** (nepafenac 0.3%, Alcon), vehicle includes propylene glycol, carbomer 974P, guar gum and carboxymethylcellulose sodium.
- **Lotemax Gel** (loteprednol 0.5%, Bausch + Lomb), vehicle includes glycerin, polycarbophil, propylene glycol and tyloxapol.
- **Moxeza** (moxifloxacin 0.5%, Alcon), vehicle includes xanthan gum and tyloxapol.
- **Nevanac** (nepafenac 0.3%, Alcon), vehicle includes mannitol, carbomer 974P, sodium chloride, tyloxapol and edeate disodium.
- **Restasis** (cyclosporine 0.05%, Allergan), vehicle includes castor oil.

ASCRS also advises against the use of highly viscous artificial tears and lubricating drops that contain these inactive ingredients. ASCRS also notes that ketorolac, loteprednol, moxifloxacin and nepafanac are available in formulations without these vehicles.

REVIEW OF OPTOMETRY

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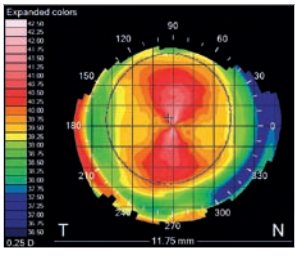

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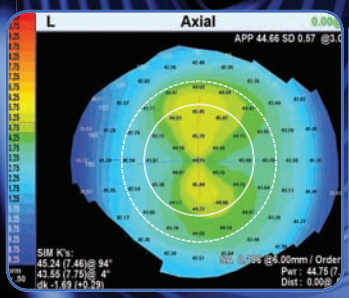

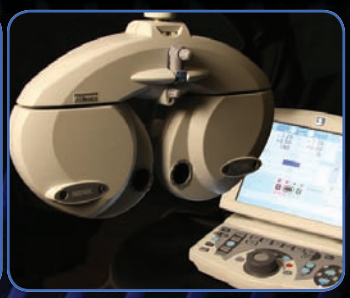

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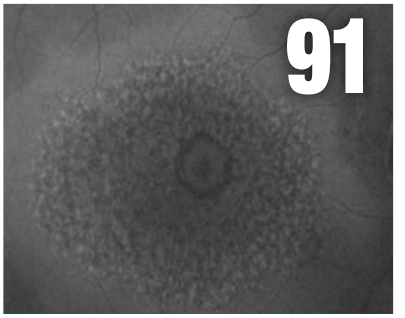

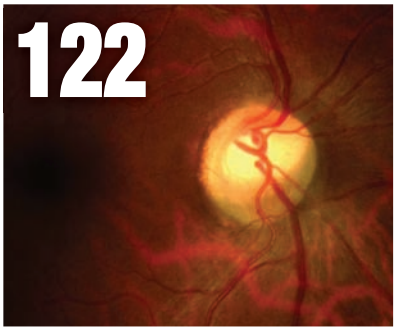

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EDITOR-IN-CHIEF • Jack Persico
(610) 492-1006 • jpersico@jobson.com

EXECUTIVE EDITOR • John Murphy
(610) 492-1021 • jmurphy@jobson.com

MANAGING EDITOR • Michael Hoster
(610) 492-1028 • mhoster@jobson.com

SENIOR EDITOR/WEB EDITOR • Colleen Mullarkey
(610) 492-1005 • cmullarkey@jobson.com

DIRECTOR ART/PRODUCTION • Joe Morris
(610) 492-1027 • jmorris@jobson.com

ART DIRECTOR • Jared Araujo
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GRAPHIC DESIGNER • Alicia Cairns
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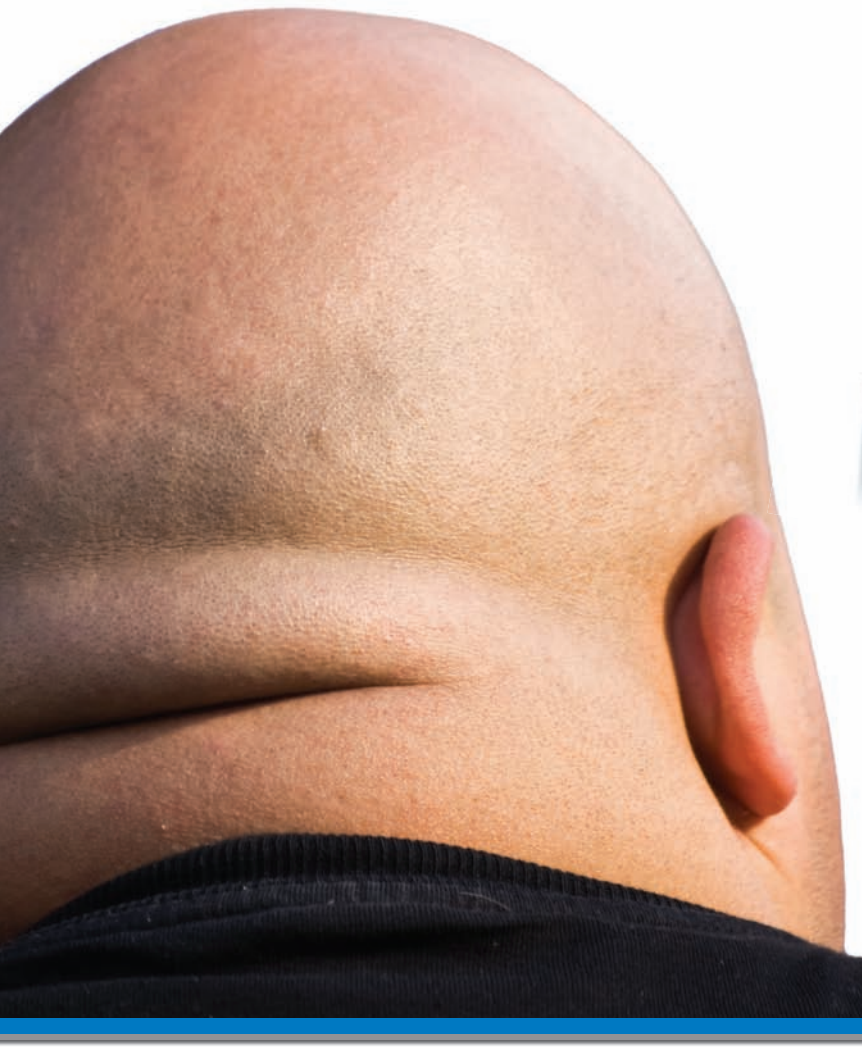

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Many Hands Make Light Work

ODs and MDs working together more closely can manage the deluge of cataract patients, and keep both professions financially healthy. **By Jack Persico, Editor-in-Chief**

If you could hire an assistant who did all the parts of your job that you consider to be a tedious drain on your productivity, how much would you be willing to pay? If this boosted your billings *and* kept you intellectually challenged, probably a decent amount. Now, what if that person worked for free? That's a no-brainer right there.

This is the proposition optometry offers to ophthalmic surgeons when seeking comanagement arrangements. You don't work for free, of course, but since your reimbursement doesn't come from the ophthalmologists (except for those employed by one), it's essentially "free" to them. They get to spend more time in surgery, where they earn considerably more and find the work more professionally stimulating anyway.

Frankly, it's an offer they can't refuse.

The need for greater optometric involvement in cataract surgery is pretty much inevitable, given recent trends. In January, the Medicare surgical reimbursement—which surgeons already felt was too low—was cut by 13%. In a classic case of "no good deed goes unpunished," CMS justified the cut with data showing that the average cataract procedure time has dropped from 35 to 21 minutes in recent years. Surgeons who improved the predictability, efficiency and safety of cataract surgery were rewarded for their ingenuity with a pay cut.

But that's only half the problem for surgeons. The newest innovation—using a femto laser to replace some manually performed aspects of the procedure—adds about $500,000 to the capital equipment needs of a surgical center, *and* a usage fee of about $400 per procedure. Oh, and it *increases* procedure time. (But no surgeon is naive enough to expect the Medicare fee to be revised upward as a result).

Squeezed by fee cuts on one end and rising costs on the other, cataract surgeons have attempted to charge patients out-of-pocket for refractive correction and premium IOLs at the time of surgery, a promising idea that has had lukewarm results thus far. It's less a strategy than a Hail Mary play.

Closing the Gap

A better way to keep surgeons solvent while also meeting the runaway demand for cataract extraction is to bring ODs more fully into the fold, with stronger comanagement relationships or even direct employment at a surgical center, a career path that new optometrists in particular might find attractive if private practice optometry isn't hiring and corporate optometry is uninspiring.

On page 34 of this month's special comanagement-themed issue, Kim Calnan-Holt, OD, of Pacific Cataract and Laser Institute gives us a glimpse of life at a surgical center and the many responsibilities entrusted to the optometrists there who comanage cataract surgery. In a well-run multidisciplinary facility, ODs empowered to their fullest capability can do (or at least oversee) everything but the surgery itself, freeing up the surgeons to increase their procedure volume to make up for that nasty 13% fee cut.

Independent ODs who refer their cataract patients to surgery centers—certainly the more common method of comanagement—have less direct control over the process than those employed at a center, and that's probably holding back progress in this area. According to a recent AOA survey, optometrists diagnose an average of 13 cataract cases per month, but only comanage about half of them (six/month on average).

The only realistic way to perform five million cataract cases per year—as the demand is expected to reach in just a few years—is through tighter integration between ODs, MDs and an array of support staff. Many hands make light work, said the English playwright John Heywood way back in 1546.

Surgeons will need to trust their comanaging ODs with more clinical responsibilities, and optometrists should make it a priority to earn that trust. Surgical comanagement should be front and center in educational curricula and at national conferences—in *both* professions.

The AOA survey reported a comanagement participation rate of 78% among optometrists. That's impressive. But let's close the gap between cases diagnosed and cases (co)managed by an OD. The opportunity, and the need, is too big to ignore. ■

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I Know Write from Wrong

I love writing to patients. And I love it when they write back. The most common letters I get from patients are these: IOU. **By Montgomery Vickers, OD**

I'm a writer. I like to write notes and letters to patients. They don't always have to be about anything in particular. I've been known to drop a note saying something as simple as, "How ya been?" or "Just checkin' in" or "Wouldja make me a pie?" OK, mostly the last one, but when I write to patients, my heart is always in the right place and I do use abbreviations that make my words sound like George Bush is sayin' 'em.

Oh, we all write to patients. Yes, you do, too. What is a recall card but a method of writing something to a patient without actually having to write something to the patient?

Speaking of recall cards, I find they come in two genres: corny and uplifting.

• *Corny reminder cards.* Corny examples include cartoon caricatures of chubby, goofy doctors or chubby, goofy images saying things that are goofy (and perhaps chubby) like, "EYE miss U!" with a sad eye doctor crying. Or maybe, "Where have 'EWE' been?" with a sheep bleating the words. Research has shown that these cards are extremely effective, at least for the card sellers.

Semi-Snellen eye charts are very big in the recall card industry. Patients find them comfortable and familiar. Patients are people too, you know. A patient sees the eye chart and he immediately knows that this is a Call to Action. Ask your marketing team about how important a Call to Action is. They love to explain things like that to ignorant eye doctors. Snellen chart? It's a Call to Action! The patient cannot help but Act by shredding the card before he reads it. Whew! Close Call.

• *Uplifting reminder cards.* There's nothing like a picture of a white dove flying into the sun with inspirational words, perhaps coming from a Higher Power. The words say such sincere and inspiring things as, "Vision is our greatest gift." Call and see if your insurance will cover this "greatest gift." Many patients have gratefully told me that seeing that bird in flight reminds them just how much they want fried chicken for dinner.

It's Your Birthday—Again

But we communicate in so many other ways, don't we? Patients love, love, love birthday postcards for some reason. My wife constantly tells me that this is because a birthday is the only day in the year that is all about YOU. I typically reply, "Then why am I at work every July 28?" She just responds with that look that all wives give that makes the husband know, deep inside, that his wife loves an idiot.

I'm always amazed that patients will thank me for a generic birthday postcard with a cartoon picture of a cake that says something clever like "Happy Birthday!" I mean, people have literally stopped me at the grocery store and tearfully thanked me for that same card I've had the computer send them for years and years. Never change a winning game plan!

Don't get me started on emails. I actually love to email patients. It's fast. It has immediacy. And most patients actually read emails, especially if you start them with something like: "I am Barrister William Bartholomew. We have recently learned that your third cousin, twice removed, Langley... uh... Smith, yeah, Smith, has willed you a rather large sum of money. Please send me your checking account number…"

Now, not every eye doctor is a celebrated columnist and I know that, for many of you, writing and communicating with patients can be daunting. But trust me when I say, "If EYE can do it, 'EWE' can do it!" (Insert smiley face here.) ■

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Comanagement Revisited

Remember, the backbone of comanagement is that it's always the patient's decision to choose the comanaging physician. **By John Rumpakis, OD, MBA, Clinical Coding Editor**

As defined in earlier columns, comanagement is a non-financial arrangement between the doctor performing surgery and a comanaging doctor who provides care to the patient for some portion of the global follow-up period. The doctor who performs the procedure is generally an MD, but in some cases is an OD. The comanaging doctor can be either an MD or an OD as well.

Let's look at some questions that have arisen (in my Inbox) since the last time we covered this topic.

• ***"How do I bill a follow-up office encounter for one of my patients who has had cataract surgery within the 90-day global period, when I have not been designated as the comanaging physician?"***

Before I answer that question, let's keep in mind some basic principles about the comanagement relationship. The comanagement of any surgery begins with the formal transfer of care from the surgeon to the comanaging physician. This transfer is typically, *but not always*, to the physician who originally referred the patient for a surgical evaluation. Remember, a referral to a surgeon *cannot* be based upon the requirement that the surgeon refer the patient back to the referring physician. In fact, in a comanagement situation, it's actually the patient who is the one to choose the comanaging physician.

However, I've seen an increasing trend among surgeons to keep the patient without designating a separate comanaging physician. Normally, if the surgeon is going to comanage the care of the patient, the surgeon bills the surgery with the component codes 6698X-54 (for the pre- and intraoperative portions) and 6698X-55 (for their prorated portion of the follow-up care). The surgeon also places a date of release to the comanaging physician in box #19 of the CMS 1500 form.

Now, if a surgeon is not comanaging with anyone, then the surgeon can simply bill 6698X without any modifiers, thereby telling the carrier that he or she is performing the pre-, intra- and postoperative care for the entire 90-day global period.

OK, so back to the question. What happens when the patient returns to your office? First, because you have never been designated as the comanaging physician, you are not bound by any of the rules of comanagement. Your office visit could be coded as a 9201X or 9921X, depending on the reason for the visit and the appropriate level of case history, physical examination and medical decision-making you performed. You are not bound to accept any reimbursement related to the surgical "comanagement" at all.

However, I believe that you have an obligation to let patients know that their follow-up care related to the surgery is already covered for the 90-day period after their surgery. But keep in mind that the patient always makes the decision of who they want to see, period! So, if the patient chooses to see you, provide the appropriate level of care required by the patient's presentation and bill the carrier accordingly.

• ***"How do I, when I am designated as the comanaging physician, code an office visit within the global period following cataract surgery that is* not *related to the cataract surgery?"***

This is an easy one. Let's refer to Appendix A of the 2013 CPT book, which contains the modifiers and their definitions. In this case, modifier -24 is the correct one to append to the office visit.

Specifically, "the physician or other qualified health provider may need to indicate that an evaluation and management [E/M] service was performed during a postoperative period for a reason(s) unrelated to the original procedure. This circumstance may be reported by adding modifier 24 to the appropriate level of E/M service."[1]

Remember that this applies to both the 920XX and 992XX codes, as the 920XX codes are considered part of the E/M code set.

Simple questions with not-so-simple answers; but, hopefully, these are ones that will aid you in your day-to-day patient care.

Meantime, it's T minus 10 months and counting until the Affordable Care Act officially kicks in. More on that next month. ■

1. Current Procedural Terminology (CPT) Professional Edition. Chicago: American Medical Association; 2013:595.

ALLERGIC CONJUNCTIVITIS:

A Growing Patient Problem

Many optometrists talk about ocular surface disease and the frequent patients with dry eye and meibomian gland disease, but they often list allergic conjunctivitis as a far third—despite the fact that over the past several years, we're seeing more and more patients present with this condition. While clearly a growing patient problem, treatment of the symptoms of allergic conjunctivitis is also an opportunity.

In an attempt to put this condition on the radar where it deserves to be, four well-known clinicians participated in a webinar, during which they discussed the prevalence of allergic conjunctivitis; the phases and treatments of the condition; and the use of BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% for itching associated with allergic conjunctivitis. The following pages briefly summarize highlights from the event.

ALLERGIC CONJUNCTIVITIS ORIGINS AND PREVALENCE

Paul M. Karpecki, OD

More than 20% of the general population suffers from allergic conjunctivitis.[1] Those who wear contact lenses might discontinue wearing their lenses; take a break from wearing them; cut back on their daily wear; or be switched to a new modality such as a daily disposables. Prompt and effective treatment of allergy symptoms will cut down on that hiatus time and possibly prevent patients from discontinuing wear.

Know the Enemy

Seasonal and perennial allergic conjunctivitis represent the two most common ocular allergies.[2] They are both type 1 (immediate) hypersensitivity reactions commonly grouped together under "allergic conjunctivitis" but the main differentiator is timing of symptoms.[3]

Commonly in seasonal allergic conjunctivitis, a significant peak in ocular symptoms occurs between April and June, and a second peak shows up between August and September, though this can certainly vary depending on where you live. Nonetheless, it's important to be aware of these key times. Perennial allergic conjunctivitis exists all year long because it's related to household allergens such as animal dander, dust mites and mold that are always present.[3]

Regional variations in seasonal allergic conjunctivitis are driven by climate and differences in pollen producers. In the west and desert regions, some plant allergens are present the entire year and when you get into the southern region, you'll see grasses all the way from January through to mid November/early December.

Identify and Destroy

Many times when patients visit the Ocular Surface Disease Clinic, we focus on dry eye, blepharitis and meibomian gland dysfunction. Patients with blepharitis may talk about itching that is more on their lids and patients with allergic conjunctivitis will complain about itching of the eye or canthal region, but they're certainly talking about symptoms of itching, so you have to differentiate. Both allergic conjunctivitis and MGD patients may complain of redness, grittiness and dryness, but allergic conjunctivitis patients tend to complain about itching first. Oftentimes, treatment with a combination agent such as an antihistamine-mast cell stabilizer will take care of the itch associated with allergic conjunctivitis.

Dr. Karpecki is Corneal Services & Ocular Disease Research Director at Koffler Vision Group in Lexington, Ky. He is also National Education Director, Optometric Medical Solutions.

THE PHASES AND TREATMENT OF ALLERGIC CONJUNCTIVITIS

Edward J. Holland, MD

As a type 1 hypersensitivity reaction, allergic conjunctivitis has three phases:

Sensitization phase. IgE antibodies specific to the presenting allergen are created and bind to the surface of mast cells, making sensitization complete. The mast cells then begin to produce histamine. Prostaglandins and leukotrienes are also produced, and are the medians of inflammation; now the eye is primed for the signs and symptoms of allergic conjunctivitis.[4]

Early phase. If the eye encounters the same allergen that led to this sensitization, it will begin the early stage allergic reaction and during this process, the allergen binds to the IgE antibodies present on the mast cells. The mast cells degranulate in response to the allergen IgE complex and within minutes, histamine, prostaglandins, leukotrienes and the other chemotactic factors such as IL-5 are released, initiating the allergic response. These factors contribute to the patient experiencing itch.[4]

Late phase. Anywhere from two to six+ hours after the allergen exposure, the allergic reaction moves to this late phase and the chemotactic factors release from mast cell degranulation, attract and recruit and activate the other inflammatory cells, mediators and additional key cells. The presence of these additional immune cells and their byproducts will prolong and exacerbate the symptoms of allergic conjunctivitis.[4]

Treatment Review

A variety of approaches are available to us as clinicians to treat the itch associated with allergic conjunctivitis. The most fundamental approach is to avoid contact with allergens as much as possible. A variety of self-help remedies, including cool compresses, over-the-counter (OTC) artificial tears/lubricants, OTC topical antihistamines and vasoconstrictors are also at our disposal. Prescription options include non-steroidal anti-inflammatory drugs, topical corticosteroids, mast cell stabilizers, antihistamines as well as dual-action antihistamine-mast cell stabilizers such as BEPREVE® (bepotastine besilate ophthalmic solution) 1.5%.

Our role is to assess symptom severity so we can provide the right treatment choice(s) and help our patients understand our recommendations, including how to use the OTC choices. We want to recommend a treatment that's quick, long lasting and gives complete relief for these patients.

Dr. Holland is Director of Cornea at the Cincinnati Eye Institute and Professor of Ophthalmology at the University of Cincinnati.

A BRIEF PRIMER ON BEPREVE

Stephen S. Lane, MD

Bausch + Lomb's prescription eye drop BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is approved in the United States for the treatment of itching associated with allergic conjunctivitis. It is a highly selective histamine H_1 receptor antagonist and a mast cell stabilizer. The BEPREVE® allergic conjunctivitis clinical trials were conducted in a Conjunctival Allergen Challenge, or CAC model, which is a consistent standard for evaluating the efficacy of allergic conjunctivitis treatments because it eliminates much of the variability associated with environmental studies.[5]

In this model, patients are evaluated for sensitivity to a specific allergen. Entry criteria into the study is a grade 2 or higher for itching and hyperemia individually.[5–8] With this response established, patients are given a dose of either the test agent or placebo. Following a specified interval—15 minutes to evaluate onset of action; eight hours or 16 hours to evaluate the duration of action—the patient is "challenged" with the allergen. In other words, the allergen is introduced into their eyes. They are then evaluated for signs and symptoms. A primary endpoint in the BEPREVE® studies was ocular itching, which was graded from 0 – 4 (a nine-point scale allowed 0.5 increments) that ranged from no itch to a very severe or incapacitating itch.[5–8]

Efficacy

The efficacy in the itch endpoint was compared to placebo at different time points. In terms of ocular itch and onset of action, 95% of eyes dosed with BEPREVE® achieved a clinically significant reduction in ocular itching at three, five and seven minutes post dose (n=156 eyes).[5–8] That's a reduction in itching score of at least one full unit, which is also statistically significant. When challenged eight hours post dose, 90% of the eyes treated with BEPREVE® had a clinically significant reduction in ocular itch, which is also statistically significant (n=156 eyes). (The eight-hour time period is considered the benchmark by the FDA for b.i.d. dosing.)

In patients with severe ocular itch of grade 3 or more, 68% of eyes treated with BEPREVE® had no ocular itching at three minutes post challenge in the onset of action visit (n=104 eyes).[5–8] Only 3% of eyes in the placebo group reported having complete elimination of itch at three minutes (n=98 eyes). These data suggest that a majority of patients, given a drop of BEPREVE® in the lane, can experience a substantial, if not complete, degree of relief from their itch before they even leave your office.

Dr. Lane is Medical Director, Associated Eye Care and Adjunct Clinical Professor, University of Minnesota.

A LOOK AT BEPREVE'S SAFETY TRIAL RESULTS

Richard L. Lindstrom, MD

As with efficacy, safety is also important. In addition to the two pivotal efficacy studies, BEPREVE® was evaluated in a six-week randomized placebo controlled multi-center safety study.[9,10] A total of 861 healthy subjects including pediatric patients as young as three years old were enrolled and dosed bilaterally for about 43 days. Safety evaluation included adverse events, vital signs, ophthalmological exams and ocular comfort.

This safety study also quantitatively assessed the ocular comfort of the drop. Again, the comfort of BEPREVE® was not statistically different from placebo at both 30 seconds and five minutes post instillation, with 92% of more than 6,400 ocular comfort scores reporting no discomfort.[9,10] The most common treatment-related adverse event reported in the six-week safety trial in normal volunteers was mild transient taste, in approximately 25% of subjects.[9,10] Other adverse events reported in at least 2% of subjects included eye irritation, headache and nasopharyngitis.

Of note, reports of dry eye were slightly higher (1.7%) in placebo-treated patients compared to BEPREVE®-treated patients (1.0%). Because many patients do have associated symptoms of dry eye and allergic conjunctivitis, this is an important clinical issue.[11]

Dr. Lindstrom is Founder and Attending Surgeon, Minnesota Eye Consultants and Adjunct Professor Emeritus, University of Minnesota Department of Ophthalmology.

INDICATION

BEPREVE® is a histamine H1 receptor antagonist indicated for the treatment of itching associated with signs and symptoms of allergic conjunctivitis.

IMPORTANT RISK INFORMATION

BEPREVE is contraindicated in patients with a history of hypersensitivity reactions to bepotastine or any of the other ingredients. BEPREVE® is for topical ophthalmic use only. To minimize risk of contamination, do not touch the dropper tip to any surface. Keep the bottle closed when not in use. BEPREVE® should not be used to treat contact lens–related irritation. Remove contact lenses prior to instillation of BEPREVE®.

The most common adverse reaction occurring in approximately 25% of patients was a mild taste following instillation. Other adverse reactions occurring in 2%-5% of patients were eye irritation, headache, and nasopharyngitis.

Please see Full Prescribing Information for BEPREVE® on the Following Page.

References

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BEPREVE® (bepotastine besilate ophthalmic solution) 1.5%

HIGHLIGHTS OF PRESCRIBING INFORMATION
These highlights do not include all the information needed to use BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% safely and effectively. See full prescribing information for BEPREVE®.

BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% Initial U.S. Approval: 2009

----------INDICATIONS AND USAGE----------
BEPREVE® is a histamine H_1 receptor antagonist indicated for the treatment of itching associated with allergic conjunctivitis. (1)

----------DOSAGE AND ADMINISTRATION----------
Instill one drop into the affected eye(s) twice a day (BID).(2)

--------DOSAGE FORMS AND STRENGTHS---------
Solution containing bepotastine besilate, 1.5%. (3)

----------------CONTRAINDICATIONS----------------
Hypersensitivity to any component of this product. (4)

----------WARNINGS AND PRECAUTIONS----------
- To minimize the risk of contamination, do not touch dropper tip to any surface. Keep bottle tightly closed when not in use. (5.1)
- BEPREVE® should not be used to treat contact lens-related irritation. (5.2)
- Remove contact lenses prior to instillation of BEPREVE®. (5.2)

----------ADVERSE REACTIONS----------
The most common adverse reaction occurring in approximately 25% of patients was a mild taste following instillation. Other adverse reactions which occurred in 2-5% of subjects were eye irritation, headache, and nasopharyngitis. (6)

To report SUSPECTED ADVERSE REACTIONS, contact ISTA Pharmaceuticals, Inc. at 1-877-788-2020, or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

See 17 for PATIENT COUNSELING INFORMATION
Revised: 12/2011

FULL PRESCRIBING INFORMATION: CONTENTS*

*Sections or subsections omitted from the full prescribing information are not listed.

FULL PRESCRIBING INFORMATION

1. INDICATIONS AND USAGE
BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is a histamine H_1 receptor antagonist indicated for the treatment of itching associated with signs and symptoms of allergic conjunctivitis.

2. DOSAGE AND ADMINISTRATION
Instill one drop of BEPREVE® into the affected eye(s) twice a day (BID).

3. DOSAGE FORMS AND STRENGTHS
Topical ophthalmic solution containing bepotastine besilate 1.5%.

4. CONTRAINDICATIONS
BEPREVE® is contraindicated in patients with a history of hypersensitivity reactions to bepotastine or any of the other ingredients [see Adverse Reactions (6.2)].

5. WARNINGS AND PRECAUTIONS

5.1 Contamination of Tip and Solution
To minimize contaminating the dropper tip and and solution, care should be taken not to touch the eyelids or surrounding areas with the dropper tip of the bottle. Keep bottle tightly closed when not in use.

5.2 Contact Lens Use
Patients should be advised not to wear a contact lens if their eye is red. BEPREVE® should not be used to treat contact lens-related irritation. BEPREVE® should not be instilled while wearing contact lenses. Remove contact lenses prior to instillation of BEPREVE®. The preservative in BEPREVE®, benzalkonium chloride, may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of of BEPREVE®.

5.3 Topical Ophthalmic Use Only
BEPREVE® is for topical ophthalmic use only.

6. ADVERSE REACTIONS

6.1 Clinical Trials Experience
The most common reported adverse reaction occurring in approximately 25% of subjects was a mild taste following instillation. Other adverse reactions occurring in 2-5% of subjects were eye irritation, headache, and nasopharyngitis.

6.2 Post Marketing Experience
Hypersensitivity reactions have been reported rarely [two (2) possibly related cases for an incidence of 0.00006%] during the post-marketing use of BEPREVE®. Because this reaction is reported voluntarily from a population of unknown size, the actual incidence cannot be verified. The hypersensitivity reactions include itching, body rash, and swelling of lips, tongue and/or throat.

8. USE IN SPECIFIC POPULATIONS

8.1 Pregnancy
Pregnancy Category C: Teratogenicity studies have been performed in animals. Bepotastine besilate was not found to be teratogenic in rats during organogenesis and fetal development at oral doses up to 200 mg/kg/day (representing a systemic concentration approximately 3300 times that anticipated for topical ocular use in humans), but did show some potential for causing skeletal abnormalities at 1000 mg/kg/day. There were no teratogenic effects seen in rabbits at oral does up to 500 mg/kg/day given during organogenesis and fetal development (>13,000 times the dose in humans on a mg/kg basis). Evidence of infertility was seen in rats given oral bepotastine besilate 1000 mg/kg/day, however, no evidence of infertility was observed in rats given 200 mg/kg/day (approximately 3300 times the topical ocular use in humans). The concentration of radiolabeled bepotastine besilate was similar in fetal liver and maternal blood plasma following a single 3 mg/kg oral dose. The concentration in other fetal tissues was one-third to one-tenth the concentration in maternal blood plasma.

An increase in stillborns and decreased growth and development were observed in pups born from rats given oral doses of 1000 mg/kg/day during perinatal and lactation periods. There were no observed effects in rats treated with 100 mg/kg/day.

There are no adequate and well-controlled studies of bepotastine besilate in pregnant women. Because animal reproduction studies are not always predictive of human response, BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

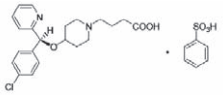
8.3 Nursing Mothers
Following a single 3 mg/kg oral dose of radio-labeled bepotastine besilate to nursing rats 11 days after delivery, the maximum concentration of radioactivity in milk was 0.40 µg eq/mL 1 hour after administration; at 48 hours after administration the concentration was below detection limits. The milk concentration was higher than the maternal blood plasma concentration at each time of measurement.

It is not known if bepotastine besilate is excreted in human milk. Caution should be exercised when BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is administered to a nursing woman.

8.4 Pediatric Use
Safety and efficacy of BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% have not been established in pediatric patients under 2 years of age. Efficacy in pediatric patients under 10 years of age was extrapolated from clinical trials conducted in pediatric patients greater than 10 years of age and from adults.

8.5 Geriatric Use
No overall difference in safety or effectiveness has been observed between elderly and younger patients.

11. DESCRIPTION
BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is a sterile, topically administered drug for ophthalmic use. Each mL of BEPREVE® contains 15 mg of bepotastine besilate. Bepotastine besilate is designated chemically as (+) -4-[[(S)-p-chloro-alpha -2-pyridylbenzyl]oxy]-1-piperidine butyric acid monobenzenesulfonate. The chemical structure for bepotastine besilate is:



Bepotastine besilate is a white or pale yellowish crystalline powder. The molecular weight of bepotastine besilate is 547.06 daltons. BEPREVE® ophthalmic solution is supplied as a sterile, aqueous 1.5% solution, with a pH of 6.8.

The osmolality of BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is approximately 290 mOsm/kg.

Each mL of BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% contains:
Active: Bepotastine besilate 15 mg (equivalent to 10.7 mg bepotastine)
Preservative: benzalkonium chloride 0.005%
Inactives: monobasic sodium phosphate dihydrate, sodium chloride, sodium hydroxide to adjust pH, and water for injection, USP.

12. CLINICAL PHARMACOLOGY

12.1 Mechanism of Action
Bepotastine is a topically active, direct H_1 receptor antagonist and an inhibitor of the release of histamine from mast cells.

12.3 Pharmacokinetics
Absorption: The extent of systemic exposure to bepotastine following topical ophthalmic administration of bepotastine besilate 1% and 1.5% ophthalmic solutions was evaluated in 12 healthy adults. Following one drop of 1% or 1.5% bepotastine besilate ophthalmic solution to both eyes four time daily (QID) for seven days, bepotastine plasma concentrations peaked at approximately one to two hours post-instillation. Maximum plasma concentration for the 1% and 1.5% strengths were 5.1 ± 2.5 ng/mL and 7.3 ± 1.9 ng/mL, respectively. Plasma concentration at 24 hours post-instillation were the below quantifiable limit (2ng/mL) in 11/12 subjects in the two dose groups.

Distribution: The extent of protein binding of bepotastine is approximately 55% and independent of bepotastine concentration.

Metabolism: *In vitro* metabolism studies with human liver microsomes demonstrated that bepotastine is minimally metabolized by CYP450 isozymes.

In vitro studies demonstrated that bepotastine besilate does not inhibit the metabolism of various cytochrome P450 substrate via inhibition of CYP3A4, CYP2C9, and CYP2C19. The effect of bepotastine besilate on the metabolism of substrates of CYP1A2, CYP2C8, CYP2D6 was not studied. Bepotastine besilate has a low potential for drug interaction via inhibition of CYP3A4, CYP2C9, and CYP2C19.

Excretion: The main route of elimination of bepotastine besilate is urinary excretion (with approximately 75-90% excreted unchanged in urine).

13. NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis and Impairment of Fertility
Long term dietary studies in mice and rats were conducted to evaluate the carcinogenic potential of bepotastine besilate. Bepotastine besilate did not significantly induce neoplasms in mice receiving a nominal dose of up to 200 mg/kg/day for 21 months or rats receiving a nominal dose of up to 97 mg/kg/day for 24 months. These dose levels represent systemic exposures approximating 350 and 200 times that achieved with human topical ocular use.

The no observable adverse effect levels for bepotastine besilate based on nominal dose levels in carcinogenicity tests were 18.7 to 19.9 mg/kg/day in mice and 9.6 to 9.8 mg/kg/day in rats (representing exposure margins of approximately 60 and 20 times the systemic exposure anticipated for human topical use).

There was no evidence of genotoxicity in the Ames test, in CHO cells (chromosome aberrations), in mouse hepatocytes (unscheduled DNA synthesis), or in the mouse micronucleus test.

When oral bepotastine was administered to male and female rats at doses up to 1,000 mg/kg/day, there was a slight reduction in fertility index and surviving fetuses. Infertility was not seen in rats given 200 mg/kg/day oral bepotastine besilate (approximately 3300 times the systemic concentration anticipated for topical ocular use in humans).

14. CLINICAL STUDIES
Clinical efficacy was evaluated in 2 conjunctival allergen challenge (CAC) studies (237 patients). BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% was more effective than its vehicle for relieving ocular itching induced by an ocular allergen challenge, both at CAC 15 minutes post-dosing and a CAC 8 hours post dosing of BEPREVE®.

The safety of BEPREVE® was evaluated in a randomized clinical study of 861 subjects over a period of 6 weeks.

16. HOW SUPPLIED/STORAGE AND HANDLING
BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is supplied in a white low density polyethylene plastic squeeze bottle with a white controlled dropper tip and a white polypropylene cap in the following sizes:

5 mL (NDC 67425-007-50)
10 mL (NDC 67425-007-75)

STORAGE
Store at 15° – 25°C (59° – 77°F).

17. PATIENT COUNSELING INFORMATION

17.1 Topical Ophthalmic Use Only
For topical ophthalmic administration only.

17.2 Sterility of Dropper Tip
Patients should be advised to not touch dropper tip to any surface, as this may contaminate the contents.

17.3 Concomitant Use of Contact Lenses
Patients should be advised not to wear a contact lens if their eye is red. Patients should be advised that BEPREVE® should not be used to treat contact lens-related irritation. Patients should also be advised to remove contact lenses prior to instillation of BEPREVE®. The preservative in BEPREVE®, benzalkonium chloride, may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of BEPREVE®.

Manufactured for: ISTA Pharmaceuticals, Inc.
Irvine, CA 92618

By: Bausch & Lomb Incorporated
Tampa, FL 33637

Under license from:
Senju Pharmaceuticals Co., Ltd.
Osaka, Japan 541-0046

U.S. Patents: 6,307,052; 6,780,877

BRV957-2/12

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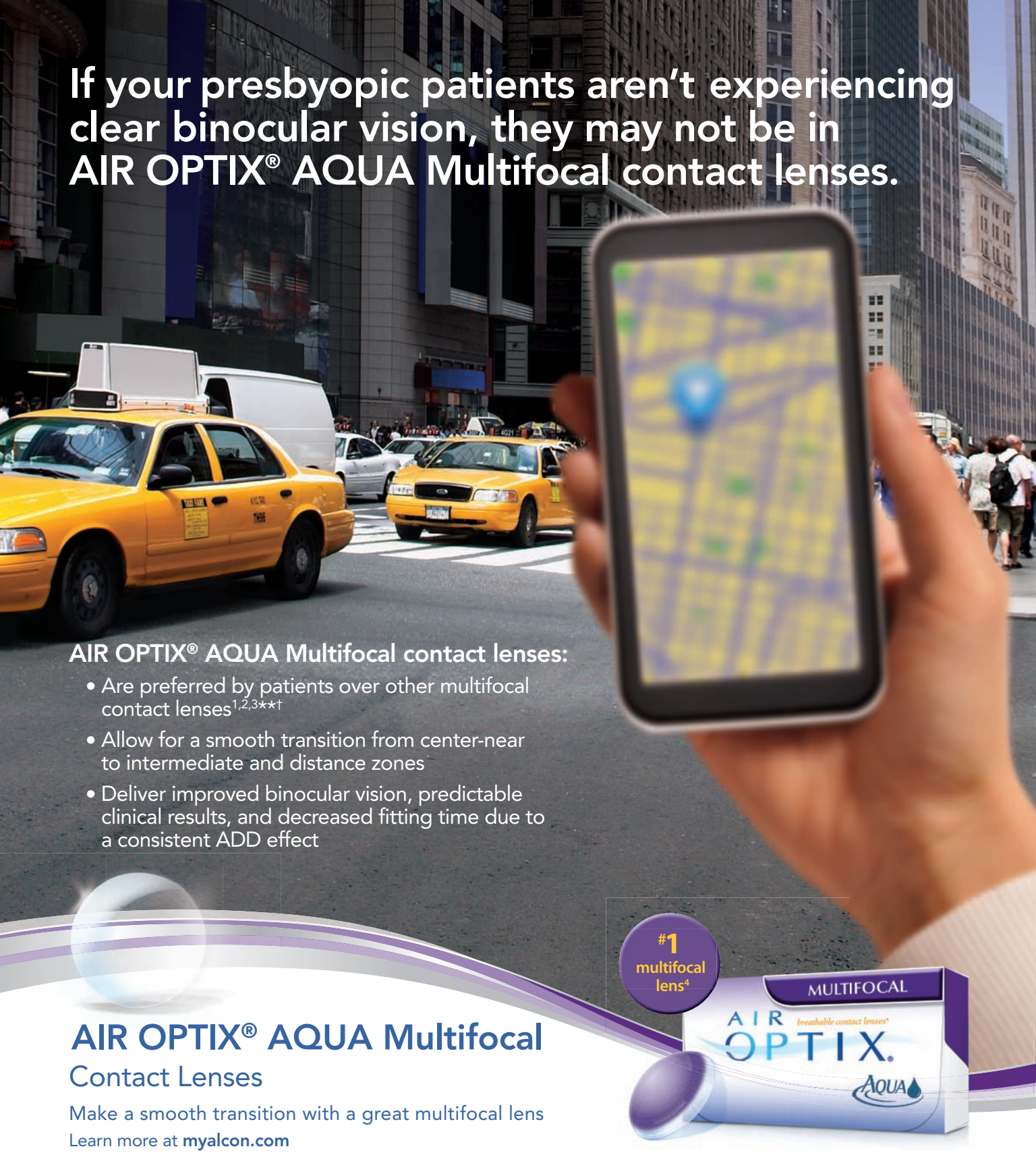
If your presbyopic patients aren't experiencing clear binocular vision, they may not be in AIR OPTIX® AQUA Multifocal contact lenses.



AIR OPTIX® AQUA Multifocal contact lenses:

- Are preferred by patients over other multifocal contact lenses[1,2,3**†]
- Allow for a smooth transition from center-near to intermediate and distance zones
- Deliver improved binocular vision, predictable clinical results, and decreased fitting time due to a consistent ADD effect

#1 multifocal lens[4]

AIR OPTIX® AQUA Multifocal Contact Lenses

Make a smooth transition with a great multifocal lens

Learn more at **myalcon.com**

*Dk/t = 138 @ -3.00D. **Among those with a preference. †As compared to PureVision^ Multi-Focal and ACUVUE^ OASYS^ for PRESBYOPIA contact lenses. ^Trademarks are the property of their respective owners.

Important information for AIR OPTIX® AQUA Multifocal (lotrafilcon B) contact lenses: For daily wear or extended wear up to 6 nights for near/far-sightedness and/or presbyopia. Risk of serious eye problems (i.e. corneal ulcer) is greater for extended wear. In rare cases, loss of vision may result. Side effects like discomfort, mild burning or stinging may occur.

References: 1. In a randomized, subject-masked clinical study at 20 sites with 252 patients; significance demonstrated at the 0.05 level; Alcon data on file, 2009. **2.** Rappon J. Center-near multifocal innovation: optical and material enhancements lead to more satisfied presbyopic patients. *Optom Vis Sci.* 2009;86:E-abstract 095557. **3.** In a randomized, subject-masked clinical trial at 6 sites with 47 patients; significance demonstrated at the 0.05 level; Alcon data on file, 2008. **4.** Based on a third-party industry report, 12 months ending October 2012; Alcon data on file.

See product instructions for complete wear, care and safety information.

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How to Upsell in a Down Economy

You know the political campaign slogan, 'It's the economy, stupid'? Believe it or not, optical upselling has little to do with the economy.

By Kevin Whaley, ABOC, NCLEC, and Samuel Teske, OD, PA

A few years ago, one of our patients came into the office wearing a neck brace. He was a 58-year-old computer programmer who just had neck surgery, and he was clearly in a lot of pain.

At his last exam three years before, we had prescribed everyday progressive lenses, which were now severely scratched and the frames were held together with Super Glue. His surgeon had told him that poor ergonomics at the computer probably caused his initial problem, which led to the surgery.

As he told us his story, we couldn't help but think: *Did we cause this—maybe?* If we had been more adamant about prescribing computer glasses, could he have postponed this outcome? So, following his refraction at this most recent visit, we prescribed four pairs of glasses for his different work environments.

Since the experience we had with this patient, we don't hesitate to prescribe the products that best serve our patients' interests. In the last few years, we've transitioned into a very patient-oriented practice that prescribes the best products: daily contact lenses, corneal reshaping lenses, vitamins, digital progressives, anti-glare lenses, polarized sunwear and computer glasses.

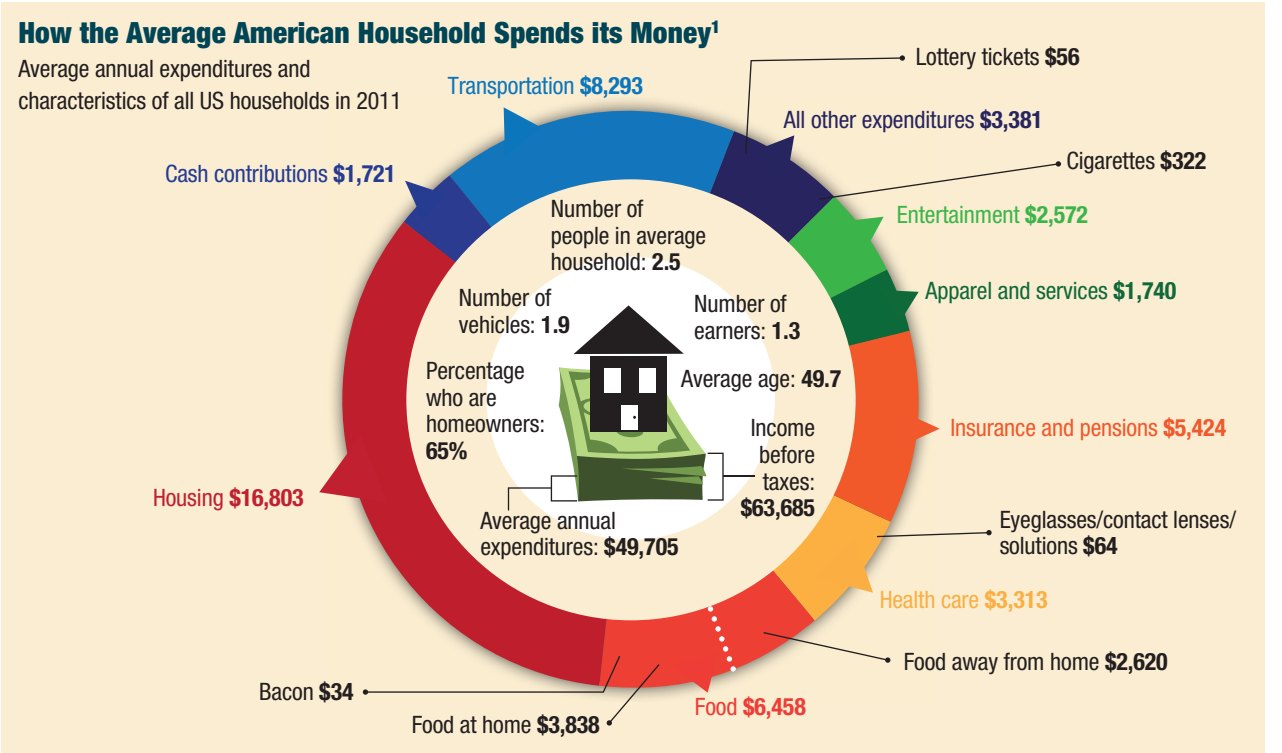
All three parties—optician, patient and doctor—are involved in the patient handoff. This way, the patient clearly hears the doctor's recommendations to the optician.

Here are a few lessons that we've learned about the sales process and serving our patients.

Forget Traditional Upselling

When we think of a salesperson, we often think of a pushy guy trying to convince a customer that she needs something that has little value to her. No one wants to be sold something they don't want or need. Traditional upselling with an old-school, used car salesman approach doesn't work, and isn't appreciated.

Instead, train your salespeople to be educated ophthalmic professionals. This new breed of salesperson knows that patients can find tons of information about their products



online. Some patients may already be more educated about the product than the staff member, so your staff must be aware of all of the advantages and disadvantages of a product and be ready to discuss them openly.

In addition to informing a patient fairly, your staff should be friendly with the patient. You don't have to hang out with patients after they leave the office, but you should be able to smile and say hello if you see them around town. You have to be genuinely interested in them, ask them what they do and listen to the response. Then when you prescribe the products the patient needs, use the knowledge that you've gained to help pinpoint your recommendations.

Ask yourself this question before you make a sale: Will the patient's life improve from purchasing this product? You want to make this patient happy not just at that moment, but you want to turn them into a loyal, returning patient who refers family and friends.

Money Isn't the Problem

Good economy or bad, your patients spend their money on lots of items that are less valuable than the products and services that you offer. Consider that an average household spends its money on loads of frivolous items, such as:[1]

- Dining out—$2,620 per year
- Entertainment—$2,572 per year
- Cigarettes—$322 per year
- Lottery tickets—$56 per year
- Bacon—$33.87 per year

Compare these purchases with the average household's expense of eyeglasses and contact lenses—$63.53 per year, which includes saline and solutions!

Which do you think is better for your patients: a nice pair of backup glasses (for when they're not wearing their contacts) or a few slices of bacon?

Of course, eye care professionals shouldn't decide for their patients what they can or can't afford But the fact is that most of your patients make bad financial decisions every day.

The products that we prescribe for them actually improve their lives. When you think about it, the cost of adding photochromic or anti-glare lenses for the life of the glasses is rather inexpensive. A pair of value-added glasses only costs a dollar or two per day for just one year.

The Economy

When we ask our colleagues about add-on items like second pairs, anti-glare or photochromic lenses, they almost always blame the economy for poor sales. Even some of the wealthiest patients complain about how they can't afford new glasses because of the bad economy. Yes, it is easier to get patients to purchase the best

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products that fit their needs in a strong economy, but many eye care professionals don't even offer the best products to their patients in tough times.

Ignore the economy. You can't fix it.

Don't let the overall economic condition impact the performance of your office, and definitely don't let it dictate the best products for your patients.

Your physician would never look at your insurance benefits and then decide what medication to prescribe. So, why do optometrists let their patients sway their decisions on what to prescribe?

Always prescribe the best products, as long as you always explain why you're prescribing it. Here's an example:

"Ms. Jones you have allergies and you wear your two-week contact lenses for a month. I'm concerned about how long you'll be able to wear contacts lenses because contact lens drop out is a common problem when patients over-wear their lenses. So, I recommend daily disposables, which will not only be better for your allergies, but will decrease your risk of not being able to wear contact lenses at all."

You owe it to your patients to let them know what's available and what's best for them. So always make the offer.

Give Them What They Want

Many patients prefer to be prescribed the best products no matter what the cost. And some patients may desire to buy better products, but they just aren't sure; they need a little reassurance from the doctor that it will help them.

Patients don't want the process to be confusing, so simply asking if they want product X is the wrong approach. People appreciate service and education, so listen to them. Patients want to be told/prescribed the best products—they'll inform you if they have cost objections, but you should not let this deter you from at least offering your recommendations.

Once the doctor has given the patient "permission" to buy—by prescribing the best products that the patient would want to have anyway—then the optician's job is rather easy. All an optician needs from an optometrist in the patient handoff is this: "Ms. Jones needs X, Y and Z, and I would like to see her again in a year." This step is crucial in smoothly moving the patient from the exam room to the optical and is to be done as a group: doctor, optician and patient. This accomplishes two important objectives: The patient hears your recommendations again in front of the optician, and the patient now knows that the optician is going to carry out your recommendations. The optician then will demonstrate the prescribed products and make further recommendations from there.

Not only will your patients appreciate a clear understanding of your recommendations, your practice will enjoy the guaranteed increase in capture rate.

Customer Service is a Must

Customer service is the key component in thinking about what is best for the patient and your office. When you approach an obstacle or an encounter with the best needs of the customer in mind, it creates a win-win for you and the patient.

You want to create a customer service culture in your office. We talk about customer service at our office meetings—not just the good customer service but the bad stuff as well. We give out customer service awards for staff members who go above and beyond their job description. For example, last week one of our opticians went and purchased two Happy Meals for children who had waited a long time to see the doctor. This unsolicited gesture came out of his own pocket. I guarantee this will be brought up at our next meeting. To quote a local optician, Jim Dundee of Belleair Opticians, "Being nice is free."

The Big Picture

The key to this story is to prescribe all of the necessary products and let the patients decide for themselves. Do not decide for the patients—this is the biggest mistake that most optometrists make. Simply prescribe what you know is the healthiest and best products for your patients, and give them the choice.

Generally speaking, patients visit an ECP every year or two, and don't always remember from one visit to the next what questions they should ask to get the best products. New products may have arrived, so each year we get to reeducate our patients, listen to them and get them the products they need.

Unfortunately, people often remember the office visit by the products they left with, not the exam. So, how will your patients feel about your office when they look at their glasses in six months? Do your best that they won't look back with regret. ■

Mr. Whaley is a licensed optician and the practice manager at The EyeDoctors in Tampa, Fla., and Dr. Teske is the founder and owner of The EyeDoctors. They are co-owners of Turn Key Optometry Consulting.

1. Consumer Expenditure Survey 2011. Bureau of Labor Statistics, US Department of Labor. Data available at: www.bls.gov/cex. Accessed February 14, 2013.

JASON R. MILLER, OD, MBA, FAAO

Dr. Miller has consulted, lectured and performed research on a wide variety of eye care areas, including contact lenses and practice management.

Choosing the Right Lens

Navigating the different multifocal contact lens designs.

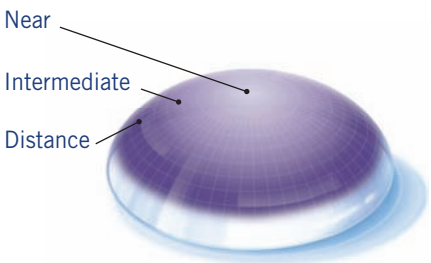
Monovision was once the best near demand vision correction option for presbyopes. It is still a fitting technique to consider, but compared to today's multifocal lens technology, it can be limiting due to loss of stereopsis and intermediate vision. Multifocal contact lenses, such as AIR OPTIX® AQUA Multifocal contact lenses, can be the vision correction your presbyopic patients need. In fact, several studies have shown that patients prefer multifocals over monovision at a rate of over 2:1.[1,2]

Having the confidence to successfully fit presbyopic patients begins with an understanding of the various multifocal lens designs. But before fitting any patient in contact lenses, review their everyday vision demands so you can personalize their fit and prescription. Below is a brief review of the common designs used today.

Multifocal Lens Designs 101

There are many multifocal contact lens designs from which to choose. One of the most common is the aspheric, which incorporates either a center-near or center-distance design. By working with the eye's natural function, the center-near design provides the most natural visual experience.

Center-near. The AIR OPTIX® AQUA Multifocal contact lens (Alcon), SofLens^ Multi-Focal (Bausch + Lomb) and PureVision^ Multi-Focal (Bausch + Lomb) are the most common soft lenses that utilize this concept. Each comes in a variety of adds.



The design of the AIR OPTIX® AQUA Multifocal contact lens allows for a smooth progression of power of gradients.

> ***"Studies have shown that patients prefer multifocals over monovision at a rate of over 2:1.[1,2]"***

Center-distance. Vistakon's ACUVUE^ OASYS^ for PRESBYOPIA contact lens features a *center-distance* aspheric zone surrounded by alternating zones of distance and near.

Other lenses, such as the Biofinity^ Multifocal (CooperVision) and the Proclear^ Multifocal (CooperVision) contact lens, utilize a center-distance and center-near design.

A Clear Winner

Patients usually do better in a lens that works like their eyes do, like the AIR OPTIX® AQUA Multifocal lens. It's designed to ensure that patients experience clear, binocular vision at all distances. When the pupil constricts with accommodation, the patient receives an enhanced near focus. The lens also delivers smooth power transitions from the center near zone, and offers three ADD ranges (LO, MED and HI) that provide flexibility for early to advanced presbyopes. Due to this design and performance, AIR OPTIX® AQUA Multifocal contact lenses are the #1 selling multifocal contact lens.[3] This lens has what it takes to meet the needs of our presbyopic patients.

References: 1. Benjamin WJ. Comparing multifocals and monovision. Contact Lens Spectrum. 2007;22(7). Available at: www.clspectrum.com/article.aspx?article=100637 (Accessed January 2013). **2.** Richdale K, Mitchell GL, Zadnik K. Comparison of multifocal and monovision soft contact lens corrections in patients with low-astigmatic presbyopia. Optom Vis Sci. 2006;83(5):266-273. **3.** Based on third-party industry report, 12 months ending November 2012; Alcon data on file.

18th Annual Comanagement Report

Cataract Comanagement: The OD 'Point Guard'

An insider's view of life on a surgical center team, and the vital role optometry can play.

By Kimberly Calnan-Holt, OD

Comanagement of cataract surgery has become an integral part of thousands of OD practices, with 78% of optometrists reporting that they comanage, on average, six cataract patients per month.[1] It is essential for the delivery of care in hundreds of surgical practices, and also a benefit cherished by a significant number of patients for reasons of comfort, convenience and continuity of care.

Although comanagement can be described by several models, this article provides an updated perspective from one particular type: relatively comprehensive peri-surgical care by an optometrist working within a surgical center.[2] (*For the perspective of a referring OD, see "Questions to Ask Your Surgeon, and Yourself," page 41.*)

The Job of a Surgical Center OD

Practicing within a surgical center has developed into an increasingly popular subspecialty of optometry. As with any profession, this subspecialty represents a spectrum of practice types, so the responsibilities of an OD working within a surgical facility may vary from center to center.

The role of optometry within a surgical practice, though it may be diverse, is perfectly suited through our education and training to be an essential element in the collaboration of care required in modern cataract surgery protocols. In addition, optometry's role can also bolster the success of the practice as a business by increasing efficiency, communication, access to care and effectiveness of care.

The truth is that today's perioperative process—often anchored by the OD and support staff—usually demands significantly more time to complete than the surgical event itself. In a recent survey, 93% of ophthalmologists reported spending 20 minutes or less with each patient.[3] For this reason, many patients report that the clinic experience with the OD is one of the major factors influencing their overall experience and impression of the surgery center's care.

To allow the surgeon maximum time in the OR, the OD may take on nearly all non-surgical responsibility (*see Table 1*), collecting pre- and post-op data, educating the patient and caregivers, and being the point-person who coordinates care at several levels. Good communication with the patient, the staff, the surgeon, the referring OD and other health care providers is essential to ensure that the surgery and perioperative care are seamless.

Table 1. Typical Pre-surgical OD Responsibilities

1. Acquisition of technical data
2. Extensive history review
3. Informed consent
4. Ocular evaluation
5. Plan for care
6. Pre-op calculations
7. Communication/education

Technical Data

Data acquisition and analysis has become a key component of modern cataract surgery (*see Table 2*). Where a patient may have sat in front of one or possibly two diagnostic tools during a preoperative exam just a few years ago, it is now common to employ at least five or six devices to complete the pre-surgical evaluation. Precise testing and biometry are absolutely essential to accurately calculate the

For allergic conjunctivitis[1]

THE POWER TO CALM THE ITCH

BEPREVE®—FIRST-LINE, YEAR-ROUND, WITH BROAD-SPECTRUM ALLERGEN COVERAGE

INDICATION AND USAGE

BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is a histamine H_1 receptor antagonist indicated for the treatment of itching associated with signs and symptoms of allergic conjunctivitis.

IMPORTANT RISK INFORMATION

BEPREVE® is contraindicated in patients with a history of hypersensitivity reactions to bepotastine or any of the other ingredients. BEPREVE® is for topical ophthalmic use only. To minimize risk of contamination, do not touch the dropper tip to any surface. Keep the bottle closed when not in use. BEPREVE® should not be used to treat contact lens–related irritation. Remove contact lenses prior to instillation of BEPREVE®.

The most common adverse reaction occurring in approximately 25% of patients was a mild taste following instillation. Other adverse reactions occurring in 2%-5% of patients were eye irritation, headache, and nasopharyngitis.

Made by the trusted eye-care specialists at BAUSCH+LOMB

Please see the accompanying prescribing information for BEPREVE® on the following page.

Reference: 1. BEPREVE [package insert]. Irvine, CA: ISTA Pharmaceuticals, Inc; 2012.

BAUSCH+LOMB

For product-related questions and concerns, call **1-800-323-0000** or visit **www.bepreve.com**.

BEPREVE®
(bepotastine besilate ophthalmic solution) 1.5%

BEPREVE® (bepotastine besilate ophthalmic solution) 1.5%

HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% safely and effectively. See full prescribing information for BEPREVE®.

BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% Initial U.S. Approval: 2009

----------INDICATIONS AND USAGE----------

BEPREVE® is a histamine H_1 receptor antagonist indicated for the treatment of itching associated with allergic conjunctivitis. (1)

----------DOSAGE AND ADMINISTRATION----------

Instill one drop into the affected eye(s) twice a day (BID).(2)

--------DOSAGE FORMS AND STRENGTHS---------

Solution containing bepotastine besilate, 1.5%. (3)

----------CONTRAINDICATIONS----------

Hypersensitivity to any component of this product. (4)

----------WARNINGS AND PRECAUTIONS----------

- To minimize the risk of contamination, do not touch dropper tip to any surface. Keep bottle tightly closed when not in use. (5.1)
- BEPREVE® should not be used to treat contact lens-related irritation. (5.2)
- Remove contact lenses prior to instillation of BEPREVE®. (5.2)

----------ADVERSE REACTIONS----------

The most common adverse reaction occurring in approximately 25% of patients was a mild taste following instillation. Other adverse reactions which occurred in 2-5% of subjects were eye irritation, headache, and nasopharyngitis. (6)

To report SUSPECTED ADVERSE REACTIONS, contact ISTA Pharmaceuticals, Inc. at 1-877-788-2020, or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

See 17 for PATIENT COUNSELING INFORMATION
Revised: 12/2011

FULL PRESCRIBING INFORMATION: CONTENTS*

*Sections or subsections omitted from the full prescribing information are not listed.

FULL PRESCRIBING INFORMATION

1. INDICATIONS AND USAGE

BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is a histamine H_1 receptor antagonist indicated for the treatment of itching associated with signs and symptoms of allergic conjunctivitis.

2. DOSAGE AND ADMINISTRATION

Instill one drop of BEPREVE® into the affected eye(s) twice a day (BID).

3. DOSAGE FORMS AND STRENGTHS

Topical ophthalmic solution containing bepotastine besilate 1.5%.

4. CONTRAINDICATIONS

BEPREVE® is contraindicated in patients with a history of hypersensitivity reactions to bepotastine or any of the other ingredients [see Adverse Reactions (6.2)].

5. WARNINGS AND PRECAUTIONS

5.1 Contamination of Tip and Solution

To minimize contaminating the dropper tip and and solution, care should be taken not to touch the eyelids or surrounding areas with the dropper tip of the bottle. Keep bottle tightly closed when not in use.

5.2 Contact Lens Use

Patients should be advised not to wear a contact lens if their eye is red. BEPREVE® should not be used to treat contact lens-related irritation. BEPREVE® should not be instilled while wearing contact lenses. Remove contact lenses prior to instillation of BEPREVE®. The preservative in BEPREVE®, benzalkonium chloride, may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of of BEPREVE®.

5.3 Topical Ophthalmic Use Only

BEPREVE® is for topical ophthalmic use only.

6. ADVERSE REACTIONS

6.1 Clinical Trials Experience

The most common reported adverse reaction occurring in approximately 25% of subjects was a mild taste following instillation. Other adverse reactions occurring in 2-5% of subjects were eye irritation, headache, and nasopharyngitis.

6.2 Post Marketing Experience

Hypersensitivity reactions have been reported rarely [two (2) possibly related cases for an incidence of 0.00006%] during the post-marketing use of BEPREVE®. Because this reaction is reported voluntarily from a population of unknown size, the actual incidence cannot be verified. The hypersensitivity reactions include itching, body rash, and swelling of lips, tongue and/or throat.

8. USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Category C: Teratogenicity studies have been performed in animals. Bepotastine besilate was not found to be teratogenic in rats during organogenesis and fetal development at oral doses up to 200 mg/kg/day (representing a systemic concentration approximately 3300 times that anticipated for topical ocular use in humans), but did show some potential for causing skeletal abnormalities at 1000 mg/kg/day. There were no teratogenic effects seen in rabbits at oral does up to 500 mg/kg/day given during organogenesis and fetal development (>13,000 times the dose in humans on a mg/kg basis). Evidence of infertility was seen in rats given oral bepotastine besilate 1000 mg/kg/day, however, no evidence of infertility was observed in rats given 200 mg/kg/day (approximately 3300 times the topical ocular use in humans). The concentration of radiolabeled bepotastine besilate was similar in fetal liver and maternal blood plasma following a single 3 mg/kg oral dose. The concentration in other fetal tissues was one-third to one-tenth the concentration in maternal blood plasma.

An increase in stillboms and decreased growth and development were observed in pups born from rats given oral doses of 1000 mg/kg/day during perinatal and lactation periods. There were no observed effects in rats treated with 100 mg/kg/day.

There are no adequate and well-controlled studies of bepotastine besilate in pregnant women. Because animal reproduction studies are not always predictive of human response, BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

8.3 Nursing Mothers

Following a single 3 mg/kg oral dose of radio-labeled bepotastine besilate to nursing rats 11 days after delivery, the maximum concentration of radioactivity in milk was 0.40 µg eq/mL 1 hour after administration; at 48 hours after administration the concentration was below detection limits. The milk concentration was higher than the maternal blood plasma concentration at each time of measurement.

It is not known if bepotastine besilate is excreted in human milk. Caution should be exercised when BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is administered to a nursing woman.

8.4 Pediatric Use

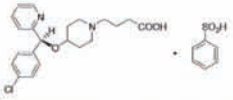
Safety and efficacy of BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% have not been established in pediatric patients under 2 years of age. Efficacy in pediatric patients under 10 years of age was extrapolated from clinical trials conducted in pediatric patients greater than 10 years of age and from adults.

8.5 Geriatric Use

No overall difference in safety or effectiveness has been observed between elderly and younger patients.

11. DESCRIPTION

BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is a sterile, topically administered drug for ophthalmic use. Each mL of BEPREVE® contains 15 mg of bepotastine besilate. Bepotastine besilate is designated chemically as (+) -4-[[(S)-p-chloro-alpha -2-pyridylbenzyl]oxy]-1-piperidine butyric acid monobenzenesulfonate. The chemical structure for bepotastine besilate is:



Bepotastine besilate is a white or pale yellowish crystalline powder. The molecular weight of bepotastine besilate is 547.06 daltons. BEPREVE® ophthalmic solution is supplied as a sterile, aqueous 1.5% solution, with a pH of 6.8.

The osmolality of BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is approximately 290 mOsm/kg.

Each mL of BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% contains:
Active: Bepotastine besilate 15 mg (equivalent to 10.7 mg bepotastine)
Preservative: benzalkonium chloride 0.005%
Inactives: monobasic sodium phosphate dihydrate, sodium chloride, sodium hydroxide to adjust pH, and water for injection, USP.

12. CLINICAL PHARMACOLOGY

12.1 Mechanism of Action

Bepotastine is a topically active, direct H_1 receptor antagonist and an inhibitor of the release of histamine from mast cells.

12.3 Pharmacokinetics

Absorption: The extent of systemic exposure to bepotastine following topical ophthalmic administration of bepotastine besilate 1% and 1.5% ophthalmic solutions was evaluated in 12 healthy adults. Following one drop of 1% or 1.5% bepotastine besilate ophthalmic solution to both eyes four time daily (QID) for seven days, bepotastine plasma concentrations peaked at approximately one to two hours post-instillation. Maximum plasma concentration for the 1% and 1.5% strengths were 5.1 ± 2.5 ng/mL and 7.3 ± 1.9 ng/mL, respectively. Plasma concentration at 24 hours post-instillation were the below quantifiable limit (2ng/mL) in 11/12 subjects in the two dose groups.

Distribution: The extent of protein binding of bepotastine is approximately 55% and independent of bepotastine concentration.

Metabolism: *In vitro* metabolism studies with human liver microsomes demonstrated that bepotastine is minimally metabolized by CYP450 isozymes.

In vitro studies demonstrated that bepotastine besilate does not inhibit the metabolism of various cytochrome P450 substrate via inhibition of CYP3A4, CYP2C9, and CYP2C19. The effect of bepotastine besilate on the metabolism of substrates of CYP1A2, CYP2C8, CYP2D6 was not studied. Bepotastine besilate has a low potential for drug interaction via inhibition of CYP3A4, CYP2C9, and CYP2C19.

Excretion: The main route of elimination of bepotastine besilate is urinary excretion (with approximately 75-90% excreted unchanged in urine).

13. NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis and Impairment of Fertility

Long term dietary studies in mice and rats were conducted to evaluate the carcinogenic potential of bepotastine besilate. Bepotastine besilate did not significantly induce neoplasms in mice receiving a nominal dose of up to 200 mg/kg/day for 21 months or rats receiving a nominal dose of up to 97 mg/kg/day for 24 months. These dose levels represent systemic exposures approximating 350 and 200 times that achieved with human topical ocular use.

The no observable adverse effect levels for bepotastine besilate based on nominal dose levels in carcinogenicity tests were 18.7 to 19.9 mg/kg/day in mice and 9.6 to 9.8 mg/kg/day in rats (representing exposure margins of approximately 60 and 20 times the systemic exposure anticipated for human topical use).

There was no evidence of genotoxicity in the Ames test, in CHO cells (chromosome aberrations), in mouse hepatocytes (unscheduled DNA synthesis), or in the mouse micronucleus test.

When oral bepotastine was administered to male and female rats at doses up to 1,000 mg/kg/day, there was a slight reduction in fertility index and surviving fetuses. Infertility was not seen in rats given 200 mg/kg/day oral bepotastine besilate (approximately 3300 times the systemic concentration anticipated for topical ocular use in humans).

14. CLINICAL STUDIES

Clinical efficacy was evaluated in 2 conjunctival allergen challenge (CAC) studies (237 patients). BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% was more effective than its vehicle for relieving ocular itching induced by an ocular allergen challenge, both at CAC 15 minutes post-dosing and a CAC 8 hours post dosing of BEPREVE®.

The safety of BEPREVE® was evaluated in a randomized clinical study of 861 subjects over a period of 6 weeks.

16. HOW SUPPLIED/STORAGE AND HANDLING

BEPREVE® (bepotastine besilate ophthalmic solution) 1.5% is supplied in a white low density polyethylene plastic squeeze bottle with a white controlled dropper tip and a white polypropylene cap in the following sizes:

5 mL (NDC 67425-007-50)
10 mL (NDC 67425-007-75)

STORAGE
Store at 15° - 25°C (59° - 77°F).

17. PATIENT COUNSELING INFORMATION

17.1 Topical Ophthalmic Use Only

For topical ophthalmic administration only.

17.2 Sterility of Dropper Tip

Patients should be advised to not touch dropper tip to any surface, as this may contaminate the contents.

17.3 Concomitant Use of Contact Lenses

Patients should be advised not to wear a contact lens if their eye is red. Patients should be advised that BEPREVE® should not be used to treat contact lens-related irritation. Patients should also be advised to remove contact lenses prior to instillation of BEPREVE®. The preservative in BEPREVE®, benzalkonium chloride, may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of BEPREVE®.

Manufactured for: ISTA Pharmaceuticals, Inc.
Irvine, CA 92618

By: Bausch & Lomb Incorporated
Tampa, FL 33637

Under license from:
Senju Pharmaceuticals Co., Ltd.
Osaka, Japan 541-0046

U.S. Patents: 6,307,052; 6,780,877

BRV957-2/12

Table 2. Possible Technical Data Acquired During Pre-op Exam

1. Corneal analysis (keratometry, topography, pachymetry, endothelial cell count)
2. Biometry (axial length, anterior chamber depth, lens thickness, white to white)
3. Acuity metrics (auto-refraction, BCVA, potential acuity measure, glare, pupil size)
4. Macular imaging
5. Nerve fiber imaging
6. Angle imaging
7. Visual field testing
8. General health measures (e.g., blood pressure, blood sugar, weight)

IOL formulas. Technicians are key team members of a surgical center's support staff and a great asset to the practice. However, the licensed health care professionals are the ones who ultimately "put it all together"—assessing, diagnosing, planning, treating and managing the patient.

History

The information gathered preoperatively in the review of systems, past history and present history is as valuable as the technical information gathered during the evaluation. In the context of planning a potential surgical procedure, certain elements become significant and contribute to a successful surgical process (*see Table 3*). Each case presents as unique, and often patients do not understand why seemingly unrelated history can be important to eye surgery. The more that is known about a patient's specific history, the more effectively the care can be tailored in an effort to reduce potential complications and maximize comfort for the patient.

Informed Consent

Today's informed consent process requires significant attention to the discussion of a patient's lifestyle, level of vision impairment, surgical options, IOL designs, desired outcome, risks, possible complications and postoperative instructions/restrictions. With such a volume of information presented in a relatively short period, repetition can be beneficial, especially employing multiple media (e.g., video presentations, web-based productions, printed documents).

With the complexities of insurance plan coverage, eligibility, comanagement fee allocation, out-of-pocket expenses (i.e., deductibles,

Table 3. Factors in the History Relevant to Planning Cataract Surgery

1. Complete systemic history, including but not limited to:
a. Diabetes (insulin, oral medication or diet control)
b. Cardiac history
c. Kidney conditions
d. Lung disease
e. Systemic inflammatory conditions
f. Recent infections (including dental)
g. Seizure disorders/tremors (e.g., Parkinson's, epilepsy)
h. Communicable diseases (HIV, MRSA, hepatitis, TB)

2. Complete ocular history (including but not limited to):
a. Rx history (habitual wear for distance, near or both; recent change)
b. Contact lens wear
c. Amblyopia/strabismus/diplopia
d. Prior acute or chronic conditions (i.e., blepharitis, conjunctivitis, keratitis, dry eye, corneal dystrophies, iritis, PXF, floaters, glaucoma, retinal/macular conditions)
e. Current ocular medications (including non-prescription meds)
f. Prior trauma
g. Prior ocular surgery (muscle, lid, corneal, pterygium, refractive, lenticular, glaucoma)
h. Vitreoretinal history (injections, laser treatment, membrane peel, vitrectomy, scleral buckle, gas bubble, silicone oil)
i. Other periocular injections (Botox, fillers)

3. Complete medication and treatment history, including but not limited to:
a. Any prior/present/planned use of alpha$_1$-adrenergic antagonist meds: Flomax (tamsulosin, Boehringer Ingelheim), Hytrin (terazosin, Abbott), Cardura (doxazosin mesylate, Pfizer), Uroxatral (alfuzosin, Sanofi-Aventis)
b. Anti-coagulation or anti-platelet therapy: Coumadin (warfarin, Bristol-Myers Squibb), Paradaxa (dabigatran etexilate, Boehringer Ingelheim), Plavix (clopidogrel bisulfate, Bristol-Myers Squibb), aspirin, other NSAIDs and vitamin E

4. Complete procedures history with dates, including but not limited to:
a. All surgeries and procedures
b. Cardiac procedures
c. Dental procedures
d. Treatments (dialysis, chemotherapy, radiation, hyperbaric, physical therapy)

5. Allergic/adverse reaction history, including but not limited to:
a. Sulfa
b. Iodine
c. Latex
d. Adhesives
e. Silicone
f. Anesthesia/epinephrine
g. Steroid responder
h. Keloid formation

6. Other
a. Claustrophobia
b. Anxiety
c. Mobility issues
d. Prone intolerance
e. Oxygen dependence
f. Language translation required
g. Care facility orders
h. Dementia
i. Syncope (vaso-vagal reaction)

optional IOL premiums, medication costs) and possible multiple procedures planned, patients must also be made fully aware of the financial ramifications and total fees of the care provided and proposed. Financial consideration is now often a topic the OD must address with the patient. Again, the center's support staffs for scheduling, billing, financing and insurance verification are invaluable team members.

Ocular Evaluation

Although it may seem redundant if the patient has recently been seen by a referring OD, it is necessary for the surgical center to confirm and evaluate the current ocular status in the context of a potential surgical treatment. Conversely, if there is a period of time between surgeries, the evaluation and testing must often be repeated and the information brought up to date.

The ocular evaluations and refractions completed by the OD team members within a surgical center are not meant to simply repeat the evaluation completed by the referring doctor, but rather to provide the surgeon the most complete and accurate ocular/visual information so that a surgical plan may be developed.

Plan for Care

With a well-orchestrated plan and delivery of a high level of care, the surgery event can be a milestone of positive change in the patient's visual status.

Although proposed plans for treatment of cataracts are now quite individualized (*see Table 4*), even the best plans must be amenable to change if concerns or complications arise. Surgical center practice requires patient access to emergency care and personnel if concerns or questions arise. The center's OD staff may participate in on-call services to manage problems and, if necessary, escalate care to an appropriate provider (e.g., the operating surgeon, retina specialist, etc.).

Completing the surgical plan will often require information to be obtained from an array of other health care providers. Such information may include a recent physical, blood work, EKG, platelet levels, blood pressure, blood glucose level, significant recovery time from other recent procedures or treatments, general well-being of the patient, and data on any prior ocular surgery.

Table 4. Points to Consider in Cataract Surgery Planning

1. Which eye is first
2. Tentative timing for second eye
   a. Anisometropia and refractive state between surgery
   b. Postoperative progress of the first eye
3. All ocular diagnoses
4. Targeted refractive outcome for both eyes
   a. Reduction of myopia/hyperopia
   b. Reduction of cylinder (toric IOL/incisional plan)
   c. Monovision/multifocal/pseudo-accommodative
5. Planned multiple or secondary procedures (e.g., refractive, glaucoma, corneal, pterygium, retinal)
6. Preferred IOL choice
7. Special surgical considerations
8. Transportation or travel
9. Postoperative instructions/restrictions
10. Pre- and postoperative medications
11. Schedule of comanaged care

IOL Calculations

The surgical center's optometric staff—with optometry's inherent extensive knowledge of optics—can contribute significantly to IOL calculations and analysis. It is necessary to calculate not only suggestions for the primary lens of choice, but also secondary lens choices in the event of a complex surgery (e.g., an anterior chamber, sulcus-placed, or sutured IOL; a monofocal IOL instead of a planned premium lens).

The increasing population of individuals who have undergone prior refractive procedures poses a particular challenge to accurate IOL calculation. An ever-evolving gamut of formulas and methods help to predict the optimal lens choice for these patients. While rare, refractive surprises occur after cataract extraction and there is an entirely different set of tools and calculations used to remedy the situation of erroneous power if warranted.

Communications

With the wealth of information gathered and the multitude of individuals involved, clear communication, often directed by the OD, is the lifeblood of a successful cataract comanagement program. Information must flow freely between the ODs and surgeons. Expectations of care, understanding of the planned or executed procedures and comfort in raising concerns or questions are all important aspects of integrated care.

Patients can present with extremely complex ocular histories, unrealistic expectations and complicated health issues. The center-based OD can be a liaison between the referring OD and operating surgeon, as the practitioner who understands the perspective of both.

The relationship and communication between the center OD and referring OD is just as crucial, and is quite a unique opportunity for varied modes of optometry

If only you could predict how ocular inflammation will behave.

DUREZOL® Emulsion now has head-to-head data vs prednisolone acetate in patients with endogenous anterior uveitis.[1]

Scan the QR code with your smartphone or log on to **www.inflammationhappens.com** to see the results for yourself.

INDICATIONS AND USAGE: DUREZOL® Emulsion is a topical corticosteroid that is indicated for the treatment of endogenous anterior uveitis.

Dosage and Administration

For the treatment of endogenous anterior uveitis, instill one drop into the conjunctival sac of the affected eye 4 times daily for 14 days followed by tapering as clinically indicated.

IMPORTANT SAFETY INFORMATION

Contraindications: DUREZOL® Emulsion, as with other ophthalmic corticosteroids, is contraindicated in most active viral diseases of the cornea and conjunctiva including epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, and varicella, and also in mycobacterial infection of the eye and fungal diseases of ocular structures.

Warnings and Precautions

- Intraocular pressure (IOP) increase – Prolonged use of corticosteroids may result in glaucoma with damage to the optic nerve, defects in visual acuity and fields of vision. If this product is used for 10 days or longer, IOP should be monitored.
- Cataracts – Use of corticosteroids may result in posterior subcapsular cataract formation.
- Delayed healing – The use of steroids after cataract surgery may delay healing and increase the incidence of bleb formation. In those diseases causing thinning of the cornea or sclera, perforations have been known to occur with the use of topical steroids. The initial prescription and renewal of the medication order beyond 28 days should be made by a physician only after examination of the patient with the aid of magnification such as slit lamp biomicroscopy and, where appropriate, fluorescein staining.
- Bacterial infections – Prolonged use of corticosteroids may suppress the host response and thus increase the hazard of secondary ocular infections. In acute purulent conditions, steroids may mask infection or enhance existing infection. If signs and symptoms fail to improve after 2 days, the patient should be re-evaluated.
- Viral infections – Employment of a corticosteroid medication in the treatment of patients with a history of herpes simplex requires great caution. Use of ocular steroids may prolong the course and may exacerbate the severity of many viral infections of the eye (including herpes simplex).
- Fungal infections – Fungal infections of the cornea are particularly prone to develop coincidentally with long-term local steroid application. Fungus invasion must be considered in any persistent corneal ulceration where a steroid has been used or is in use.
- Contact lens wear – DUREZOL® Emulsion should not be instilled while wearing contact lenses.

Adverse Reactions

In the endogenous anterior uveitis studies, the most common adverse reactions occurring in 5-10% of subjects included blurred vision, eye irritation, eye pain, headache, increased IOP, iritis, limbal and conjunctival hyperemia, punctate keratitis, and uveitis.

For additional information about DUREZOL® Emulsion please refer to the brief summary of prescribing information on adjacent page.

Reference: 1. DUREZOL® Emulsion Package Insert.

Alcon®

 6/12 DUR12020JAD

DUREZOL®
(difluprednate ophthalmic emulsion) 0.05%

DUREZOL®
(difluprednate ophthalmic emulsion) 0.05%

BRIEF SUMMARY OF PRESCRIBING INFORMATION

INDICATIONS AND USAGE
Ocular Surgery
DUREZOL® (difluprednate ophthalmic emulsion) 0.05%, a topical corticosteroid, is indicated for the treatment of inflammation and pain associated with ocular surgery.
Endogenous Anterior Uveitis
DUREZOL® Emulsion is also indicated for the treatment of endogenous anterior uveitis.

DOSAGE AND ADMINISTRATION
Ocular Surgery
Instill one drop into the conjunctival sac of the affected eye 4 times daily beginning 24 hours after surgery and continuing throughout the first 2 weeks of the postoperative period, followed by 2 times daily for a week and then a taper based on the response.

Endogenous Anterior Uveitis
Instill one drop into the conjunctival sac of the affected eye 4 times daily for 14 days followed by tapering as clinically indicated.

DOSAGE FORMS AND STRENGTHS
DUREZOL® Emulsion contains 0.05% difluprednate as a sterile preserved emulsion for topical ophthalmic administration.

CONTRAINDICATIONS
The use of DUREZOL® Emulsion, as with other ophthalmic corticosteroids, is contraindicated in most active viral diseases of the cornea and conjunctiva including epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, and varicella, and also in mycobacterial infection of the eye and fungal disease of ocular structures.

WARNINGS AND PRECAUTIONS
IOP Increase
Prolonged use of corticosteroids may result in glaucoma with damage to the optic nerve, defects in visual acuity and fields of vision. Steroids should be used with caution in the presence of glaucoma. If this product is used for 10 days or longer, intraocular pressure should be monitored.

Cataracts
Use of corticosteroids may result in posterior subcapsular cataract formation.

Delayed Healing
The use of steroids after cataract surgery may delay healing and increase the incidence of bleb formation. In those diseases causing thinning of the cornea or sclera, perforations have been known to occur with the use of topical steroids. The initial prescription and renewal of the medication order beyond 28 days should be made by a physician only after examination of the patient with the aid of magnification such as slit lamp biomicroscopy and, where appropriate, fluorescein staining.

Bacterial Infections
Prolonged use of corticosteroids may suppress the host response and thus increase the hazard of secondary ocular infections. In acute purulent conditions, steroids may mask infection or enhance existing infection. If signs and symptoms fail to improve after 2 days, the patient should be re-evaluated.

Viral Infections
Employment of a corticosteroid medication in the treatment of patients with a history of herpes simplex requires great caution. Use of ocular steroids may prolong the course and may exacerbate the severity of many viral infections of the eye (including herpes simplex).

Fungal Infections
Fungal infections of the cornea are particularly prone to develop coincidentally with long-term local steroid application. Fungus invasion must be considered in any persistent corneal ulceration where a steroid has been used or is in use. Fungal culture should be taken when appropriate.

Topical Ophthalmic Use Only
DUREZOL® Emulsion is not indicated for intraocular administration.

Contact Lens Wear
DUREZOL® Emulsion should not be instilled while wearing contact lenses. Remove contact lenses prior to instillation of DUREZOL® Emulsion. The preservative in DUREZOL® Emulsion may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of DUREZOL® Emulsion.

ADVERSE REACTIONS
Adverse reactions associated with ophthalmic steroids include elevated intraocular pressure, which may be associated with optic nerve damage, visual acuity and field defects; posterior subcapsular cataract formation; secondary ocular infection from pathogens including herpes simplex, and perforation of the globe where there is thinning of the cornea or sclera.

Ocular Surgery
Ocular adverse reactions occurring in 5-15% of subjects in clinical studies with DUREZOL® Emulsion included corneal edema, ciliary and conjunctival hyperemia, eye pain, photophobia, posterior capsule opacification, anterior chamber cells, anterior chamber flare, conjunctival edema, and blepharitis. Other ocular adverse reactions occurring in 1-5% of subjects included reduced visual acuity, punctate keratitis, eye inflammation, and iritis. Ocular adverse reactions occurring in < 1% of subjects included application site discomfort or irritation, corneal pigmentation and striae, episcleritis, eye pruritis, eyelid irritation and crusting, foreign body sensation, increased lacrimation, macular edema, sclera hyperemia, and uveitis. Most of these reactions may have been the consequence of the surgical procedure.

Endogenous Anterior Uveitis
A total of 200 subjects participated in the clinical trials for endogenous anterior uveitis, of which 106 were exposed to DUREZOL® Emulsion. The most common adverse reactions of those exposed to DUREZOL® Emulsion occurring in 5-10% of subjects included blurred vision, eye irritation, eye pain, headache, increased IOP, iritis, limbal and conjunctival hyperemia, punctate keratitis, and uveitis. Adverse reactions occurring in 2-5% of subjects included anterior chamber flare, corneal edema, dry eye, iridocyclitis, photophobia, and reduced visual acuity.

USE IN SPECIFIC POPULATIONS
Pregnancy
Teratogenic Effects
Pregnancy Category C. Difluprednate has been shown to be embryotoxic (decrease in embryonic body weight and a delay in embryonic ossification) and teratogenic (cleft palate and skeletal) anomalies when administered subcutaneously to rabbits during organogenesis at a dose of 1–10 mcg/kg/day. The no-observed-effect-level (NOEL) for these effects was 1 mcg/kg/day, and 10 mcg/kg/day was considered to be a teratogenic dose that was concurrently found in the toxic dose range for fetuses and pregnant females. Treatment of rats with 10 mcg/kg/day subcutaneously during organogenesis did not result in any reproductive toxicity, nor was it maternally toxic. At 100 mcg/kg/day after subcutaneous administration in rats, there was a decrease in fetal weights and delay in ossification, and effects on weight gain in the pregnant females. It is difficult to extrapolate these doses of difluprednate to maximum daily human doses of DUREZOL® Emulsion, since DUREZOL® Emulsion is administered topically with minimal systemic absorption, and difluprednate blood levels were not measured in the reproductive animal studies. However, since use of difluprednate during human pregnancy has not been evaluated and cannot rule out the possibility of harm, DUREZOL® Emulsion should be used during pregnancy only if the potential benefit justifies the potential risk to the embryo or fetus.

Nursing Mothers
It is not known whether topical ophthalmic administration of corticosteroids could result in sufficient systemic absorption to produce detectable quantities in breast milk. Systemically administered corticosteroids appear in human milk and could suppress growth, interfere with endogenous corticosteroid production, or cause other untoward effects. Caution should be exercised when DUREZOL® Emulsion is administered to a nursing woman.

Pediatric Use
Safety and effectiveness in pediatric patients have not been established.

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

Nonclinical Toxicology
Carcinogenesis, Mutagenesis, and Impairment of Fertility
Difluprednate was not genotoxic *in vitro* in the Ames test, and in cultured mammalian cells CHL/IU (a fibroblastic cell line derived from the lungs of newborn female Chinese hamsters). An *in vivo* micronucleus test of difluprednate in mice was also negative. Treatment of male and female rats with subcutaneous difluprednate up to 10 mcg/kg/day prior to and during mating did not impair fertility in either gender. Long term studies have not been conducted to evaluate the carcinogenic potential of difluprednate.

Animal Toxicology and/or Pharmacology
In multiple studies performed in rodents and non-rodents, subchronic and chronic toxicity tests of difluprednate showed systemic effects such as suppression of body weight gain; a decrease in lymphocyte count; atrophy of the lymphatic glands and adrenal gland; and for local effects, thinning of the skin; all of which were due to the pharmacologic action of the molecule and are well known glucocorticosteroid effects. Most, if not all of these effects were reversible after drug withdrawal. The NOEL for the subchronic and chronic toxicity tests were consistent between species and ranged from 1–1.25 mcg/kg/day.

PATIENT COUNSELING INFORMATION
Risk of Contamination
This product is sterile when packaged. Patients should be advised not to allow the dropper tip to touch any surface, as this may contaminate the emulsion. Use of the same bottle for both eyes is not recommended with topical eye drops that are used in association with surgery.

Risk of Secondary Infection
If pain develops, or if redness, itching, or inflammation becomes aggravated, the patient should be advised to consult a physician.

Contact Lens Wear
DUREZOL® Emulsion should not be instilled while wearing contact lenses. Patients should be advised to remove contact lenses prior to instillation of DUREZOL® Emulsion. The preservative in DUREZOL® Emulsion may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of DUREZOL® Emulsion.

Revised: June 2012
U.S. Patent 6,114,319

Manufactured For
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Alcon Laboratories, Inc.
6201 South Freeway
Fort Worth, Texas 76134 USA
1-800-757-9195
MedInfo@AlconLabs.com
Manufactured By:
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Woodstock, IL 60098

to work together in the care of a mutual patient. Center ODs often serve as liaisons between the surgical center and the referring OD network, acting as a resource for information and education in a peer-to-peer capacity.

Communication with other professionals within a practice, such as nursing and anesthesia staff, is also essential. The ancillary support staff forms a collective team and are a tremendous resource for patient care (*see Table 5*). Often, the ODs in a surgical center act to coordinate activity among the clinical, non-clinical and surgical staff within the practice. The voluminous information now available from evaluations and calculations can be very complex and time-consuming to review. The OD is in a keen position to understand the clinical case, manage the flow and serve the varying needs of the entire organization.

Lastly, clear and complete communication with the patient is obviously crucial. The center OD staff can professionally educate the patient, address questions and concerns, assist with the consent process, and convey the outcome and expected course of recovery. It is important to stress that the patient's best interest will always dictate the course of care. The program of care may change from the anticipated game plan, but there is a true collaboration of care providers working as a team to provide the best for each patient.

Table 5. Comanagement Center Team Members

1. Surgical staff
2. Optometric staff
3. Anesthesia staff
4. Nursing staff
5. Administrative and management staff
6. Operating room staff
7. Technicians
8. Scheduling staff
9. Billing/patient finance staff
10. Counselors
11. Marketing staff
12. IT/health informatics staff

The comanagement center–based OD is often the "point guard" of this cooperative team that includes the primary eye care optometrist who entrusted the patient to the surgical center. For the referring OD to understand the process above and provide as much information as possible will only improve the ultimate care of their patient. ■

Dr. Calnan-Holt is an optometric physician at the Pacific Cataract and Laser Institute in Spokane, Wash., a referral center founded in 1985.

1. AOA Clinical Practice of Optometry, Executive Summary. Available at: www.aoa.org/documents/ric/2011_clinical_practice_of_optometry-executive_summary.pdf. Accessed January 5, 2013.
2. Cunningham D, Whitley W. What is integrated eye care? Rev Optom. 2012 Mar;149(3):64-71.
3. Ophthalmologist Compensation Report 2011. Available at: www.medscape.com/features/slideshow/compensation/2011/ophthalmology. Accessed January 5, 2013.

Questions to Ask Your Surgeon, and Yourself

By Nathan Scott, OD

Careful consideration is required long before a patient is referred to a surgical comanagement center. In my opinion, a common pitfall of the referring primary eye care provider (PECP) is to give surgical comanagement too little thought. Successful surgical comanagement requires serious consideration of all steps, even those that occur outside of your exam room.

The most important aspect of surgical comanagement is communication. Ask yourself the following questions about your current surgical comanaging facility and/or surgeon:

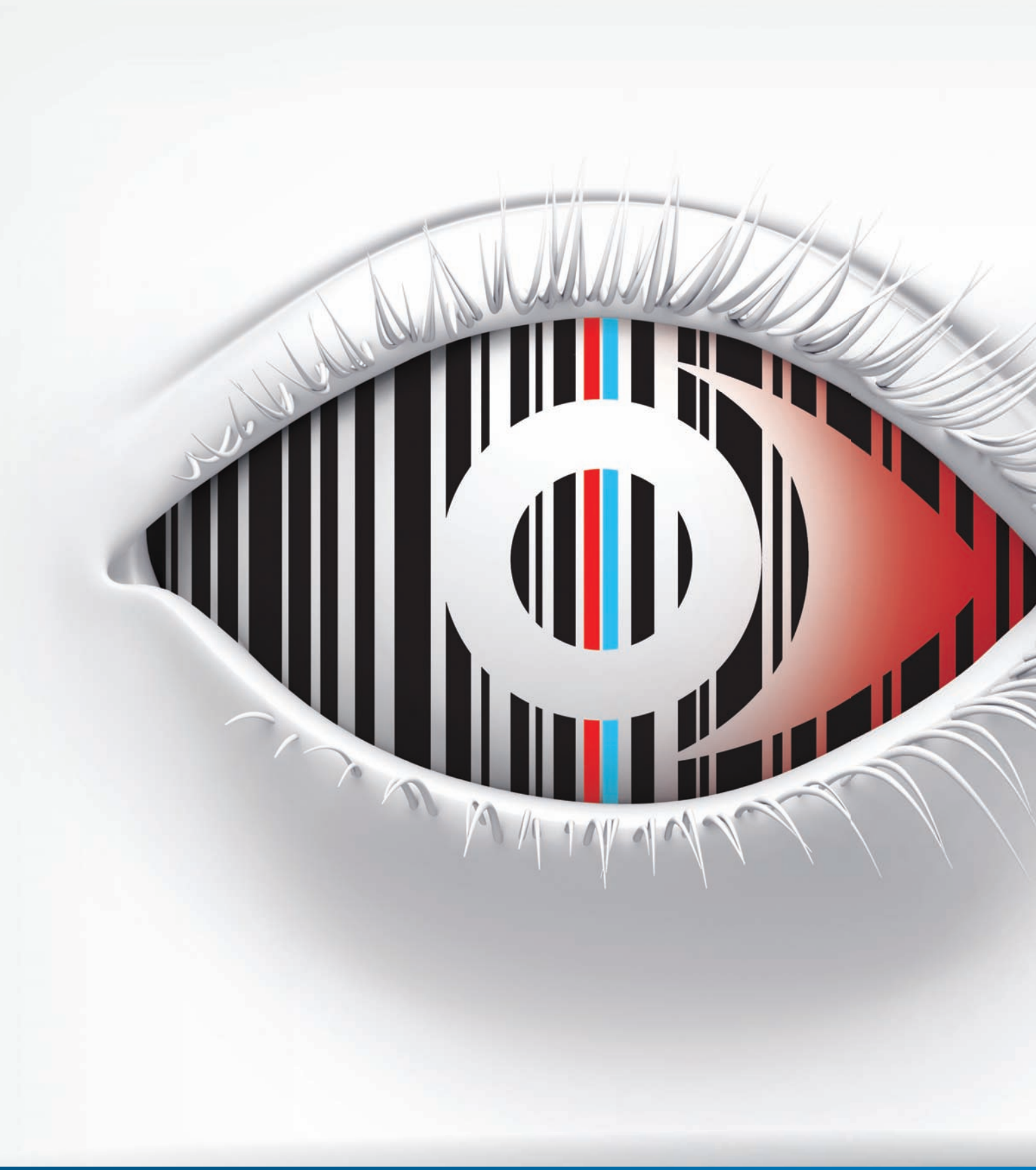
- Do they communicate their ability to perform a full spectrum of surgeries relevant to their specialty?
- Do they disclose their success and complication rates in writing for you and your patients to review and compare?
- Do they provide professional patient literature regarding the various procedures performed for you to pass along to your patients?
- Do they provide information about fees and insurance billing that you may pass along to your patients?
- Are you invited to visit their facility and observe care provided to surgical patients?
- Are you informed, in a timely manner, of the surgical outcome and recommended postoperative treatment?
- Do they properly bill and/or submit claims indicating comanagement so that you may be properly reimbursed in a timely manner?

The PECP must consider the expertise and skill of the surgeon. I have observed that ophthalmologists dedicating themselves solely to surgery have far better outcomes, with fewer complications, than those who perform surgery secondary to their non-surgical practice.

If the above considerations are favorable, then I would recommend the PECP step back and consider the comanaging philosophy of the surgeon or surgical group. I expect the surgeon or surgical group to respect my role as the patient's PECP. This is especially critical when the referring doctor is an optometrist. In general, the most successful comanaging relationships are those where both referring and consulting providers are striving to meet the patient's vision needs while working closely as a team.

The approach to comanagement should always be about how to provide the best possible care for your patient. Carefully selecting a comanaging surgeon or surgical group will result in extremely satisfied patients with improved vision and quality of life, generating positive word-of-mouth that will speak highly of all parties involved in the delivery of care.

Dr. Scott is the owner of Spectrum Eye Care, a private practice in Chelan, Wash.



nicox

Ophthalmic Diagnostics

Reference: 1. FDA Section 510k number (K110722) for RPS Adeno Detector Plus™; March 15, 2011.

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DECODE THE RED EYE

AdenoPlus™ is the first in-office immunoassay that aids in the rapid differential diagnosis of acute conjunctivitis.

Fast ≤2 minutes to complete the test
Results within 10 minutes

Accurate Identifies adenovirus with 90% sensitivity and 96% specificity[1]

Easy Complete in the office in 4 simple steps

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RAPID RESULTS FOR A CONFIDENT DIAGNOSIS

For information about incorporating diagnostic evidence into your practice or to order AdenoPlus™, call **1.855.MY.NICOX** (1.855.696.4269).

18th Annual Comanagement Report

An Allergist's Rx for Ocular Allergies

Cross-specialty referrals facilitate more accurate diagnoses and improved patient outcomes. **By Leonard Bielory, MD**

Throughout the year, nearly all optometrists see a plethora of patients who present with signs and symptoms of allergic eye disease. Clearly, the same can be said of allergists and immunologists.

Caring for patients who present with allergic eye disease represents a unique area of opportunity between eye care professionals and allergists. Drawing upon clinical experience, cross-specialty referrals unquestionably facilitate more accurate diagnoses and improved patient outcomes.

This article reviews the signs and symptoms of allergic eye disease, with specific clinical insight. Additionally, it discusses the most effective testing options and treatment strategies for your ocular allergy patients.

Immunology of the Anterior Surface

The eye is an immunologically distinct entity—it has a unique anterior chamber immune system; it lacks formed lymph nodes within the orbit, lacrimal, gland, eyelids and conjunctiva; and it contains one of the densest populations of mast cells (approximately 50 million) located beneath the conjunctival surface and the pericular tissue.

The conjunctiva is composed of thin, non-keratinizing squamous epithelial cells with varying densities of goblet cells, Langerhan's cells and stem cells—all of which are predominantly found at the limbus. The conjunctiva extends from the lid margin to the limbus. Thus, conjunctival inflammation can be triggered not only by allergens that penetrate the epithelial surface into the substantia propria (where the mast cells reside), but also by contact dermatitis, dermatophyte infestation or stem cell damage following LASIK surgery (*see "LASIK's Impact On Allergy," page 48*).

The anterior surface is bathed in a tear biofilm that exhibits a lipid, aqueous and mucoid layer. Additionally, the tears contain a host of biologically active mediators (e.g., immunoglobulins, cytokines, interleukins, growth factors) that alter the character of the tear biofilm,

Recommendations for Cross-Specialty Consultations

- **Eye care providers should refer ocular allergy patients to an allergist when:**
  - Symptoms are inadequately controlled following attempted intervention.
  - Quality of life and/or ability to function are impacted.
  - Adverse reactions to medications are documented.
  - The patient and/or clinician express a desire to identify the specific offending allergens and receive advice on environmental control.
  - Comorbid conditions (e.g., asthma and recurrent sinusitis) develop.
  - The patient and/or clinician are interested in immunotherapy for long-term control.

- **Allergists should refer ocular allergy patients to an eye care provider when:**
  - The clinician wishes to consider the use of strong topical or systemic corticosteroids.
  - A patient has been using ocular corticosteroids for more than two weeks to rule out the presence of cataracts and/or increased intraocular pressure.
  - A patient reports any persistent ocular complaints.

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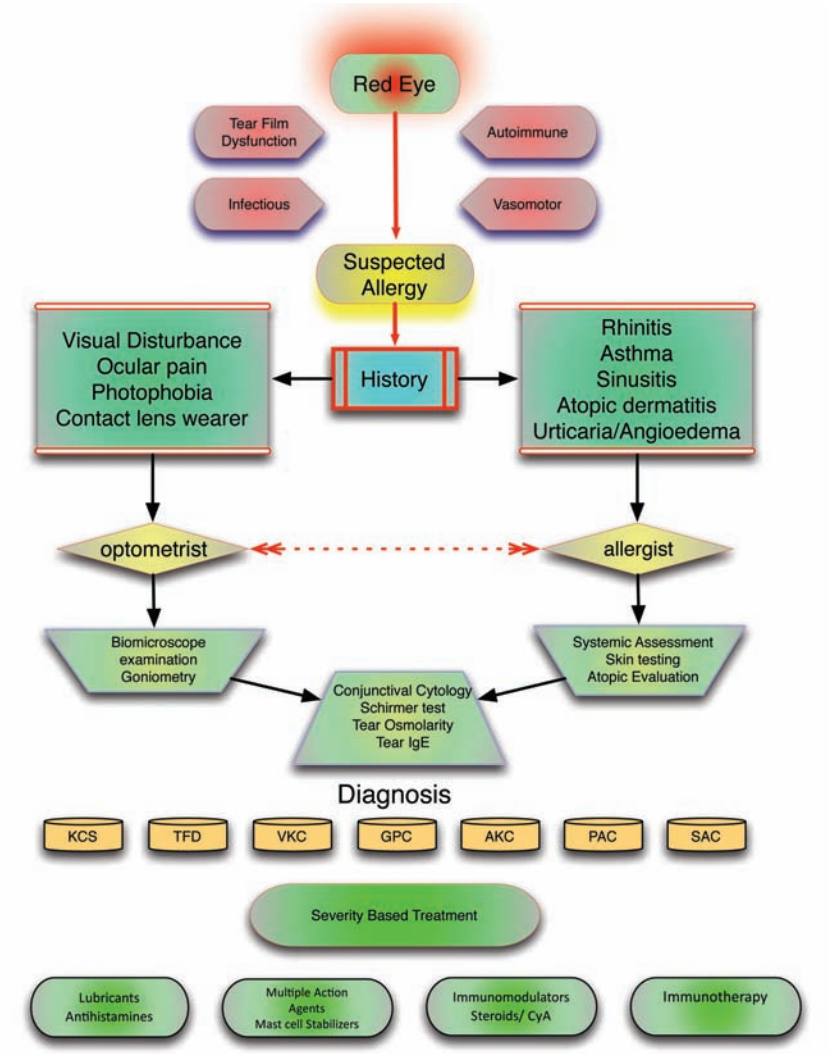

Proper evaluation of a red eye involves analyzing a wide spectrum of disorders. To treat these signs and symptoms of ocular allergy, patients should seek care from either an eye care provider or an allergist—the health care providers who are best suited to help minimize symptoms and optimize visual outcome.

based on the underlying inflammatory response of the ocular surface.

Pathophysiology of AC

Allergic conjunctivitis (AC) triggered by IgE-mast cell-mediated activation is the most common hypersensitivity of the ocular surface. It is generally understood that the condition affects up to 40% of the American population.

Direct exposure of the ocular mucosal surface to the patient's surrounding environment activates mast cells. This process occurs when an allergen attaches to its specific epitopes via the IgE antibody and binds to the mast cell surface. Once two IgE molecules crosslink to the allergen, the mast cell is activated, which yields the acute and late phases of AC.

In the late phase of AC, the conjunctival mucosal surface is infiltrated by neutrophils, eosinophils, lymphocytes and macrophages. The presence of eosinophils in the conjunctival surface confirms the diagnosis of AC.

Signs and Symptoms of AC

The signs and symptoms of ocular allergy are casued by mast cell activation via specific allergen-crosslinking IgE molecules. IgE-mast cell activation permits the immediate release of preformed histamine, which yields the early-phase allergic reaction; activates various enzymes that assist in the formation of leukotrienes and prostanglandins; and releases multiple cytokines, which initiates the late-phase reponse.

The allergic inflammatory reponse involves the four classic signs of inflammation: *rubor* (redness), *tumor* (swelling), *calor* (warmth) and *dolor* (pain). The mixture of preformed and de novo mediators provides various opportunities for a synergism between the signs and symptoms of allergy (*see "Mediators of IgE-Mast Cell Activation in Allergic Conjunctivitis," page 50*). And it's this specific constellation of signs and symptoms that helps guide your therapeutic mangement plan, including the prescription of agents that inhibit more than one allergic mediator.

A particular caveat for eye care specialists: "Ocular pain" is not suggestive of acute allergic inflammation. Instead, such a complaint should prompt you to investigate for either a chronic allergic condition, such as atopic keratoconjunctivitis (AKC), vernal keratoconjunctivitis (VKC), or other ocular conditions such as optic neuritis, uveitis, iritis, keratitis or scleritis. Blepharospasm can occur in patients with AKC or VKC, and both conditions often generate excessive, sticky mucus and photophobia upon morning waking.

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LASIK's Impact on Allergy

Allergic manifestations of the ocular surface have been observed in patients who've undergone LASIK surgery.[12] Typically, allergy-related complications manifest in those with increased postoperative irritation, visual morbidity and dry eye complications.

LASIK causes significant inflammation in normal patients, which is further exacerbated in atopic eyes. Further, a diffuse lamellar keratitis is one particular complication of LASIK that has been linked to atopic individuals.[12]

In general, goblet cell density decreases in patients with allergic inflammation and/or dry eye disease. Additionally, LASIK has been associated with decreased goblet cell density and mucin volume.[13,14]

Therefore, patients with pre-existing allergic conjunctivitis and dry eye disease should be managed appropriately during the preoperative evaluation process for LASIK surgery.

Seasonal vs. Perennial AC

More than two decades ago, researchers believed that the most common form of ocular allergy was seasonal allergic conjunctivitis (SAC), while perennial allergic conjunctivitis (PAC) was reported to affect just 5% of the population.[1] More recent reports based on the National Health and Nutrition Survey III suggested that ocular symptoms associated with allergies affect 40% of the US population, with an increased prevalence of perennial allergen-linked symptoms.[2] The progressive prevalence of ocular allergy appears to be multifactorial, and has been linked to epigenetics; climate change; and a confounding increase in other anterior surface conditions, such as multiple forms of dry eye syndrome.[2]

The onset of SAC coincides with increased environmental pollen release. By age 30, more than 80% of patients who exhibited nasal allergies during preadolescence will experience SAC.[3] Multiseasonal exacerbations during the tree, grass and weed seasons are common and may persist for as long as four weeks, depending on the pollen production cycle of the offending plant species.

PAC is commonly associated with perennial allergens, such as molds, dust mites and animal dander. Keep in mind that the pollination seasons of some plants and trees persist longer than four weeks. In such instances, the associated allergic conjunctivitis potentially could be considered perennial by some clinicians.

Allergy Testing

• *Patient history*. Obtaining a thorough patient history usually provides general direction when seeking a diagnosis of any allergic presentation. Further, a careful history helps uncover the presence of other comorbid conditions. However, the history alone may not provide enough information to determine which specific allergen is affecting the patient.[4,5] In allergy management, the clinical diagnosis—as determined by the history and physical examination—is supported by an assessment of the IgE antibodies. The diagnosis of conjunctivitis or allergic rhinoconjunctivitis can be detected in more the sweeping majority of patients.

Remember that allergic disorders rarely affect a single organ. In most cases, allergic reactions include any combination of several primary symptoms, such as asthma, allergic rhinitis, rhino-conjunctivitis, atopic dermatitis or urticaria.

• *Physical examination*. Begin the examination of an ocular allergy patient with a simple inspection of the face and area surrounding the eye. This includes an evaluation of the periocular tissue and eyelids for evidence of dermatitis, swelling, discoloration, ptosis or blepharospasm, as well as the presence or absence of tear discharge.

Additional clues for ocular allergy include the presence of a horizontal skin crease across the bridge of the nose (a.k.a., "nasal salute") that occurs in patients who constantly rub their nose due to itching. "Allergic shiners" are ecchymotic-looking areas located beneath the eyes typically are associated with allergic rhinitis. Periorbital edema is common, and is more likely to develop on the lower lids secondary to gravitation forces.[4]

Following facial inspection, examine the conjunctiva for signs of chemosis, hyperemia, cicatrization or papillae formation on the palpebral and bulbar membranes.

• *Skin prick testing*. Intradermal and skin prick tests are used to confirm a specific allergen sensitivity. Both diagnostic techniques are simple, rapid and inexpensive. Also, because the patient readily observes either process, the skin testing procedure may serve as part of the allergy education process.

Keep in mind, however, that the conjunctivae may be uniquely sensitized to a particular allergen. So skin testing often proves negative in these instances, and patients may subsequently require allergen-specific serum IgE testing or conjunctival provocation with specific allergens (performed at specialized centers) to further evaluate the localized conjunctival response.

• *Patch testing*. Patch testing is an essential investigative technique that helps the clinician identify

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GIVE THEM A DROP THAT LASTS

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INDICATIONS AND USAGE

LASTACAFT® (alcaftadine ophthalmic solution) 0.25% is an H_1 histamine receptor antagonist indicated for the prevention of itching associated with allergic conjunctivitis.

MECHANISM OF ACTION

Alcaftadine is an H_1 histamine receptor antagonist and inhibitor of the release of histamine from mast cells. Decreased chemotaxis and inhibition of eosinophil activation have also been demonstrated.

IMPORTANT SAFETY INFORMATION

WARNINGS AND PRECAUTIONS

To minimize contaminating the dropper tip and solution, care should be taken not to touch the eyelids or surrounding areas with the dropper tip of the bottle. Keep bottle tightly closed when not in use.

Patients should be advised not to wear a contact lens if their eye is red.

LASTACAFT® should not be used to treat contact lens-related irritation.

Remove contact lenses prior to instillation of LASTACAFT® (alcaftadine ophthalmic solution) 0.25%. The preservative in LASTACAFT®, benzalkonium chloride, may be absorbed by soft contact lenses. Lenses may be reinserted after 10 minutes following administration of LASTACAFT®.

LASTACAFT® is for topical ophthalmic use only.

ADVERSE REACTIONS

The most frequent ocular adverse reactions, occurring in < 4% of LASTACAFT® treated eyes, were eye irritation, burning and/or stinging upon instillation, eye redness, and eye pruritus.

The most frequent non-ocular adverse reactions, occurring in < 3% of subjects with LASTACAFT® treated eyes, were nasopharyngitis, headache, and influenza. Some of these events were similar to the underlying disease being studied.

Please see Brief Summary of full Prescribing Information on adjacent page.

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Once-daily dosing[1]

1. LASTACAFT® Prescribing Information. **2.** Torkildsen G, Shedden A. The safety and efficacy of alcaftadine 0.25% ophthalmic solution for the prevention of itching associated with allergic conjunctivitis. *Curr Med Res Opin.* 2011;27(3):623-631. **3.** Data on file, Allergan, Inc., 2005.

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Mediators of IgE-Mast Cell Activation in Allergic Conjunctivitis[15,16]

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  - Itching, redness, edema
- Heparin
- Chemotactic factors
- Protease mediators
  - Tryptase
  - Chymase
- Chemotactic factors
  - Neutrophil
  - Eosinophil

De novo allergies
- Prostaglandins (PGD2)
  - Sensitized nerves, enhanced pain, edema, redness
- Leukotrienes (LTB4, LTC4, LTD4, LTE4)
  - Chemotaxis, edema, vascular permeability

specific allergens in cases of delayed-type hypersensitivity reaction, such as contact dermatitis. This process involves the detection of primed, antigen-specific T-lymphocytes that circulate throughout the body using non-irritating antigen application to normal skin. Within two to three days after patch application, the individual's skin is evaluated for allergic response.

Eye care providers, in particular, should be aware that some patients may test positive for allergies to benzalkonium chloride and thimerosal—preservative agents currently or historically found in many ophthalmic medications and contact lens solutions.[6]

• *Serum IgE*. Detection of allergen-specific IgE in the blood serum is used when skin or patch testing is ineffective or impractical. These instances include:

- Poor patient cooperation during skin testing.
- Patients who have extensive dermatitis.
- Patients on long-term topical and/or systemic antihistamine therapy.

Additionally, allergen-specific IgE testing allows us to quantify sensitizations to diverse antigens simultaneously. Keep in mind, however, that skin testing has been shown to have a higher sensitivity and specificity than serum-based testing.

Ocular Allergy Treatments

Patients with severe ocular allergies may seek the immediate assistance of an optometrist to resolve the underlying allergic inflammation, ensure eye health and preserve vision. Many patients with allergic conjunctivitis also require a more extensive evaluation

for comorbid atopic disorders.

Our armamentarium for ocular allergy includes:

• *Nonpharmacological treatment*. Nonpharmacological treatment consists of allergen avoidance, preservative-free ocular lubricants, cold compresses and the use of daily disposable contact lenses.

• *Histamine H_1 receptor antagonists*. Antihistamines bind with histamine receptors, which decrease vasodilation and instantly relieve the primary symptom of itching. These agents have a minimal effect on conjunctival erythema. Oral antihistamines are used for mild allergies that involve nasal symptoms; however, many of these drugs have some anticholinergic effect and may augment the surface drying effect associated with ocular allergy.[7] Common oral histamine antagonists include diphenhydramine, loratadine and fexofenadine.

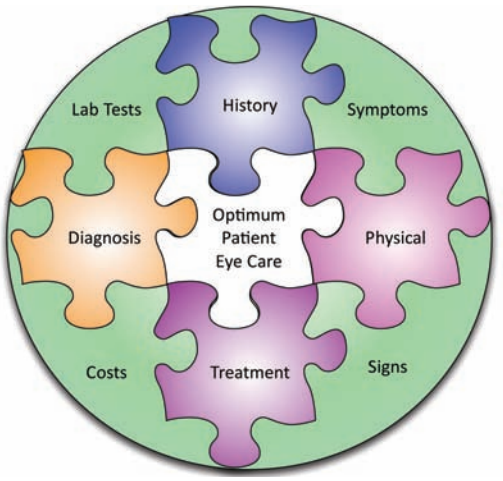
• *Mast cell stabilizers*. Mast cell degranulation is the primary site of allergic inflammation. Mast cell stabilization prevents the release of proinflammatory allergic mediators. However, to be clinically maximizing their effectiveness, mast cell stabilizers must be taken prophylactically—before allergen exposure. Common mast cell stabilizers include cromolyn, lodoxamide, nedocromil and pemirolast.

• *Topical mast cell stabilizers/H1 receptor antagonists*. Newer ophthalmic allergy medications provide dual (and multiple) action by simultaneously inhibiting mast cell degranulation and preventing histamine release. Common topical mast cell stabilizers/H_1 receptor antagonists include alcaftadine, azelastine, bepotastine, epinastine and olopatadine.

• *Topical non-steroidal anti-inflammatory drugs (NSAIDs)*. Topical NSAIDs inhibit prostaglandin synthesis via blockage of cyclooxygenase (COX1 and COX2)—the enzyme responsible for the production of inflammatory mediators. COX inhibition reduces tissue inflammation and alleviates symptoms of ocular itch. Common examples of topical NSAIDs include ketorolac and bromfenac.

• *Corticosteroids*. These medications are reserved for patients with severely acute or chronic forms of allergic conjunctivitis that are unresponsive to the aforementioned therapeutic agents.[8] Further, intranasal steroids also have been shown to yield a moderate effect on the allergic nasal and ocular symptoms.[9]

• *Allergen immunotherapy*. High-dose, subcutaneous allergen immunotherapy is a well-established treatment for allergic conjunctivitis and rhinitis. Immunotherapy not only affords the individual increased tolerance to allergen exposure, but also decreases his or her dependence upon medication. One study showed that, following immunotherapy, patients could tolerate exposure to significantly higher allergen concentrations before exhibiting symptoms of redness, pruritus and ocular swelling.[10,11] ■



To maximize treatment efficacy, the clinician must be able to differentiate between the allergic and non-allergic inflammatory conditions. This includes a proper patient history with a detailed symptom list; a physical examination that includes disease signs; and the determination of a primary diagnosis.

Dr. Bielory is an attending at Robert Wood Johnson University Hospital and principal investigator, US EPA grant on Climate Change and Allergic Airway Disease, Rutgers University in New Brunswick, NJ.

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18th Annual Comanagement Report

Comanage with Specialty ODs to Cultivate Better Care

Don't even think about losing the patient. Think instead about getting the patient the best care. **By Cheryl Murphy, OD, Contributing Editor**

Optometrists who practice full-scope care have learned the techniques and methods required to provide vision therapy, specialty contact lens fittings and low vision—yet their knowledge might be a bit dusty, their hands-on experience might be a little rusty, and they may not have the necessary equipment and tools in office to give the highest level of treatment and care the patient requires and deserves.

When this occurs, ODs need to reach out to those with the experience and expertise to do a thorough job. Optometrists who specialize in vision therapy, specialty contact lenses or low vision fit the bill.

So, are we handing off to specialty ODs as often as we should?

For a specialty contact lens fit, optometrist Gwen Gnadt uses a corneal topographer in her office to obtain precise measurements on a patient.

Specialty Contact Lens ODs

Probably not, says Gwen Gnadt, OD, of Eye Vision Associates in Lake Ronkonkoma, NY, who fits specialty contact lenses on a regular basis. She says that most of her specialty contact lens fits come to her by referral and, "about 80% [of the referrals come] from ophthalmologists, mostly corneal specialists, and [just] 20% from other ODs."

Dr. Gnadt explains, "I feel that many ODs are reluctant to refer to a practice with an optical for fear that they might lose their patient. But, we try to make it clear both to the referring doctor and to the patient that we are only providing a specialty service, and that the referring doctor is their primary provider. We make every effort to get that patient back to their doctor."

One way that Dr. Gnadt's practice accomplishes this is by "telling the patients that I will be sending a letter to their doctor explaining our outcome. I also 'cc' that letter to the patient to reinforce that I have told them to return," she says. "If a patient needs glasses and their referring doctor has an optical, I will tell them they should take their Rx there so their primary eye doctor has control."

She also says she doesn't necessarily perform a comprehensive eye exam when she receives a new patient as a referral. "It really depends on how much information

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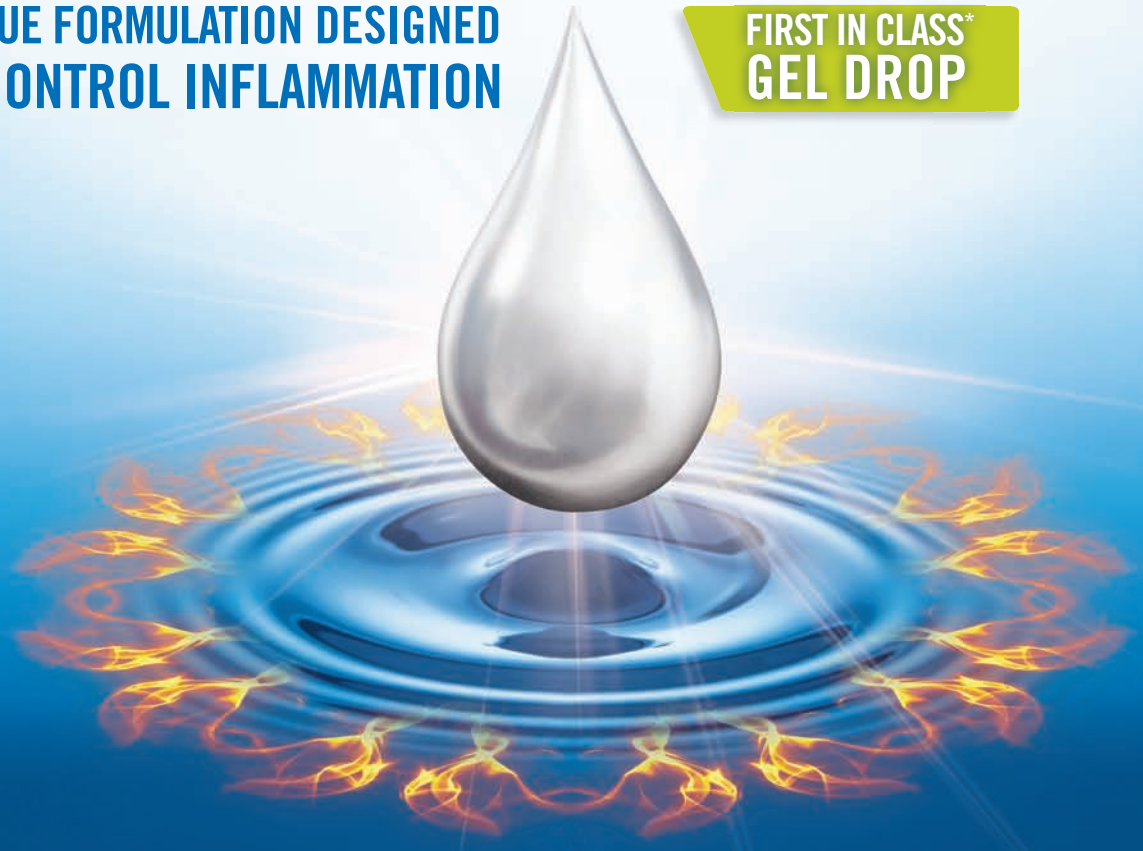

Indications and Usage

- LOTEMAX® GEL is a corticosteroid indicated for the treatment of post-operative inflammation and pain following ocular surgery

Important Risk Information about LOTEMAX® GEL

- LOTEMAX® GEL is contraindicated in most viral diseases of the cornea and conjunctiva including epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, and varicella, and also in mycobacterial infection of the eye and fungal diseases of ocular structures
- Intraocular pressure (IOP) increase—Prolonged use of corticosteroids may result in glaucoma with damage to the optic nerve, defects in visual acuity and fields of vision. If this product is used for 10 days or longer, IOP should be monitored
- Cataracts—Use of corticosteroids may result in posterior subcapsular cataract formation
- Delayed healing—Use of steroids after cataract surgery may delay healing and increase the incidence of bleb formation and occurrence of perforations in those with diseases causing corneal and scleral thinning. The initial prescription and renewal of the medication order should be made by a physician only after examination of the patient with the aid of magnification
- Bacterial infections—Prolonged use of corticosteroids may suppress the host response and thus increase the hazard of secondary ocular infection. In acute purulent conditions, steroids may mask infection or enhance existing infections
- Viral infections—Use of corticosteroid medication in the treatment of patients with a history of herpes simplex requires great caution. Use of ocular steroids may prolong the course and exacerbate the severity of many viral infections of the eye (including herpes simplex)
- Fungal infections—Fungal infections of the cornea are particularly prone to develop coincidentally with long-term local steroid application. Fungus invasion must be considered in any persistent corneal ulceration where a steroid has been used or is in use
- Contact lens wear—Patients should not wear contact lenses when using LOTEMAX® GEL
- The most common ocular adverse drug reactions were anterior chamber inflammation (5%), eye pain (2%) and foreign body sensation (2%)

Please see brief summary of full prescribing information on adjacent page.

*Ophthalmic corticosteroid.

References: 1. LOTEMAX GEL Prescribing Information, September 2012. **2.** Fong R, Leitritz M, Siou-Mermet R, Erb T. Loteprednol etabonate gel 0.5% for postoperative pain and inflammation after cataract surgery: results of a multicenter trial. *Clin Ophthalmol.* 2012;6:1113-1124. **3.** Data on file, Bausch & Lomb Incorporated.

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Brief Summary: Based on full prescribing information.

To report SUSPECTED ADVERSE REACTIONS, contact Bausch & Lomb at 1-800-323-0000 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch

INDICATIONS AND USAGE

LOTEMAX is a corticosteroid indicated for the treatment of post-operative inflammation and pain following ocular surgery.

DOSAGE AND ADMINISTRATION

Invert closed bottle and shake once to fill tip before instilling drops.

Apply one to two drops of LOTEMAX into the conjunctival sac of the affected eye four times daily beginning the day after surgery and continuing throughout the first 2 weeks of the post-operative period.

CONTRAINDICATIONS

LOTEMAX, as with other ophthalmic corticosteroids, is contraindicated in most viral diseases of the cornea and conjunctiva including epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, and varicella, and also in mycobacterial infection of the eye and fungal diseases of ocular structures.

WARNINGS AND PRECAUTIONS

Intraocular Pressure (IOP) Increase

Prolonged use of corticosteroids may result in glaucoma with damage to the optic nerve, defects in visual acuity and fields of vision. Steroids should be used with caution in the presence of glaucoma. If this product is used for 10 days or longer, intraocular pressure should be monitored.

Cataracts

Use of corticosteroids may result in posterior subcapsular cataract formation.

Delayed Healing

The use of steroids after cataract surgery may delay healing and increase the incidence of bleb formation. In those diseases causing thinning of the cornea or sclera, perforations have been known to occur with the use of topical steroids. The initial prescription and renewal of the medication order should be made by a physician only after examination of the patient with the aid of magnification such as slit lamp biomicroscopy and, where appropriate, fluorescein staining.

Bacterial Infections

Prolonged use of corticosteroids may suppress the host response and thus increase the hazard of secondary ocular infections. In acute purulent conditions of the eye, steroids may mask infection or enhance existing infection.

Viral Infections

Employment of a corticosteroid medication in the treatment of patients with a history of herpes simplex requires great caution. Use of ocular steroids may prolong the course and may exacerbate the severity of many viral infections of the eye (including herpes simplex).

Fungal Infections

Fungal infections of the cornea are particularly prone to develop coincidentally with long-term local steroid application. Fungus invasion must be considered in any persistent corneal ulceration where a steroid has been used or is in use. Fungal cultures should be taken when appropriate.

Contact Lens Wear

Patients should not wear contact lenses during their course of therapy with LOTEMAX.

ADVERSE REACTIONS

Adverse reactions associated with ophthalmic steroids include elevated intraocular pressure, which may be associated with infrequent optic nerve damage, visual acuity and field defects, posterior subcapsular cataract formation, delayed wound healing and secondary ocular infection from pathogens including herpes simplex, and perforation of the globe where there is thinning of the cornea or sclera.

The most common adverse drug reactions reported were anterior chamber inflammation (5%), eye pain (2%), and foreign body sensation (2%).

USE IN SPECIFIC POPULATIONS

Pregnancy

Teratogenic Effects: Pregnancy Category C.

Loteprednol etabonate has been shown to be embryotoxic (delayed ossification) and teratogenic (increased incidence of meningocele, abnormal left common carotid artery, and limb flexures) when administered orally to rabbits during organogenesis at a dose of 3 mg/kg/day (35 times the maximum daily clinical dose), a dose which caused no maternal toxicity. The no-observed-effect-level (NOEL) for these effects was 0.5 mg/kg/day (6 times the maximum daily clinical dose). Oral treatment of rats during organogenesis resulted in teratogenicity (absent innominate artery at ≥5 mg/kg/day doses, and cleft palate and umbilical hernia at ≥50 mg/kg/day) and embryotoxicity (increased post-implantation losses at 100 mg/kg/day and decreased fetal body weight and skeletal ossification with ≥50 mg/kg/day). Treatment of rats with 0.5 mg/kg/day (6 times the maximum clinical dose) during organogenesis did not result in any reproductive toxicity. Loteprednol etabonate was maternally toxic (significantly reduced body weight gain during treatment) when administered to pregnant rats during organogenesis at doses of ≥5 mg/kg/day.

Oral exposure of female rats to 50 mg/kg/day of loteprednol etabonate from the start of the fetal period through the end of lactation, a maternally toxic treatment regimen (significantly decreased body weight gain), gave rise to decreased growth and survival, and retarded development in the offspring during lactation; the NOEL for these effects was 5 mg/kg/day. Loteprednol etabonate had no effect on the duration of gestation or parturition when administered orally to pregnant rats at doses up to 50 mg/kg/day during the fetal period.

There are no adequate and well controlled studies in pregnant women. LOTEMAX should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Nursing Mothers

It is not known whether topical ophthalmic administration of corticosteroids could result in sufficient systemic absorption to produce detectable quantities in human milk. Systemic steroids appear in human milk and could suppress growth, interfere with endogenous corticosteroid production, or cause other untoward effects. Caution should be exercised when LOTEMAX is administered to a nursing woman.

Pediatric Use

Safety and effectiveness in pediatric patients have not been established.

Geriatric Use

No overall differences in safety and effectiveness have been observed between elderly and younger patients.

NONCLINICAL TOXICOLOGY

Carcinogenesis, Mutagenesis, Impairment Of Fertility

Long-term animal studies have not been conducted to evaluate the carcinogenic potential of loteprednol etabonate. Loteprednol etabonate was not genotoxic *in vitro* in the Ames test, the mouse lymphoma tk assay, or in a chromosome aberration test in human lymphocytes, or *in vivo* in the single dose mouse micronucleus assay. Treatment of male and female rats with up to 50 mg/kg/day and 25 mg/kg/day of loteprednol etabonate, respectively, (600 and 300 times the maximum clinical dose, respectively) prior to and during mating did not impair fertility in either gender.

PATIENT COUNSELING INFORMATION

Administration

Invert closed bottle and shake once to fill tip before instilling drops.

Risk of Contamination

Patients should be advised not to allow the dropper tip to touch any surface, as this may contaminate the gel.

Contact Lens Wear

Patients should be advised not to wear contact lenses when using LOTEMAX.

Risk of Secondary Infection

If pain develops, redness, itching or inflammation becomes aggravated, the patient should be advised to consult a physician.

FOR MORE DETAILED INFORMATION, PLEASE READ THE PRESCRIBING INFORMATION.

Bausch & Lomb Incorporated
Tampa, Florida 33637 USA
US Patent No. 5,800,807

the referring physician provides and how long it has been since the patient had an exam," Dr. Gnadt says. "Of course, in my office I will do the pertinent contact lens-related examination, refraction, corneal topography and assessment of external ocular health."

But, she adds, "it would be helpful if the referring doctor could provide me with as much of this information as possible for comparative data. For some of these patients, it can be very difficult to get consistent data on them."

So, if you're referring a patient to a specialty OD (or any specialist), be sure to share the appropriate patient history. This is another good step towards ensuring the best possible patient care.

Vision Therapists

Optometrist David Maze, a private practice vision therapist in Westmont, Ill., has taken precautions one step further by adopting a "no fill" policy for prescription lenses for patients who came in through referrals from outside docs.

"I strongly encourage patients to go back to their family eye care professional when I prescribe lenses," he says. When it comes to referred patients, "if I determine a prescription is necessary, we do not and will not fill an Rx, even if the parent/patient asks us for convenience's sake."

Dr. Maze has an optical in his practice, but developed this "no fill" policy in order to build trust with referring ODs. "I do think hesitation exists when referring to other ODs with an optical, but I think that mindset is changing. I think ODs are getting more comfortable sending us patients."

Since 2005, Dr. Maze has been carefully tracking his referral sources to see how vision therapy patients find his practice. His percentage of referrals from ODs is about 25%. Other health care providers, such as OTs, PTs, speech and language specialists, neuropsychologists, MDs and chiropractors, together account for about 35%—with occupational therapists contributing more than any of the other sources in that group. The remaining 40% of referrals for vision therapy come from family and friends of current patients or word of mouth (30%), educators (5%) and Internet sites (5%), such as optometrists.org, COVD.org, OEP.org and other media.

David Maze, OD, works with a child in his fully-equipped vision therapy practice.

While ODs have had specialty training in optometry school, it sometimes just isn't enough. "Most ODs' clinical experience with vision therapy has been at academic institutions and large clinics. Even with the best attending, that experience does not match that of a private practice with therapy," Dr. Maze says. "I feel many of the externs that I teach learn the impact vision therapy can have in a child's life as well as see the [benefits of a] collaborative effort [among ODs.]"

Dr. Maze works with referring ODs, analyzing the patient information they provided and then he examines the patient himself. "I almost always recheck any and all phorias, vergences and near-point of convergence as well as oculomotor skills during the first encounter," he says. Then he uses the findings gathered at that initial visit to screen for visual issues and, if necessary, he will have the parent/patient schedule a full therapy evaluation.

Refractions and ocular health evaluations aren't repeated if previously done, unless the referring doctor specifically asks him to do so, such as in cases of refractive amblyopia. And as far as dilations go, Dr. Maze says, "it is easier for everyone involved if the dilation is completed before the patient enters my office."

He emphasizes to the patient that "the referring doctor is the ocular health expert, distance glasses expert and good at screening for binocular vision problems." His practice always sends patients back to their referring OD for annual eye examinations, any ocular health concern and all glasses and/or contact lenses. "We try our best to send a copy of our findings/report to the referring OD as well as a thank you and a summary report upon

the patient's completion of therapy."

ODs collaborating and comanaging with specialty ODs can make a winning combination for patients and help to unite us as a profession. "I haven't met an OD yet who isn't interested in the absolute best outcome for his/her patients," Dr. Maze says.

Low Vision Specialists

Low vision specialists also seem to have a relatively low referral rate from other ODs.

Lisa Chan-O'Connell, OD, who provides low vision care for Lighthouse International in New York, says that in low vision, just like in specialty contact lenses and in vision therapy, "we have significantly lower numbers of referrals from optometrists vs. ophthalmologists."

While these patients may already be in the hands of ophthalmologists treating the underlying ocular disease involved in their condition, Dr. Chan-O'Connell says that she too thinks there might be a hesitation among optometrists when it comes to referring out to another eye care practice. "Ophthalmologists do not seem to hesitate when a specialty referral—such as retina, glaucoma, or neuro-ophthalmology—is needed." Likewise, "optometrists have the abilities to treat a wide variety of ocular conditions, so when a specialty referral is needed, we should not hesitate to send our patients for [specialty care such as] low vision evaluations."

A low vision evaluation is similar to a comprehensive eye exam, but there are some significant differences. An extensive history must be taken on the patient's condition as well as a detailed functional history that assesses different aspects of the patient's everyday life.

Lisa Chan-O'Connell, OD (at rear), shows how to adjust an expanded field bioptic telescope.

The low vision specialist performs a trial frame refraction to allow the patient to maintain/adapt to an eccentric view position. Different charts are used for measuring visual acuities as well as contrast sensitivity function, and visual fields are tested if necessary.

These specialized charts and techniques are something that the average OD likely doesn't use on a regular basis. That is why a referral to a low vision specialist is an invaluable resource when it comes to providing patients with targeted diagnosis and care. They also have specialty low vision devices conveniently in stock, and they're used to producing atypical spectacle prescriptions such as those with high adds.

"Sending a patient for a low vision evaluation will be in the patient's best interest, allowing them to continue functioning independently," Dr. Chan-O'Connell says. "If patients are not referred and their difficulties are not addressed, the patient will only refer themselves or look for another OD to provide a solution to their problems."

And that is true of all patients who need specialty care. "If the OD makes the referral, then the patient doesn't [have to] try to look for answers on their own and they will be grateful that you are the OD that is really trying to help them," Dr. Chan-O'Connell says.

Don't buy into the myth that once you send your patient to another OD, you'll never see that patient again. By and large, specialty ODs are doing their best to ensure that this doesn't happen. It is not their intention to "steal" your patients, but simply to extend their particular experience, tools and techniques to you and your patients through their specialty services. ■

7 Tips for Referring Patients to Specialty ODs

By Stuart Rothman, OD

1. Network and establish referral relationships among specialty ODs in various areas.

2. Establish guidelines as to what you expect from them and for the care of your patient.

3. Explain to the specialist what you are comfortable doing and what you are not. For example, will you do re-evaluations on patients you have referred for therapy?

4. Provide as much information as possible to the specialist to lessen the need for subjecting your patient to repeat testing.

6. Do as much as you can with the patient before referring.

7. Refer with confidence, not half-heartedly. If the patient needs the service, talk up its importance as well as the specialty OD who will provide the care.

Dr. Rothman is an associate professor at SUNY College of Optometry. His private practice in Livingston, NJ, specializes in vision therapy.

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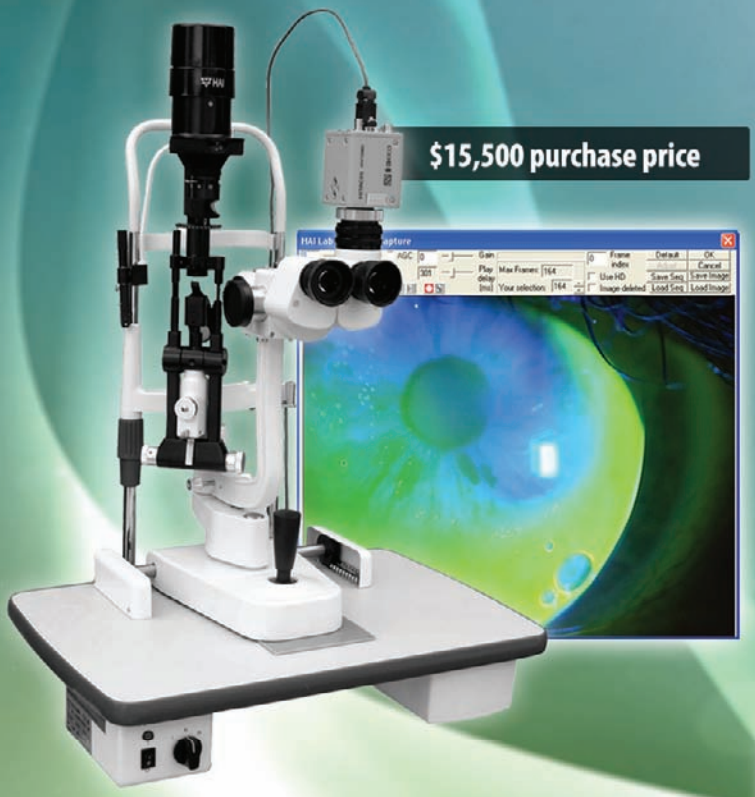

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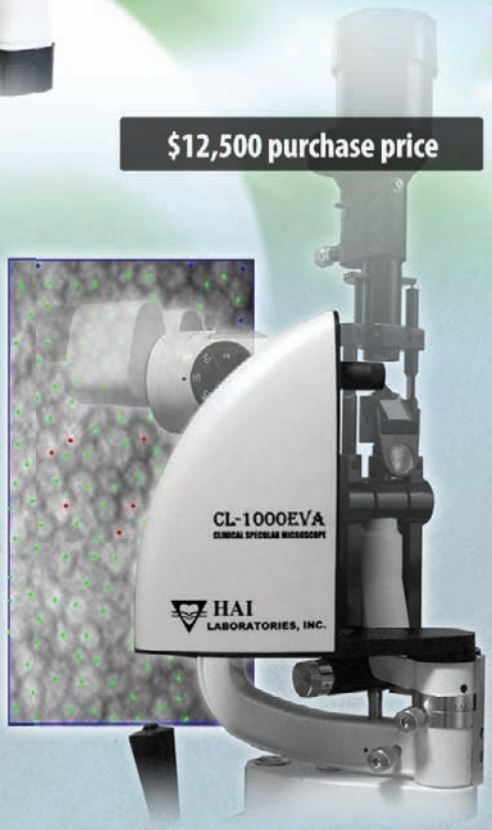

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18th Annual Comanagement Report

NAION Follows Cataract Surgery

Although rare, NAION is one of the most visually devastating complications associated with cataract extraction. **By Joseph P. Ruskiewicz, OD, MPH**

A very somber, elderly woman brightened my day when she complained about the sudden appearance of wrinkles on her face following cataract surgery. She told me that, as she continued to look into her bathroom mirror, she was further horrified by a previously undetected cobweb located above the shower.

While humorous, it is gratifying to hear the many ways that patients express excitement about improved vision following cataract surgery. Under normal circumstances, cataract extraction (CE) is a low-risk procedure. Infrequently, some patients may experience significant postoperative complications, such as uveitis or endophthalmitis. However, one potential CE complication that rarely garners coverage in the ophthalmic literature is nonarteritic anterior ischemic optic neuropathy (NAION).

The incidence of NAION following CE is estimated at one case per 2,000 procedures.[1] However, multiple studies have suggested that just 2.3 to 10.2 cases per 100,000 incidences of spontaneous NAION actually are reported in the general population over age 50.[2,3]

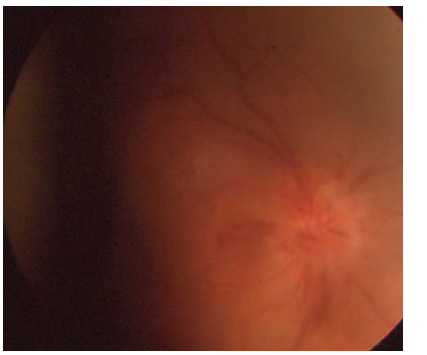
This article reviews two cases of NAION following CE. The first patient experienced NAION following CE in the first eye, and then developed NAION in the contralateral eye following a subsequent CE procedure years later. The patient was very fortunate that her second eye was not as visually compromised as the first.

The second patient underwent CE in one eye and then developed NAION years later. But, because of a longstanding fear of NAION in the second eye, she delayed the second cataract procedure for more than seven years.

Case I

History

An 87-year-old female presented for a cataract surgery consultation. The patient said that she wanted to undergo CE in her left eye in order to retain an unrestricted Pennsylvania driver's license. Her ocular history was significant for cataract removal with a posterior chamber intraocular lens (IOL) implantation in her right eye five years earlier. Two weeks after implantation, she developed NAION in her right eye.



The right eye of our 87-year-old patient described in Case I. This image was taken one month following cataract extraction. Note the presence of hyperemia, hemorrhages and edema.

Her visual acuity measured 20/50 OD at the three-day postoperative visit; however, four weeks later, her acuity was reduced to finger counting. She was placed on a short course of oral prednisone, which was discontinued after one week following the onset of NAION.

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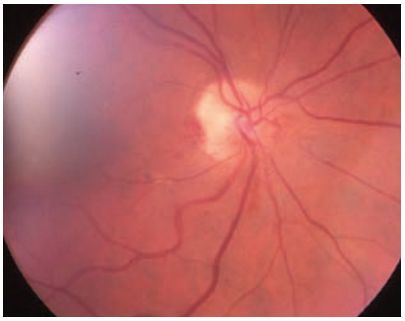


Our patient's right eye at the two-month postoperative follow-up. Although some hemorrhages were still present, the hyperemia and edema decreased.

Diagnostic Data

At the CE consultation for her left eye, our patient's uncorrected visual acuity measured 20/300 OD and 20/70 OS with pinhole testing. Her spectacle-corrected visual acuity measured 20/60 OU. She correctly identified 0/7 plates OD and 7/7 plates OS on color vision testing.

Her intraocular pressure measured 20mm Hg OD and 18mm Hg OS at 10:00 a.m. Pupillary testing uncovered a grade +2 afferent defect OD, but was unremarkable OS. Confrontation fields demonstrated a central/inferior scotoma OD but were full OS.

Slit lamp examination of the right eye revealed a clear anterior chamber and cornea, and a well-centered IOL implant. The left eye exhibited a grade 3 nuclear sclerotic cataract.

Fundus examination of the right eye showed a pale optic nerve head, with a cup-to-disc ratio of 0.30 x 0.30. We noted mild pigmentary changes and a 3DD choroidal nevus located temporal to the macula. All other findings were normal. Fundus examination of the left eye revealed a pink and healthy optic nerve, with a cup-to-disc ratio of 0.35 x 0.35. All other findings were normal. Refraction measured -1.00D -2.00D X 100 OD and -1.00D -1.25D X 085 OS.

Current systemic medications included 81mg aspirin per day, which she began using when diagnosed with NAION in her right eye after the first CE procedure. Her systemic history was unremarkable.

Management Plan

In consultation with both the patient and her son, we scheduled her for CE OS. In accordance with Pennsylvania requirements, we advised the patient that until she underwent CE, she was not permitted to drive at night.

Follow-up and Discussion

- ***One week.*** She underwent successful CE OS, and reported good vision and no pain at her one-week follow-up. She reported excellent compliance with her topical antibiotic, NSAID and steroid; however, she missed four days of aspirin use. We documented small optic nerve head splinter hemorrhages with no disc edema in the left eye.
- ***One month.*** Her uncorrected visual acuity measured 20/300 OD and 20/70 OS with pinhole testing. (Pinhole yielded no improvement OD; however, her bilateral acuity improved to 20/40 without spectacle correction.) She correctly identified 0/7 plates OD and 7/7 plates OS on color vision testing.

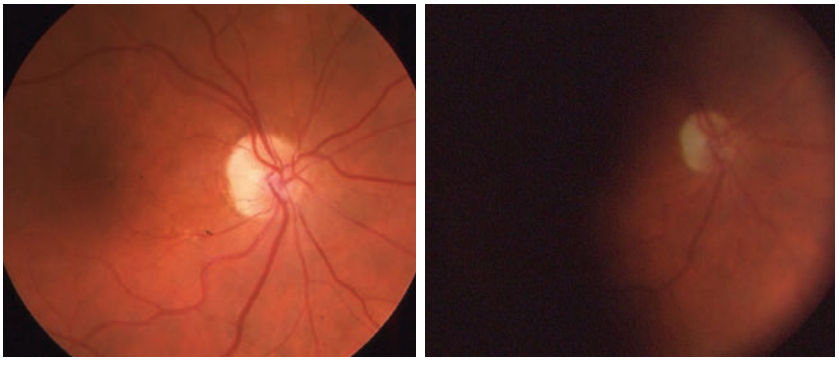
Her intraocular pressure measured 18mg Hg OU. Pupillary testing uncovered a grade +2 afferent defect OD, but was unremarkable OS. Confrontation fields demonstrated a central scotoma located at 20° OD, but were full OS.

Slit lamp examination of the right eye revealed a clear anterior chamber and cornea, and a well-centered IOL implant with no posterior chamber opacification (PCO). The left eye had trace cells in the anterior chamber and a clear cornea, with a well-centered IOL and no PCO.

Fundus examination of the right eye showed a pale optic nerve head OD, with a cup-to-disc ratio of 0.30 x 0.30.

We noted mild dry pigmentary changes in the macula and a 3DD choroidal nevus located temporal to the macula. All other findings were normal.

Fundus examination of the left eye revealed splinter hemorrhages and segmental edema, with a cup-to-disc ratio of 0.35 x 0.35. All other findings were normal. Refraction measured -1.00D -2.00D X 100 OD and -0.75D -1.75D X 085 OS.



Our patient's right eye at one-year (left) and three-year follow-up.

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Characteristics of NAION Following CE vs. Spontaneous NAION

	Immediate	Delayed	Spontaneous
	NAION following CE*	NAION following CE +	NAION
Epidemiology	Incidence: 34.6 in 100,000 cases.[1]	Incidence: 51.8 in 100,000 cases (within six months).[1]	Incidence: 2.3 to 10.3 per 100,000 cases in patients over age 50.[2,3,23]
Risk factors associated with NAION	Possible elevated IOP during CE.[2] No association with hypertension or "crowded" optic nerves.[26]	Risk factors unknown; may be same as those of immediate NAION. No association with hypertension or "crowded" optic nerves.[26]	Possibly elevated cholesterol, diabetes mellitus, hypertension, "crowded" disk, sleep apnea and nocturnal hypotension.[12,24-29] Use of amiodarone or erectile dysfunction medications and male gender.[10,30,31]
Clinical signs	Acutely decreased visual acuity. Associated nerve fiber layer defect on visual field testing. Relative afferent pupillary defect. Optic nerve edema, no other reasonable alternative etiologies.	Same as immediate.	Same as immediate.
Epidemiology of second eye without cataract extraction	Not applicable.	Not applicable.	24% to 48% chance within five to 11 years.[2,32] Decompression study found a 14.7% likelihood in second eye over 5.1 years.[33]
Epidemiology of second eye with cataract extraction	53% of patients with previous NAION, develop NAION in the fellow eye following cataract extraction.[6]	Same as immediate.	Not applicable.
Treatment of NAION	Aspirin, like steroids, is not effective and does not improve visual acuity.[32-36] There is some evidence that levodopa may improve acuity.[37] Systemic evaluation and sleep study are warranted.[21]	Same as immediate.	Same as immediate.
Predictors for second eye developing spontaneous NAION	Visual acuity for first NAION eye is 20/200 or worse. Significantly increased risk of NAION in second eye.[33]	Same as immediate.	Same as immediate.
Preventing second eye from developing NAION	81mg of aspirin per day potentially is helpful, but remains unproven. Avoid nocturnal hypotension.[12] Possible association with sleep apnea.[28,29] Avoid CE; if performed, however, strict IOP control may help.	Same as immediate.	81mg of aspirin per day potentially is helpful, but remains unproven. Avoid nocturnal hypotension.[12] Possible association with sleep apnea.[28,29]

* Defined by various studies as 24 hours to 24 weeks.
+ Defined by various studies as more than 24 weeks to one year.

• ***Five months.*** The patient reported stable vision in her left eye, with no other visual or ocular complaints. Her final visual acuity measured 20/300 OD, 20/25 OS and 20/25 OU with spectacle correction.

Neuro-ophthalmic consultation was ordered after the splinter hemorrhages were detected, and confirmed the development of NAION in her left eye without giant cell arteritis. While she achieved 20/25 OS on a high-contrast chart, she reported feeling "visually restricted." Consequently, the patient stopped driving because she felt unsafe on the road.

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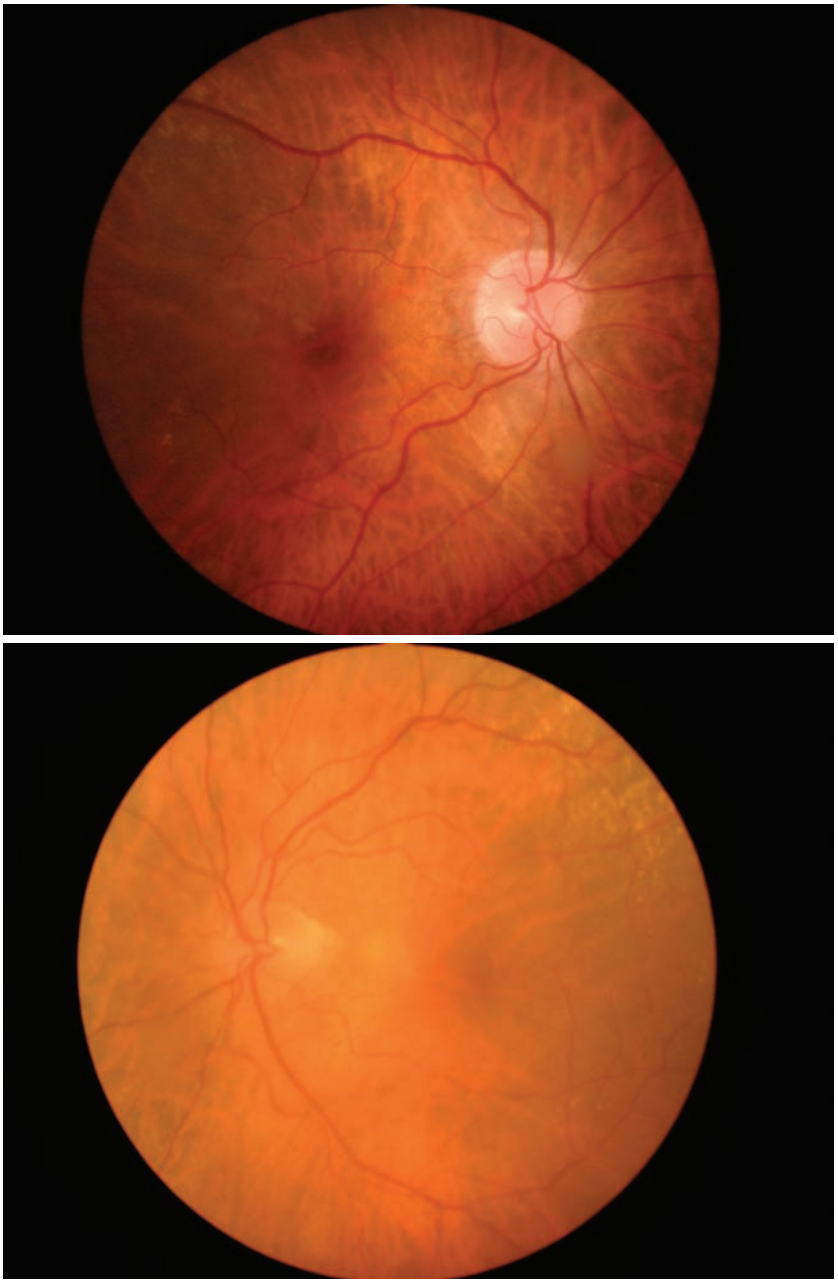

The right and left eyes of our 79-year-old patient described in Case II (OD top, OS bottom). The images were taken before she developed NAION in her right eye.

The patient moved out of the area shortly after the five-month follow-up, and has not returned to our office since.

Case II

History

Two weeks before a scheduled eye examination, a 79-year-old female presented with decreased vision in her right eye upon awakening. She denied concurrent headache, fatigue, temporal scalp tenderness and pain with jaw claudication.

Her ocular history was significant for uncomplicated CE in her right eye four years earlier. Additionally, she was being followed as an ocular hypertensive; however, her IOP never exceeded 24mm Hg. Her systemic history was remarkable for hypertension, arrhythmia and arthritis.

Current medications included 0.25mg digoxin, 40mg Nexium (esomeprazole magnesium, AstraZeneca), 20mg Lexapro (escitalopram oxalate, Forest Laboratories, Inc.), 50mg Cozaar (losartan, Merck), 81mg aspirin and an unconfirmed dosage of tramadol.

Diagnostic Data

Visual acuity measured light perception OD and 20/40 OS with pinhole testing. (Pinhole yielded no improvement OD.) Her spectacle-corrected visual acuity measured 20/40 OU. She correctly identified 0/7 plates OD and 7/7 plates OS on color vision testing.

Her intraocular pressure measured 18mm Hg OU. Pupillary testing uncovered a grade +2 afferent defect OD and a grade 2 nuclear sclerotic cataract OS. Confrontation fields demonstrated inferior loss OD, but were full OS.

Slit lamp examination of the right eye showed a clear anterior chamber and cornea, and a well-centered IOL with no evidence of PCO. The left eye showed a grade 2 nuclear sclerotic cataract.

Fundus examination of the right eye revealed disc edema with hemorrhages and cotton-wool spots, as well as mild drusen formation and macular pigment changes. The cup-to-disc ratio measured 0.30 x 0.30 OD. Fundus examination of the left eye revealed mild drusen formation and macular pigment changes. The cup-to-disc ratio measured 0.25 x 0.25 OS. Refraction measured 2.25D -2.75 X 100

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[1]Bergmanson J. Clinical Ocular Anatomy and Physiology, 14th ed. Houston , Texas: Texas Eye Research and Technology Center, 2007.

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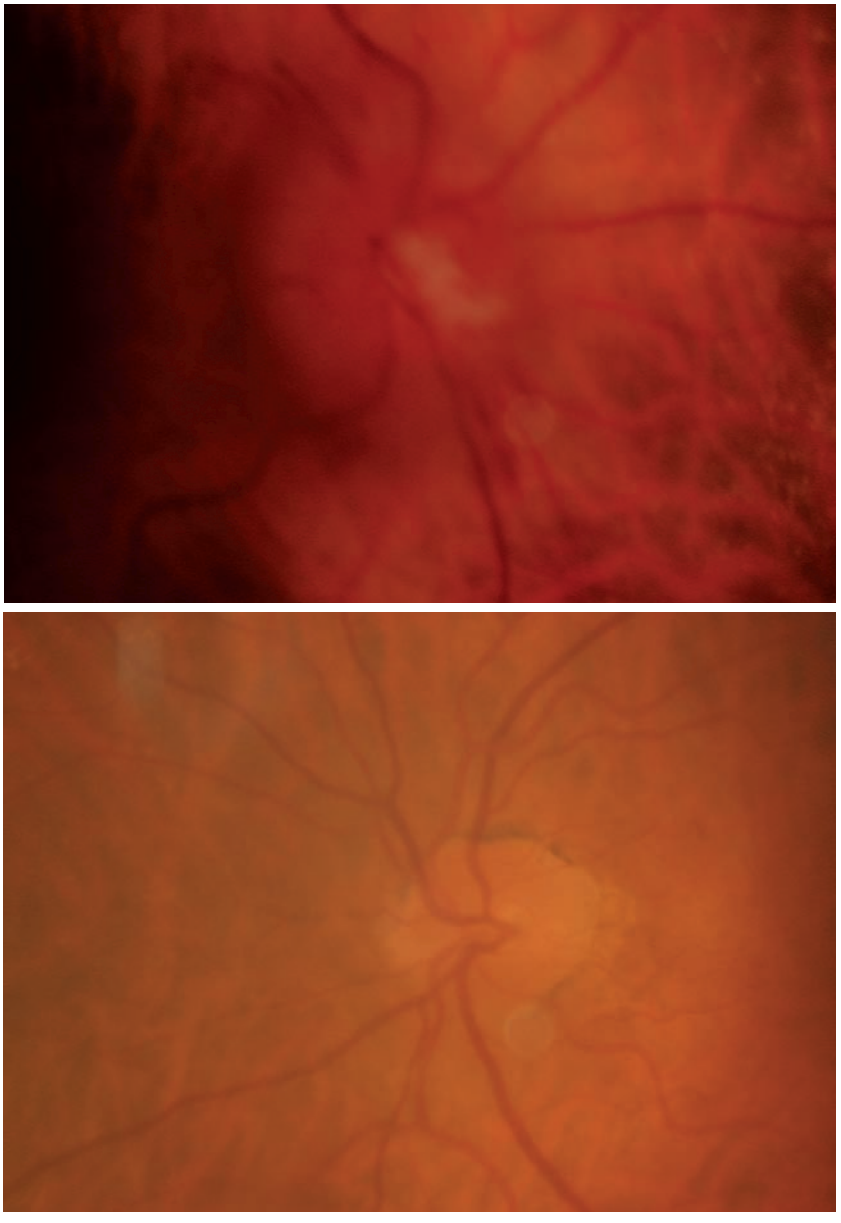

Our patient's right and left eyes (OD top, OS bottom) two weeks after she experienced NAION OD. Note the splinter hemorrhage, hyperemia and edema in her right eye.

OD and 2.50D -2.75D X 090 OS.

Management Plan

We ordered immediate blood testing, including sedimentation (SED) rate and C-reactive protein. Although the SED rate was normal—considering the patient's age, optic disc appearance and precipitous vision loss—the neuro-ophthalmologist performed a temporal artery biopsy. It was negative.

We have followed the patient for seven years since she developed NAION in her right eye. Fortunately, no changes have occurred to the left optic nerve. Because of the complication in her right eye, and the consequently increased potential for NAION in the contralateral eye, the patient decided not to undergo CE in her left eye.

Signs and Symptoms of NAION

There are two forms of anterior ischemic optic neuropathy, arteritic and nonarteritic. Of these, NAION is less visually devastating and, as we shall discuss, can be associated with CE.

As clinicians, we are familiar with the NAION patient who reports sudden, painless, monocular vision or visual field loss. Often, these losses are noticed when waking up. Pain has been reported upon eye movement, but is extremely rare.[4] Acuity may vary from no change to extreme visual compromise. Visual field loss also can be variable, but typically manifests as an altitudinal deficit or arcuate scotoma.

A relative afferent pupillary defect is always present in patients who present with NAION.[5] Clinical signs include the familiar swollen disc with hyperemia as well as peripapillary, flame-shaped hemorrhages.[6] These findings sometimes can involve just a small segment of the disc, as seen in the left eye of the patient described in Case I. Both eyes typically show what is termed a "disc at risk," with a small central cup. In most instances, the patients have an associated systemic history of diabetes mellitus, hypertension, hypercholesterolemia or a combination of these conditions.[7]

In addition to CE, other conditions that may act as triggers for NAION are nocturnal hypotension, obstructive sleep apnea, anemia, hyperhomocysteinemia and some coagulopathies.[8,9]

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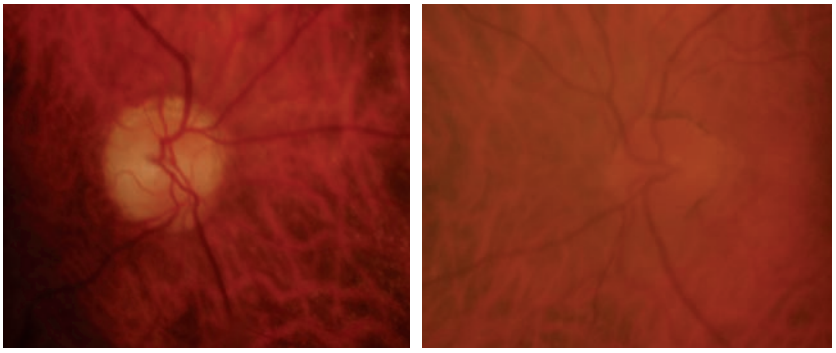

Three months after our patient developed NAION in her right eye (OD left, OS right). Note that her right optic nerve was very pale, yet retained nearly the same cup-to-disc ratio.

Viagra (sildenafil, Pfizer), also may precipitate NAION.[10] Interestingly, however, a recent literature review in the *Journal of Sex Medicine* indicated that no conclusive evidence supports a direct cause/effect relationship between PDE5 inhibitors and vision-threatening ocular events.[11]

CE and NAION

The mechanism for the development of an optic neuropathy following CE may be related to IOP elevation. Sanjay S. Hayreh, MD, PhD, and associates suggest that elevated IOP secondary to CE causes a disruption in ocular perfusion pressure of the posterior ciliary arteries—either directly or via the peripapillary choroid.[12,13] This, in turn, results in ischemia and a cascade of edema that leads to optic nerve head swelling.[12,14]

Interestingly, other clinicians have documented NAION following CE in patients who exhibited good IOP control.[15] Transient IOP increase during the operative or perioperative period may be responsible for causing the ischemia.

As seen in Case I, NAION was closely associated with CE. There have been numerous reports of a causative association, including surgical technique.[1,16] For optometrists, the important consideration is that if NAION has occurred in one eye—either following CE or spontaneously—the risk of the second eye developing NAION following CE is high.[1]

In a review of nearly 6,000 CE cases from the Bascom Palmer Eye Institute in Miami, three patients developed NAION within one year of surgery. Two of the three individuals had a history of NAION in the contralateral eye.[1]

More alarmingly, another study indicated that 53% of CE patients who had a previous NAION developed a subsequent NAION following CE in the contralateral eye.[6] This finding suggests that CE patients with a history of NAION are nearly four times more likely to experience optic neuropathy than those with no previous history of NAION.

Both clinicians and researchers generally agree that NAION following CE usually occurs within hours or days of surgery. Whether CE can cause delayed NAION weeks to months later is more controversial. While the incidence of NAION following CE is relatively low, it is more likely to occur than spontaneous NAION in patients who have not undergone CE.[1,12] Also, if delayed NAION was not associated with CE, but merely spontaneous instead, an equal distribution of postoperative cases would be expected during the year following surgery (*see "Characteristics of NAION Following CE vs. Spontaneous NAION," page 62*).[17]

Additionally, the clinical findings for CE-induced and spontaneous NAION also are markedly different. For example, patients with postoperative NAION typically have significantly lower rates of hypertension and higher cup-to-disc ratios.[14]

Despite this evidence, one article in the *Journal of Cataract and Refractive Surgery* indicated that there is insufficient data to confirm a relationship between CE-induced and delayed NAION.[18]

Treatments for NAION

With no treatment, visual acuity can improve for up to one year in approximately 50% of cases.[19] In the Ischemic Optic Neuropathy Decompression Trial, surgical intervention to save the optic nerve was found to be ineffective, and even potentially harmful.[19]

Other interventional strategies have been attempted to further increase this recovery period, including daily aspirin use, attempts to improve optic nerve perfusion pressure, vasodilators, systemic steroids and intravitreal steroids. Unfortunately, none of these treatments have been proven to be effective in clinical trials.[20]

Increased Risk of Stroke and Heart Attack

Any patient who develops NAION is at an increased risk for cerebrovascular and cardiovascular events.[21] You should promptly inform the individual's primary care provider of the diagnosis, and educate the patient about his or

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her increased risk for the systemic conditions.

Further, if the patient is hypertensive, recommend that patients take their medications in the morning or during the day to avoid nocturnal hypotension. You may even wish to help enroll the patient in a study to evaluate for sleep apnea.

Patient Counseling

So, what guidance should you provide for a patient with a history of NAION and cataract? There are several fundamental considerations: What was the extent of vision loss secondary to NAION? Which eye is most visually dominant? What are the patient's visual demands? What systemic and ocular comorbidities exist? How much does the existing cataract affect the patient's vision and functional abilities?

In my office, we evaluate these factors concurrently during the patient education process. If a patient previously developed NAION following CE, inform the patient that he or she has a 53% likelihood of developing NAION in the fellow eye following CE.[6] Further, explain that there is a 15% chance of developing NAION within five years, even if the second CE is not peformed.[22] Finally, caution every patient that there are no effective treatment options if NAION develops in the contralateral eye.

Perhaps, within the next decade, an effective treatment for NAION will be developed. Until then, advise patients with a history of NAION to delay subsequent cataract procedures for as long as possible. Ultimately, of course, the decision to undergo contralateral CE is up to the patient. It is our responsibility to help the patient make this decision in light of the most current research. ■

Dr. Ruskiewicz is in private practice in Pottstown, Pa., and serves as an associate clinical professor at the Pennsylvania College of Optometry at Salus University in Elkins Park, Pa.

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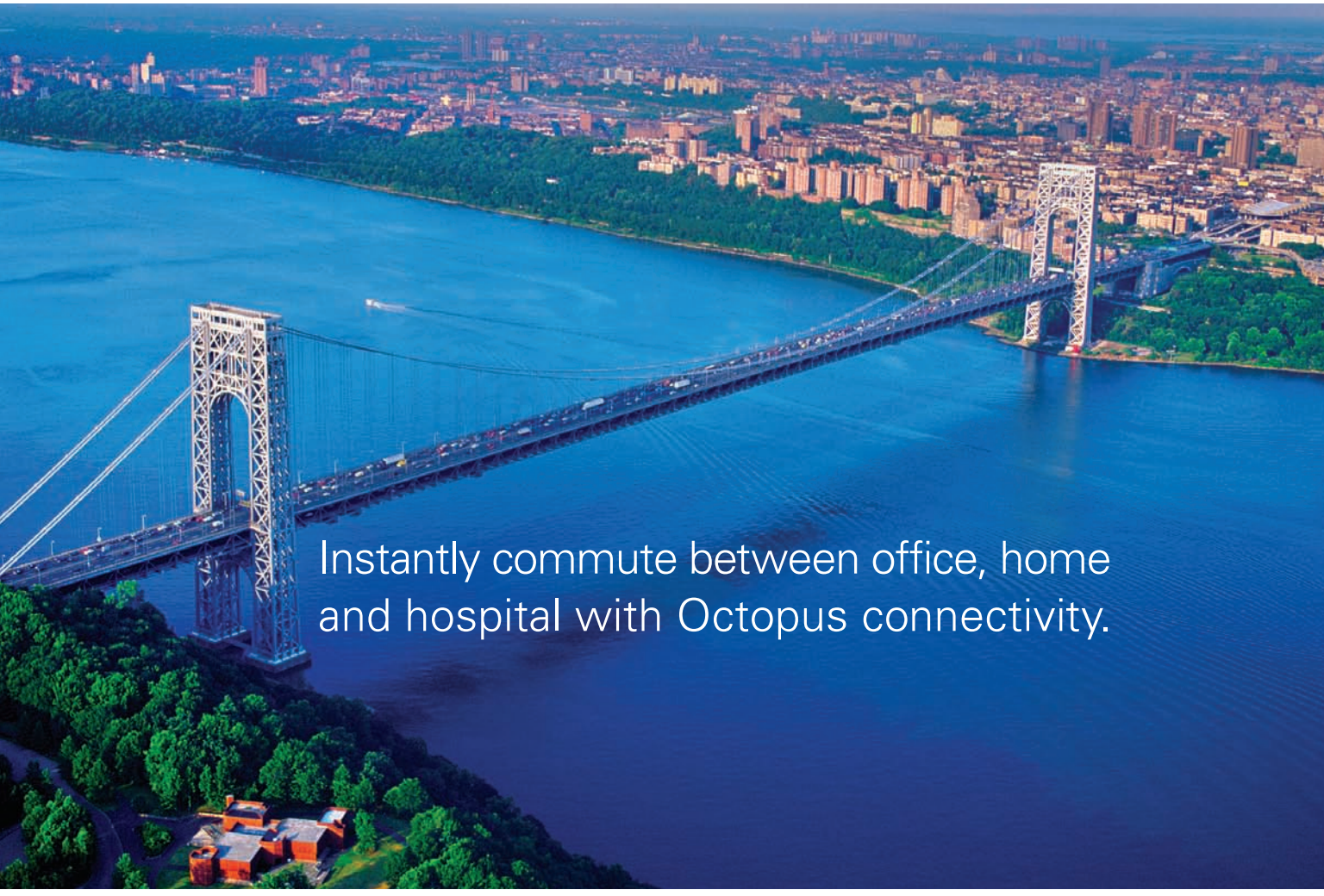

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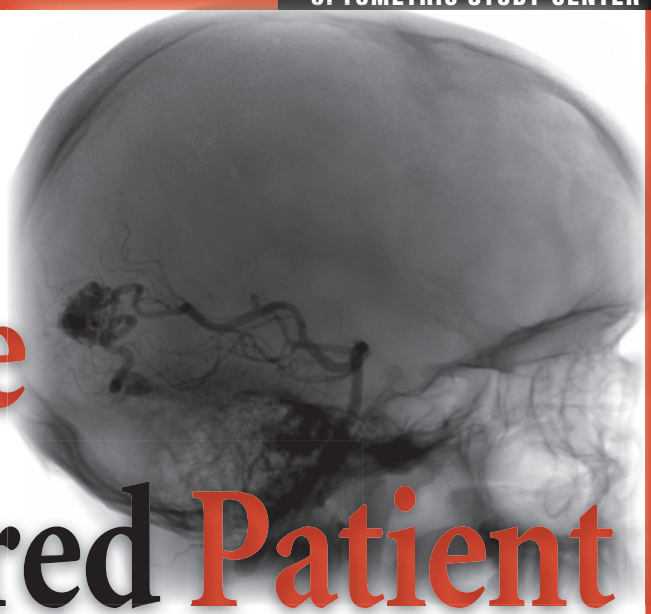

Vision Care for the Brain-Injured Patient

As brain injury vision rehabilitation becomes more commonplace, the need for trained optometrists rises. **By Kevin Houston, OD**

Over the past decade, several factors have resulted in an increasing demand for optometrists trained in brain injury vision rehabilitation (BIVR). To start, there have been a significant number of brain-injured soldiers returning from Iraq and Afghanistan. Other factors include continually improving trauma survival rates due to medical advances, increased awareness of sports-related concussions and the increased incidence of cerebrovascular accidents (CVA) in the aging Baby Boomer population.[1]

Vision problems are common after brain injury, and recently published research supports the effectiveness of rehabilitative devices and therapy.[2-9] As a result, it has become more important for rehabilitation facilities to seek and privilege optometrists trained in BIVR. In addition, ODs in general practice are increasingly likely to encounter patients with an acquired brain injury (ABI), such as a concussion, and asked to provide expert opinion concerning its impact on visual function.

As caring providers, we want to have the knowledge to offer our patients the newest and most effective treatments available for their visual dysfunction. I will discuss inpatient vs. outpatient delivery of care, diagnoses, assessment and treatment for the ABI patient. Currently there is no consensus on the best model for BIVR care, and there is no evidence to support one method over another.

The model described below is one that I developed for my inpatient clinics and was influenced by my early career in private-practice vision therapy, experience in an inner-city academic low vision rehab clinic, hospital-based experience with the medical model of rehabilitation and interaction with other optometrists working with the inpatient population.

Inpatient vs. Outpatient Care

The Veterans Affairs Low Vision Intervention Trial (LOVIT) provides level 1 evidence demonstrating the efficacy of inpatient low vision rehabilitation.[10] Conversely, outpatient studies have shown much smaller treatment effects. My experience suggests this is also true for brain injury vision rehab, whose population and interventions are very similar to low vision. Inpatients have one purpose each day—engaging in their rehabilitation therapies.

The issue of non-compliance and no-shows is eliminated and continual reassurance is provided from members of the rehabilitation team for the BIVR interventions and

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Goal Statement: As brain injury vision rehabilitation becomes more commonplace, the need for optometrists trained in this area is increasing. This article discusses inpatient vs. outpatient delivery of care, diagnoses, assessment and treatment for patients who have acquired brain injuries.
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devices. Treatments initiated inpatient need to be continued and visual demands reassessed outpatient as the patient re-enters the community. I recommend ODs consider seeking privileges at a local rehab hospital as a way to enhance the care they already provide.

What About Vision Care?

The inpatient medical rehab team routinely calls upon OTs to assess and address visual dysfunction. Because OTs recognize they have limited training in eye care, they are typically strong proponents of having ODs credentialed at rehab hospitals.

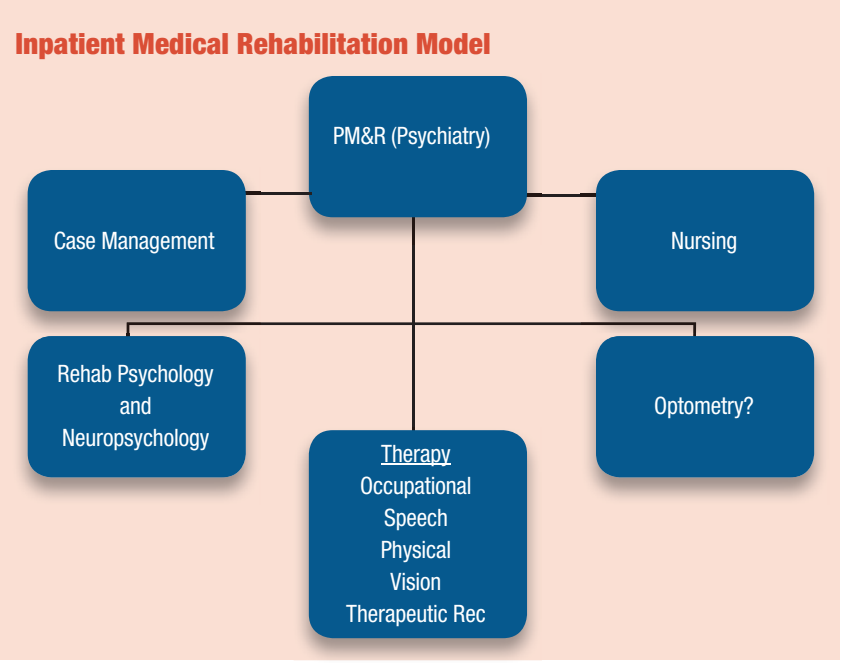
Currently, ODs are usually labeled as consulting staff (not hired). There are many benefits to hospital consulting:

1. The OD can bill for services provided with little to no overhead.
2. No-show rates are virtually non-existent.
3. TBI/ABI is a rewarding and interesting patient population.
4. It can be a great referral source for outpatient practices.
5. It improves relationships between the OD and other health care professionals in the medical community.

I personally bring my own diagnostic equipment with me, but I don't supply any therapy equipment or lenses that are not purchased by the hospital. There is tremendous variation between states and insurances concerning reimbursement for press-on prisms. Explaining to brain-injured patients that they may or may not get a bill in the mail for the lenses is uncomfortable and counterproductive to building an environment of trust. Instead, my strategy has been to first get privileges and deliver good, basic care, and then gently start making small equipment requests.

ABI vs. TBI

ABI, or acquired brain injury, refers to any injury to the brain postpartum, including—but not limited to—stroke, traumatic brain injury, aneurysm or tumor. TBI, or traumatic brain injury, is a class of ABI caused by trauma.



The inpatient medical rehabilitation model as directed by the physical medicine specialist. The optometrist is not currently a standard vision rehab team member, but rather serves in a consultant role.

Fresnel prisms are always the first thing I ask for, followed by plano yoked 12PD (which can be used for neglect or one lens removed for strabismus), reading glasses (for patients who have lost theirs) and plano glasses for mounting press-on Peli prisms, occluders and prisms for strabismus.

Other equipment I use includes 4PD, 8PD and 40PD press-on Fresnels; 17.5 base left prism adaptation spectacles; visuomotor task board; rotatable prism training goggles; +1.00D and +2.00D readers; fixation sticks; plastic elastic eye patches (can be swabbed with EtOH); brock string; hart charts; prism bars or flippers; and +/-1.50D flippers.

The first sign that the hospital has committed to a comprehensive program of vision rehab is the willingness to purchase equipment and dedicate a therapist to vision care. I have had success getting hospitals to purchase Fresnel prisms, prism training goggles and other vision therapy supplies through the OT therapy budget, further reducing overhead. Patients often have not had dilated eye exams since their ABI, so comprehensive services are indicated.

ODs have the opportunity to be a major contributor to patient welfare even without additional training. Our general training provides us with the basic skills needed to accurately assess vision, deal with refractive error, manage infections and triage more severe vision-threatening conditions. Even if we provide no vision therapy or prisms, our presence is a tremendous asset to the patient and physical medicine staff.

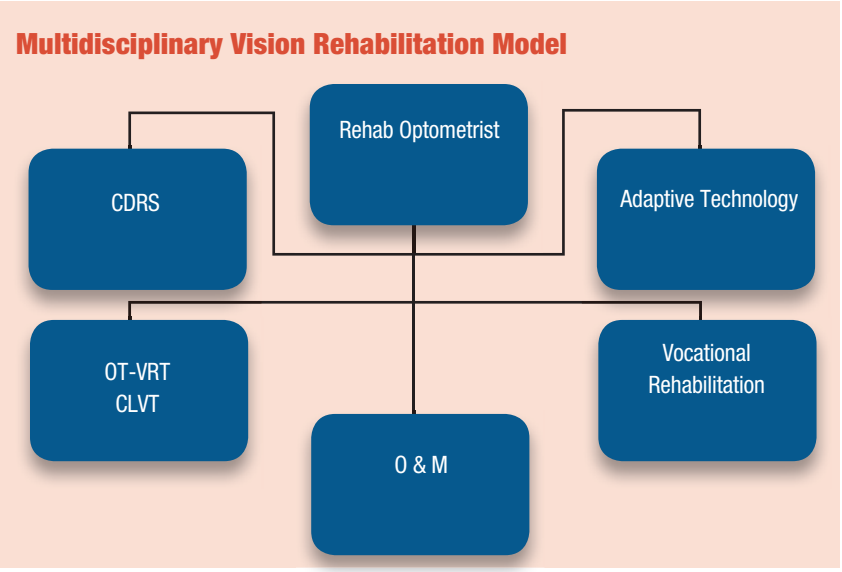


Illustration of the multidisciplinary vision rehabilitation model that parallels the medical model with the OD as the physician directing care. Case management is not illustrated here but is available in some vision rehab clinics. The VA Health Care System model is similar to this representation and is provided as an inpatient service at 10 blind rehab centers across the US.

Vision Rehabilitation Plans

All of my vision rehabilitation plans include four categories of treatment:[11,12]

1. *Neuromuscular re-education.* This includes all of our vision therapies that aim to restore normal oculomotor and visual function.

2. *Compensatory training during activities of daily living.* This training includes teaching advantageous postural and gaze adaptations (eccentric viewing, anchoring, scanning strategies, line guides, most prisms, etc.).

3. *Awareness of deficits, education and safety.* Awareness of deficits is a major barrier to rehabilitation in the ABI population. You usually cannot rely on the patient to provide an accurate description of their problem, especially when they are in early stages post injury.

4. *Continuum of care.* This is a major topic in rehab hospital settings—assuring that rehabilitation does not cease when the patient is discharged. This will include the plan of care for vision, such as when they return to the care of their primary eye care practitioner, who should review the continuum of care suggestions from the inpatient BIVR optometrist. (*See "Mock Binocular Vision Treatment Plan," page 76.*) [4,13-15]

Diagnosis and Treatment

Now, let's take a look at some of the most common ocular conditions you will see in ABI/TBI patients and talk about what to look for and how to treat it. (*See "Acquired Brain Injury Diagnoses," page 79.*)

Nerve palsies

Cranial nerve palsies are the most commonly encountered condition in the ABI population.[16] Of those, cranial nerve IV (CN IV) has the highest prevalence—due to its long course and close anatomical relationship to the medullary velum.

It also creates the most functional impairment of all the cranial nerves and, in my experience, is the least responsive to prism due to the torsional component. CN IVs can present as a palsy with frank strabismus, or more commonly, as a paresis. Clinically, this can be as subtle as a worsening of blur on tilt toward the affected eye during reading or walking, so the patient's description is essential.

Assume in TBI and posterior circulation disease that any visual blur is CN IV-related until proven otherwise. Your differential diagnosis is skew deviation, which rarely occurs in TBI. Skew deviation will improve if you lie the patient down, but I rarely use this method to make the diagnosis. Instead, I look for symptoms of torsion and worsening on head tilt.

An astute patient will report a crossed double image of a pen held horizontally upon head tilt toward the affected eye. From a rehabilitative perspective, the differential is important because skew deviations are comitant (same in all directions) and don't typically have a torsional component.

Importantly, torsion cannot be treated with prism. The only option is to fit prism for the vertical component and tip the head to alleviate the torsion.

Conversely, CN IV nerves are incomitant—they worsen when looking down and on head tilt toward the affected eye. Importantly, torsion cannot be treated with prism. The only option is to fit prism for the vertical component and tip the head to alleviate the

torsion. Cranial nerve III controls all ocular motility except for abduction (eye moving out) and CN IV function of intorsion and infraduction. It also controls the levator and accommodation. Often the pupil will be blown or, in cases of partial recovery, sluggish or asymmetric. It is also possible that the pupil was never affected.

Elevation of the affected eyelid on infraduction or adduction is a sign of aberrant regeneration.[17] You will need to rule out incomitancy and asymmetric accommodation, which can cause many of the symptoms associated with post trauma vision syndrome and post concussion syndrome.[17]

Other palsies commonly encountered are 6th nerve (esotropia without abduction), internuclear ophthalmoplegia (failure of adduction with or without exotropia) and vertical gaze palsies.[16]

Rehab of Binocular Vision

The most conservative approach is to patch, blackout or fog a lens/eye. If you patch a patient who is in the first six months of recovery, I suggest alternating the patch daily so the paretic eye gets some work. I occasionally will use partial occlusion in the diplopic motor field, particularly in the bifocal/downgaze region.

Binasal occlusion (BNO) is a common treatment of debated efficacy for many different visual conditions, consisting of placing occluders (usually semitransparent tape) on the nasal portion of both lenses. A recent study showed increased visual evoked potential (VEP) amplitude in mild TBI patients wearing opaque BNO, whereas BNO reduced amplitude in a visually normal control.[18] They proposed that in order to deal with the visual motion sensitivity resulting from their mild TBI, patients suppress the near retinal periphery—in turn, eliminating input from the nasal fields negates the suppressive influence and thus "produces a widespread disinhibition effect and resultant increase in VEP."[18]

I have no experience with VEP, but I am skeptical of BNO because I have tried it with several patients and had lukewarm subjective responses every time. I don't have as much experience with mild TBI as many of my clinical colleagues, and many adamantly report it is helpful for their patients. I think more research is still needed to help determine if this is a valid treatment or some type of placebo effect.

You can also use a prism (usually press-on) on the non-dominant eye. For long-standing palsy, I believe surgery may be the best option. Any time prism is fit, an essential component is educating the patient that "Some double vision will remain, but that the prism brings the images closer together to promote eye teaming." When prescribing cut

Medical Rehabilitation Model

Rehabilitation hospitals are facilities where patients go after a serious injury or disease when they cannot function at home or need close medical supervision. The team is multidisciplinary, directed by an MD or DO who has specialty board certification and training in physical medicine and rehabilitation (PM&R). One or more neuropsychologists are typically part of the team involved in the patient's care. The therapy services include:

- Occupational therapists (OT).
- Physical therapists (PT).
- Speech language pathologists (SLP).
- Therapeutic recreation therapists.

Case managers deal with various logistical issues, including insurance, disability and discharge destination. Social workers and chaplains are typically on staff to provide the emotional support and care that is critical to the human recovery process. It's likely that this strong multidisciplinary care team is a large part of the reason that inpatient rehabilitation is more efficacious. Typically, patients who are not independent within three to four weeks are moved to a skilled nursing facility for continued care, but this varies somewhat depending on the facility.

Mock Binocular Vision Treatment Plan

This vision rehab treatment plan was developed in collaboration with the OT who will carry out the agreed upon activities. Treatment will be comprised of: 1) Neuromuscular re-education 2) Compensatory strategies 3) Education and safety 4) Continuum of care.

Goals

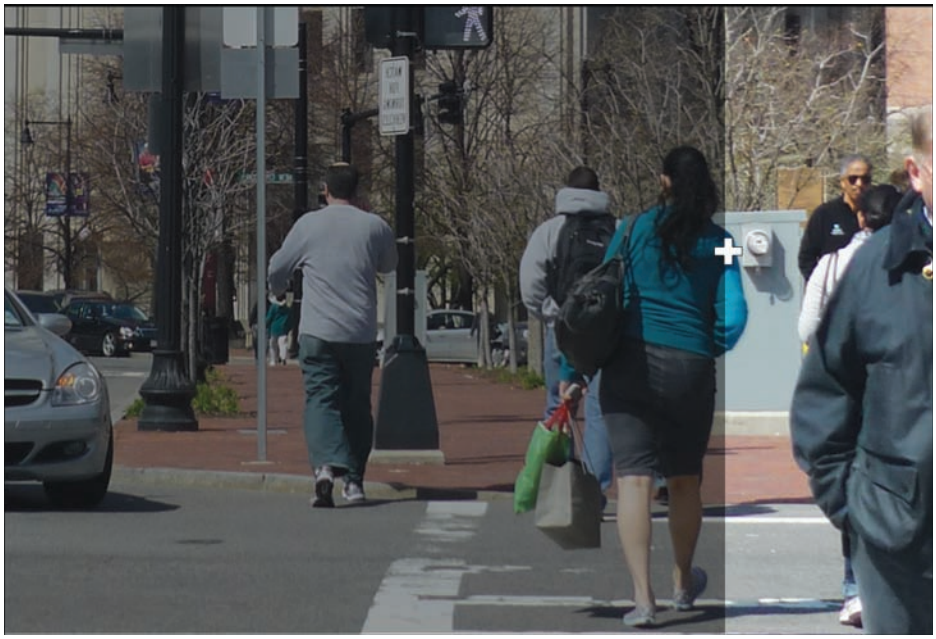
- Restoration of binocular vision in primary gaze prior to discharge.
- Compensatory head posturing to the left during ADLs (to move the eye away from the paretic field).
- Education of therapy team, caregivers and patient for increased fall risk during weight bearing and other mobility activities when gazing to the paretic field. OT will evaluate and make recommendations on whether the patient needs a patch for safe mobility prior to discharge.
- The patient should follow up with their primary care optometrist approximately one month following discharge for the continued vision rehab, including reassessment of the prism.

Example of an inpatient vision rehab treatment plan for a patient with right internuclear ophthalmoplegia.

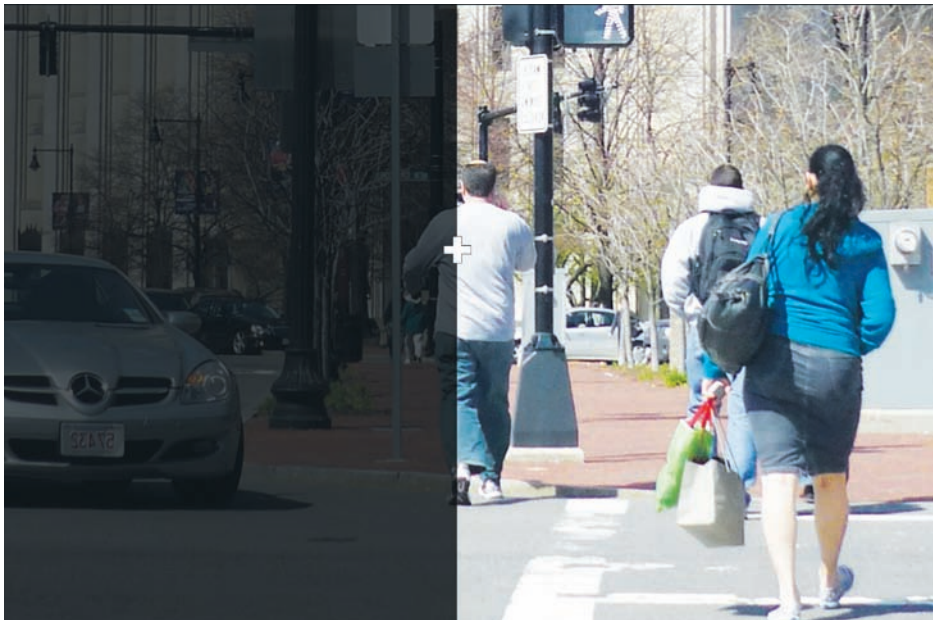
prism in a permanent form, it is best to split the prism power between the eyes and use a higher base curve in order to balance and reduce distortion. Adjusting the frame to increase the face-form wrap can be helpful as well.

My method for inpatient binocular vision rehab is to use under-correcting prism (by ~4D horizontally and 1D to 2D vertically) combined with basic vision therapy activities. Patching is used only as needed for safety and relief from symptoms over top of the prism.

Ten or so cycles of alternate cover (just like cover test, except longer) is useful to promote fusion, and the patient can easily practice these during downtime at the hospital or at home if outpatient. (*See treatment protocols at* www.revoptom.com.) If nothing else, the patient and staff appreciate a proactive treatment and it results in better compliance with prism wear.



1. When gazing away from the field loss to the right, the blind area is drawn directly in front of the patient.



2. Simulation of the view of a patient with left hemianopia crossing the street. The plus represents the point of fixation.

Hemianopia

When evaluating for field loss, I always start with confrontations—performing both kinetic and field counting assessments monocularly and binocularly. Low levels of sensitivity show up "black" on computerized threshold perimetry but can often be useful to the patient. I also use an assessment I call functional scan, in which the patient fixates my finger in their intact hemifield (binocularly) and then searches to find a pen I am holding in the hemianopic field. This gives me an idea about the functionality of the residual field or how well the patient is compensating for their vision loss.

The number of steps (discrete eye movements) to locate the pen is recorded. For example, a well-adapted patient will locate the target within two to three eye movements, whereas a patient who is using residual field will saccade directly to the pen without searching. The ideal test, not yet available to clinicians, would measure detection of life-sized stimuli within

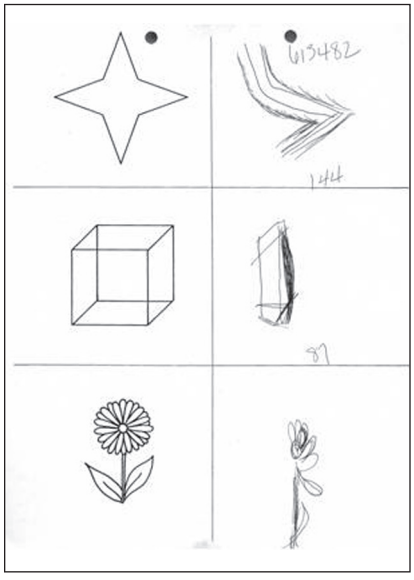
natural scenes. For example, in 2009, Alexandra Bowers, PhD, MCOptom, and colleagues measured functional performance of hemianopes on a pedestrian detection task in a driving simulator.[19] Most OT-based rehabilitation of hemianopia is comprised of cued scanning during ADL training and saccadic worksheets (Bernell Corp.), although some use focused visual scanning training (VST) with a light board called the Dynavision (Bioness Inc.).[20]

Patient education on the dynamic nature of hemianopia (that it moves with the eye) is underemphasized in my opinion—illustrated by useless head-turning behaviors and frustration. Awareness training in my protocol involves daily practice in finding the border of the vision loss with the patient's hand, while keeping the eye stationary in primary, right and left gaze.

Improved awareness should result in self-employment of compensatory strategies and less frustration. I emphasize to the caregiver and patient that the field loss moves in front of patients when they are gazing away from the field loss, putting them at a high risk for fall (*figures 1 and 2*). Advising patients to position themselves with their companions on their blind side is essential since they are likely to gaze in the direction of the conversation.

Hemianopic Prisms

Patients with hemianopia cannot scan efficiently in complex situations, such as driving and walking in busy environments. The only prism device that has been shown to improve patient-reported detection and mobility in a multicenter, placebo-controlled trial is the Peli Peripheral Prism (p-prism).[21] Peripheral prism segments (40D or 57D, oblique or horizontal) fit above and below the line of sight expand the blind field 20° to 30° in all horizontal positions of gaze.[19] I recommend the 57D oblique for its ability to better expand the crucial perimacular areas. (Chadwick Optical provides fitting materials and protocol, and is available for phone consultation.) Its efficacy for driving is currently under investigation.[22]



3. Patient with left hemispatial neglect showing classic left side incompletion on the figure copying subtest of the Behavioural Inattention Test.

Alternative prism designs include the Gottlieb Visual Field Awareness System (Gottlieb Vision Group) and the sector prism (Chadwick Optical). While the designs vary, sector prisms are typically 12Δ (6°) and Gottlieb VFAS are 18.5Δ (10°). They are embedded into the blind side of the lens and may help patients by amplifying the effect of scanning to the blind field, but do not expand the field in primary gaze or when looking opposite the field loss. Studies have not yet determined how often patients gaze into the prism, if at all.

In driving simulator studies, researchers found most hemianopes detect small-eccentricity (4°) pedestrians fairly well but not large-eccentricity (14°) pedestrians.[19] Both prism designs (p-prism and VFAS) may be effective in this case, since the hemianopes are at least scanning a little bit (4°). Studies are still needed (and are planned) to compare the prism designs in the driving simulator with eye/gaze tracking.

Hemispatial Neglect

The classic symptoms of severe left hemispatial neglect (LHSN) are failing to shave the left side of the face or eat food from the left side of the plate. LHSN is a different condition from hemianopia, occurring quite regularly without any visual field loss at all. When it occurs comorbidly with hemianopia, the impairment is much more severe than it would be for hemianopia alone because patients forget to look in the direction of the field loss.[23] If you spend some time on the stroke unit, you will quickly realize the extremely high incidence of this condition in patients with right-brain stroke—five out of the last seven patients I saw in a recent week had moderate to severe cases with gaze deviation.

Reported frequency ranges from 13% to 81%.[24,25] Patients with chronic severe LHSN are not routinely seen in general practices (most reside in nursing homes). Instead, the primary care eye care practitioner will see patients with history of neglect whom often deny problems yet exhibit attentional biases. This "left inattention" may make them unsafe drivers. Even if paper and pencil tests such as the line bisection or figure copy (*figure 3*) are negative, I insist that all my patients with any history of LHSN (or homonymous hemianopsia) see a driver rehab specialist before I will complete any motor vehicles forms.

Acquired Brain Injury Diagnoses			
Vision Problem	**Occurrence**	**Recovery**	**Treatment**
Nerve Palsies	Stroke 70%	57% in 3 months	Under-correcting prism and alternative cover fusion activity
Homonymous Field Defects	TBI 39%, Stroke 67%	50% in 3 months	Awareness, eccentric viewing, VST^, p-prisms
Hemispatial Neglect and Abnormal Egocentric Localization	Right Stroke 43%	31% have persistent neglect	Prism adaptation therapy, Dynavision, VST^ and cueing
Saccadic Eye Movement Dysfunction	23%	Unknown	Repetitive saccades
Accomodative Dysfunction (Paresis and Pseudomyopia)	TBI 30%	Unknown	Pencil push-ups, lens rock, bifocals, minus lenses (pseudomyopia)
Cortical Visual Impairment and Bilateral Hemianopia	5%‡	Unknown	Contrast, magnification, direct lighting, adaptive technology
Convergence Palsy and Insufficiency	9%‡	Unknown	Pencil push-ups, prism bar vergence training
Alexia (Central Reading Impairment)	<5%‡	Unknown	Speech language pathology, adaptive technology
Agnosias	<5%‡	Unknown	Compensatory strategies with OT and speech

‡ Based on unpublished incidence data from Dr. Houston's inpatient clinic
^ Visual Scanning Therapy

Patients with hemispatial neglect often have abnormal egocentric localization such that the internal representation of body midline is deviated or dissociated. Sometimes, the calibration between eye and hand is disturbed.[26,27] Egocentric localization is believed to be generated from proprioceptive information from the body and extraocular muscles, and integrated with vision in the parietal lobes.[28, 29]

Prism Adaptation Therapy for LHSN

Prism adaptation therapy (PAT) is a well-studied treatment that aims to improve neglect by "recalibrating" egocentric localization. In 1998, the first article published on PAT found that 10 minutes of practice with 10° rightward deviating prism (yoked base left) reduced symptoms of neglect immediately, and that the effects amplified over the next couple hours (the glasses are off at this point).[30] Since then, there have been 502 papers and 41 original studies to demonstrate that repeated exposure could substantially and permanently reduce various neglect behaviors.[31]

That being said, PAT has not been as easy and inexpensive as initially hoped. It has to be repeated at least 10 times to get maximum efficacy and is less effective in early post acute neglect patients.[32] While it improves chronic LHSN, it is not a cure. It is, however, the best evidence-based treatment available for this debilitating condition and optometrists are qualified to provide treatment, should they choose to do so. If the OD does not provide PAT, it is important to refer the patient to someone who does.

Reduced ability of the damaged brain to calculate the coordinates of external objects relative to the position of the body certainly exists, and is called *visual midline shift* by some and *abnormal egocentric localization* (AEL) by others.[33]

AEL in left-brain damage (with or without right hemianopia) is probably very rare, since it is the right brain that is specialized for spatial coordinate processing. AEL with right-brain damage is probably very common, but the exact impact on mobility and other visuomotor function is not well-studied.

Whether this can or should be treated with continuous-wear prism is another question—I am conducting two studies looking at aspects of this behavior and hope to provide some definite answers over the next several years.

Saccadic Eye Movement Deficiencies

Patients with frontal lobe injury often have reduced inhibition of saccadic eye movements and behaviors similar to HSN. Most patients with TBI have frontal lobe contusions due to the coup/contrecoup forces and frequently exhibit problems with visual distractibility. The frontal lobes send signals to the infranuclear areas, where burst neurons for gaze are located. Frontal lobe input can either be excitatory in the case of volitional saccades (I tell my eyes to move) or inhibitory to prevent reflexive eye movement when it would be inappropriate.[34]

When you have damage to the right frontal lobe, visual distractibility to the right can frequently be observed during confrontations testing. The patient might describe being unable to keep their eye still during the test, and even become frustrated at their inability to stop looking over. History will typically reveal that they have had difficulty concentrating since the ABI. Patients with large, right hemispheric infarcts involving frontal, parietal and temporal areas may have neglect and failure of saccade inhibition, which may be part of the reason why they exhibit severe conjugate eye and head deviation

4. Patient performing visual open loop (VOL) pointing on the visuomotor task board. He must look at the target on the surface and place his index finger directly under it. The examiner uses a protractor on the underside to quantify misalignments. Patients with HSN often show large deviations in VOL, whereas patients with HH do not.

to the right. Disorders of volitional (voluntary) saccades are also common in ABI. These usually occur with generalized motor apraxia, commonly after left hemisphere damage.

Treatments for disorders of saccadic suppression (visual distractibility) are typically environmental modifications to reduce distractions. Some small studies have been published using side-field occluders for neglect—the effect is probably to reduce unwanted reflexive saccades away from the neglected side (problems suppressing reflex eye movements to the right often occur with left-neglect). I have used this in severe cases with some success, but do not usually resort to this rather undignified intervention unless the symptoms are severe and environmental modifications have failed.

The functional implications of disturbed volitional saccades are not clear, nor is the potential benefit of treatment. I usually diagnose the condition and describe its relationship to lesion location and the patient's symptoms of general motor apraxia. In some cases when the OT is interested in trying an intervention, I will suggest repetitive (~60 reps) large-amplitude (~20°) saccades to targets held by the patient or therapist. The high repetition provides them with something they would not get with everyday eye movement.

Optic Ataxia

Optic ataxia (OA) is visually guided reaching dysfunction as a result of bilateral parietal lobe injury. Patients with OA attempt to reach but are surprised by their inability to find the target. They grasp at the air in search of the clinician's hand during assessment and may be misdiagnosed as being cortically blind. They are always impaired but will often show better function than you might expect (based on their finger-to-nose test) because stereotyped behaviors and reaches to nonvisual targets are not impaired.[35] Further examination reveals that they can often distinguish very small print (when they can find it).

Here's a perfect example—a patient sat in my chair last year and could not reach and touch my hand when I moved it away from the midline, but promptly sifted through his wallet, found the business card for his neurologist and read it to me.

A good strategy is to have the OT instruct the patient to pause, direct their gaze to the target of interest and then reach (in most cases, if the patient can foveate the target, they can reach to it). Reaching during ADL training may not be enough to maximize recovery and so I use repetitive reaching (60 to 100 repetitions) to try to "recalibrate" the system.[36,37] I use the visuomotor task board, which is essentially two dots on a piece of foam posterboard (*figure 4*), but the Dynavision, or saccadic fixator (Wayne Engineering), is a great tool when available.[38] In situations where there is a major attentional bias or misalignment, PAT should be helpful with

the base opposite the direction of the error.[37]

Cortical Blindness, Cortical Visual Impairment, Bilateral Hemianopia

The common theme of all these conditions is bilateral damage to the posterior cortical areas. These patients may actually be blind from occipital lobe damage, or unable to properly fixate or make sense of what they see.

Optometrists can change a blanket diagnosis of CVI and start to apply some very useful strategies by understanding neglect, optic ataxia and hemianopia. From a theoretical standpoint, we want these patients to try and relearn vision by reinforcing vision with touch. We also want to acknowledge the impact of the visual impairment itself and use typical low vision techniques (contrast enhancement, enlargement of print and direct illumination). Recovery is hard to predict.

Measuring Outcomes

Third-party reimbursement provided to rehabilitation hospitals is heavily dependent upon demonstrating sufficient therapy units (sessions) and measurable improvements. The Functional Independence Measure (FIM) and the Barthel Index (BI) are common therapist-scored rating systems of the level of assistance the patient requires for daily activities.[38,39] If the OD aims to provide rehabilitative interventions, a separate visual function outcome measure is needed because these rating systems are probably not very sensitive to changes in visual function.

I have been asked on multiple occasions to provide outcome measures for my services, but established visual functioning questionnaires, such as the NEI-VFQ 25, VA VFQ-48 or 20, or the convergence insufficiency symptom survey are not validated for ABI.[40-42]

I have recently begun developing a measure specific to this population, as have a few other practitioners, but none are yet published. Not only is outcome measure essential for internal monitoring of efficacy, it may become required as pay-for-performance paradigms continue to increase. ■

Dr. Houston specializes in brain injury vision rehabilitation and holds a full-time research faculty appointment with Harvard University at the Massachusetts Eye and Ear Infirmary and Schepens Eye Research Institute in Boston. Clinical services are provided at Spaulding Rehabilitation Hospital Boston and Cape Cod.

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1. The demand for ODs trained in brain injury visual rehabilitation (BIVR) has increased over the past decade for all of the following reasons except:
a. Continually improving trauma survival rates due to medical advances.
b. Increased awareness of sports-related concussions.
c. As a consequence of increased incidence of cerebrovascular accidents (CVA) due to the aging Baby Boomer population.
d. Medicare's elimination of inpatient consultation codes.

2. Rehabilitation hospitals:
a. Are facilities where patients go after a serious injury or disease when they cannot function at home.
b. Are always privately owned.
c. Typically hire ODs as employees.
d. Are facilities where patients reside long term when they cannot function independently at home.

3. A commonly used therapist-scored rating system of the patient's level of assistance required for daily activities is:
a. VA VFQ-48
b. NEI VFQ-25
c. FIM
d. TIM

4. The professionals called upon by the medical rehab team to assess and address visual dysfunction are:
A. Physical therapists.
B. Speech language pathologists.
C. Occupational therapists.
D. Therapeutic recreation therapists.

5. Which of the following is a benefit to hospital consulting as an OD?
a. There is little to no overhead.
b. No-shows are not an issue.
c. It can be a referral source to our outpatient practices.
d. All of the above are benefits.

6. Vision rehabilitation plans should include:
a. Neuromuscular re-education.
b. Compensatory training during activities of daily living.
c. Awareness of deficits, education, safety and continuum of care.
d. All of the above.

7. General ODs who have a patient who was recently discharged from a rehab hospital should always:
a. Prescribe vision therapy.
b. Prescribe hemianopic prisms.
c. Refer to a neurologist.
d. Request a copy of the discharge summary, which will contain the brain injury visual rehabilitation OD's recommendations for continuum of care.

8. The most commonly encountered visual problem in the acquired brain injury population is:
a. Cranial nerve palsies.
b. Cortical blindness.
c. Left neglect.
d. Optic apraxia.

9. Patients with blurred vision and a history of concussion will need to have this condition carefully ruled out:
a. Retrobulbar optic neuritis.
b. Keratoconus.
c. Post concussion syndrome.
d. Cranial nerve IV (trochlear) paresis.

10. Torsional strabismus from CN IV palsy is best addressed by
a. The occupational therapist.
b. Horizontal prism.
c. Tipping the head away from the hypertropic eye.
d. Tipping the head toward the hypertropic eye.

11. Your patient is complaining of visual motion sensitivity. You detect anisocoria and asymmetric accommodation on dynamic (Bell) near-point retinoscopy in the right eye. You then notice during EOMs that the right eyelid retracts on adduction. What is the most likely explanation?
a. They became surprised by something behind you (and to the right) during the test.
b. Internuclear ophthalmoplegia.
c. You were observing signs of an old third nerve palsy with aberrant regeneration.
d. You missed the refraction; over-minused the right eye.

12. Which is not a proper plan of care for an adult stroke patient with acquired strabismus?
a. Patch the eye and refer for surgery in 24 months.
b. Binocular vision rehab with press-on prisms and fusional exercises.
c. No treatment; the patient can close an eye when they want to eliminate the double vision.
d. All may be a proper plan of care; research has not been done to confirm any approach is better than another.

13. The functional impact of hemianopia is best assessed using:
a. Computerized visual fields.
b. Confrontations and observing scanning ability (functional scan).
c. Clearing them for driving and seeing how many accidents they have.
d. Scanning laser ophthalmoscopy.

14. A patient with right hemianopia might:
a. Run into something directly in front of them because of the hemianopia (depending on their point of fixation).
b. Run into something on their left because of the hemianopia (depending on their point of fixation).
c. Have a prism fit on their right lens.
d. All of the above.

15. What is most common after right brain stroke?
a. Hemianopia
b. Hemispatial neglect
c. Internuclear ophthalmoplegia
d. Pseudomyopia

16. Your patient reports a "mini stroke" a few months ago in the history and was told not to drive. They deny problems and want you to clear them for driving.

Their field is full on confrontations and they seem pretty "with it," but you notice a little spasticity in the right arm.

Which of the following is not a prudent course of action?
a. Ask about the time early after the stroke: Did they have to be reminded to look left?
b. Run a threshold field to rule out a relative field depression.
c. Administer the Behavioral Inattention Test line bisection and figure drawing tests.
d. Refer for an on-road evaluation with a certified driving rehab specialist before signing the motor vehicles form.

17. Prism adaptation therapy is a treatment for:
a. Hemianopia.
b. Hemispatial neglect.
c. Visual field loss.
d. All of the above.

OSC QUIZ

18. Patients with a history of head trauma who cannot keep their eyes still during confrontations testing:
a. May be having difficulty suppressing reflex saccades due to frontal lobe injury.
b. Have full visual fields.
c. Should be retested when they are feeling more cooperative.
d. None of the above.

19. Optic ataxia
a. Always occurs with hemianopia.
b. Never occurs with hemianopia.
c. Is characterized by an inability to reach to visually presented targets unless they are foveated.
d. It the same condition as oculomotor apraxia.

20. A patient presents with history of cardiac arrest with hypoxic brain injury (bilateral injury), cannot read the eye chart at 20 feet, and reports seeing your hand but cannot reach and touch it.
Which of the following is not an appropriate next step in the assessment of their vision?
a. See if they can write a word or number given verbally or visually presented.
b. Make sure they are fixating the eye chart and try moving it closer or into their line of sight.
c. Test their visual field and look for signs of hemispatial neglect.
d. All of the above are appropriate to differentiate impairments related to cortical VI from hypoxic brain injury.

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5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
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14.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
15.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
16.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
17.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
18.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
19.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
20.	Ⓐ	Ⓑ	Ⓒ	Ⓓ

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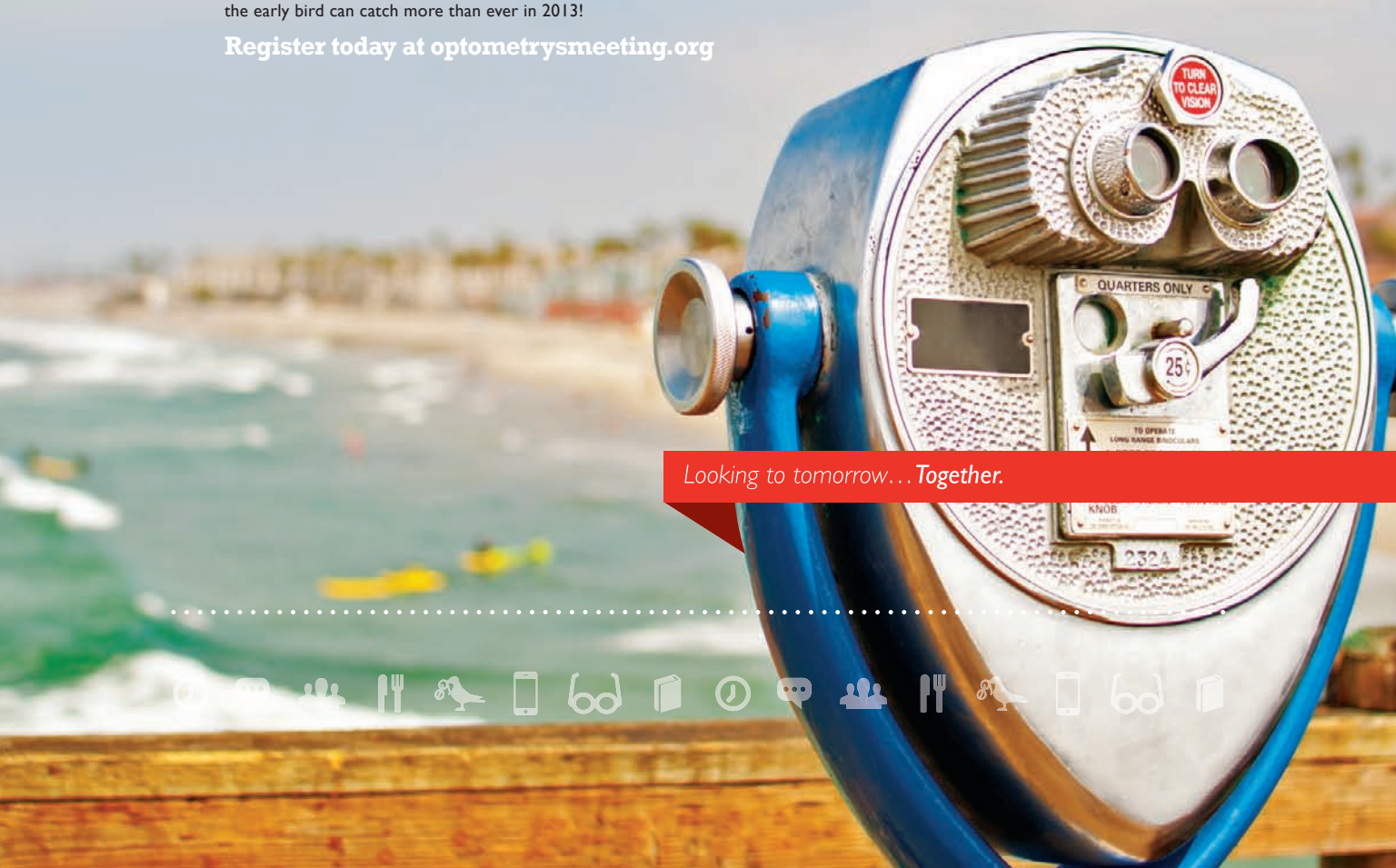


Looking to tomorrow… ***Together.***

A Hole in One

One injection of a new drug could resolve vitreomacular adhesions, traction and macular holes—and spare the patient from surgery. **Edited by Paul C. Ajamian, OD**

Q I have an elderly patient with vitreomacular adhesions (VMA). I normally send these patients out for surgery, but she's reluctant to have an eye operation at her age. Are there any other options?

A Until recently, the only two options had been observation and vitrectomy—or, more likely, observation *until* vitrectomy, says Ajey S. Alurkar, MD, vitreoretinal specialist at Omni Eye Services, in Atlanta.

Bear in mind that the problem resolves on its own in about 10% percent of these patients, he says. "So, if you had a patient with vitreomacular traction (VMT), vitreomacular adhesions or early-stage macular holes, you'd watch and wait, but eventually book the patient for surgery," Dr. Alurkar says.

Vitrectomy is not exactly a cakewalk for the patient, he says. "Once you do vitrectomy surgery, you're automatically committing the patient to a second surgery, because that lens is going to mature into a cataract within six months to five years." Not to mention, the patient will be facing the risks of retina surgery as well as spending at least a few days post-op facing the floor.

The good news is there's now a new option for symptomatic patients: Jetrea (ocriplasmin, ThromboGenics) is a one-time intravitreal injection that basically dissolves the vitreous attachments to the retina. It was approved by the FDA in October 2012 and became available in January 2013.

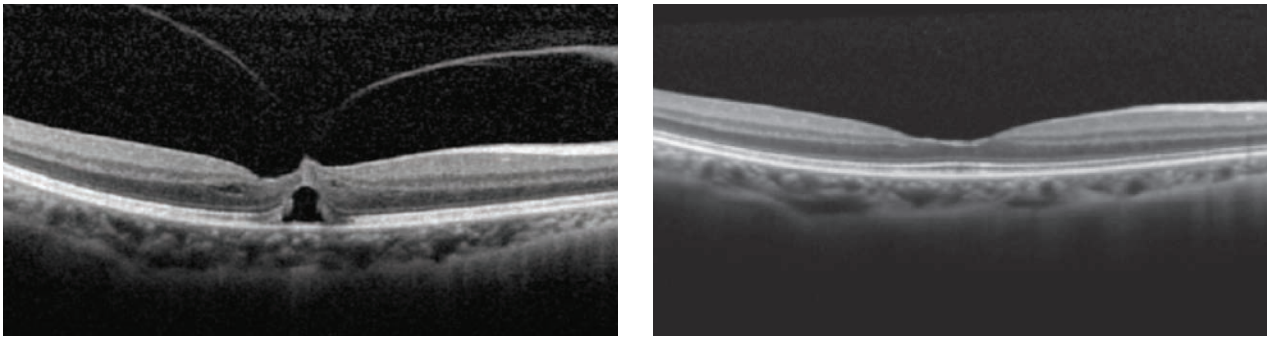
"Now, when a patient comes in with an early stage macular hole, I say, 'I'm going to schedule you for surgery, but I'm going to inject this into your eye first. There's a 40% chance it will fix the hole within 28 days. And if it doesn't fix it, then we're going to take you into surgery as planned,'" Dr. Alurkar says. He adds that the success rate for VMA or VMT is around 30%.

A second injection of Jetrea is not recommended. "If it doesn't work the first time, it's likely not going to work at all," he says. Also, be aware that a single shot costs the patient $4,000. "But, if it works, it saves a lot of time and trouble for both the surgeon and the patient, and it also saves the patient's lens."

Optical coherence tomography is essential for diagnosing VMA, VMT or macular holes, Dr. Alurkar says. So, if you don't have one of these instruments, and you have a patient with flashes, floaters or visual distortion that you just can't diagnose, be sure to send the patient for an OCT scan or to a retinal specialist, he says.

If you do have an OCT, and the patient lives far from the surgeon, you could offer to do the scan at day 28 to see if the injection worked.

Patients with multiple vitreomacular attachments, as seen on OCT, are probably not good candidates for Jetrea, Dr. Alurkar advises. Likewise, patients should not be given this treatment if they have high myopia (greater than 8.00D), a history of prior retinal detachment, a macular hole greater than 400µm in diameter, or have other ischemic retinal diseases that affect their vision. ■



OCT of the macula shows vitreomacular traction (left). Less than a month after Jetrea injection, the problem has resolved (right).

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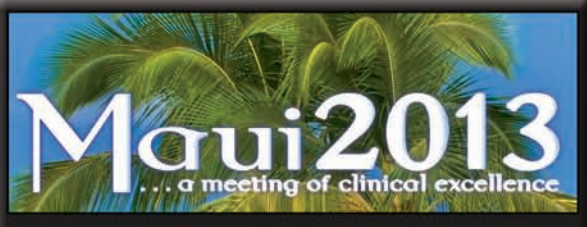

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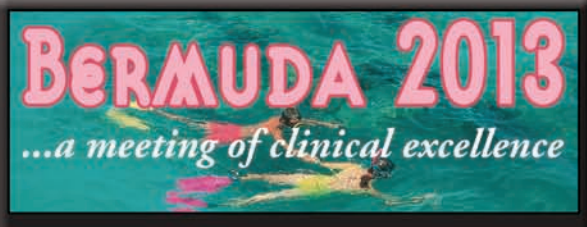

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How to Burst Your Bubble

When inserting scleral lenses, use plenty of fluid and ensure proper fit to minimize air bubbles under the lens.

Edited by Joseph P. Shovlin, OD

Q I just started fitting scleral lenses recently and am having a difficult time minimizing bubbles under the lens. How can I be sure that they are resulting from the insertion technique—and how do I avoid them?

A Air bubbles are a common challenge in scleral lens fitting. While small bubbles (2mm or less) may not interfere with the patient's sight or eye health, large bubbles can disrupt the lens fit and negatively affect vision, in some cases leading to corneal desiccation. Air bubbles typically arise from improper application of the scleral lens or poor lens fit.

"If a bubble arises from improper application, it will be there immediately upon insertion," says Jason Jedlicka, OD, who practices at the Cornea and Contact Lens Institute of Minnesota in Edina, Minn. "So, if you apply a lens and see the bubble the moment you look at the lens, it is usually from poor application."

Scleral lenses function by holding a fluid reservoir, so when bubbles appear underneath the lens that means it's losing fluid or didn't get enough fluid during the application process.

The bottom line: Don't skimp on the saline.

"Fill the lens completely to the rim with saline before application, and make sure the patient opens the eye sufficiently because solution will be lost if the lens bumps the lids during application," says Greg DeNaeyer, OD, clinical director of Arena Eye Surgeons in Columbus, Ohio. "If the patient is having persistent difficulties, try having them fill the lens with Refresh Celluvisc (carboxymethylcellulose, Allergan) in place of saline. The carboxymethylcellulose is less likely to spill out because of its increased viscosity."

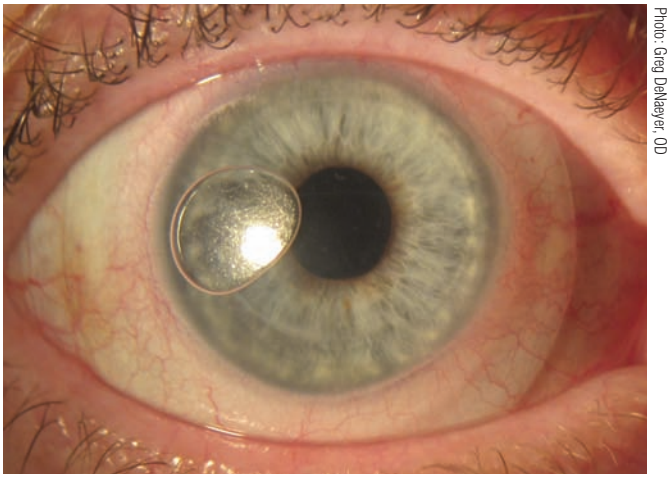

Photo: Greg DeNaeyer, OD

A large air bubble under the scleral lens can disrupt lens fit and also negatively affect the patient's vision and eye health.

If you're using plenty of fluid, your insertion technique could be the issue. "Practice will improve technique eventually," Dr. Jedlicka says. "If the problem is the fitter during diagnostic fitting, make sure you use impeccable technique and have the patient help by holding the lower lid or standing up during application, as needed."

If the bubble arises a few moments after application, you need to find a better fit. Usually, this means that the edge of the lens is loose in at least one area. "If your scleral lens has spherical peripheral curves, look for signs of scleral toricity. Perhaps a lens with a toric periphery would be in order," Dr. Jedlicka says. "This would be apparent by checking all four quadrants of the lens fit and looking for tighter and looser sectors."

In some instances, the sclera can be irregularly asymmetric, and even a toric periphery will not fix the issue. "In those cases, a quadrant-specific periphery, steepening the entire periphery or moving to a hybrid lens design may be needed to resolve bubble trouble," he says.

Bubbles can also result from scleral lenses that have a fenestration—a small 1mm hole that is drilled into the paracentral region. Ordering the lens without a fenestration prevents this unwanted complication. ■

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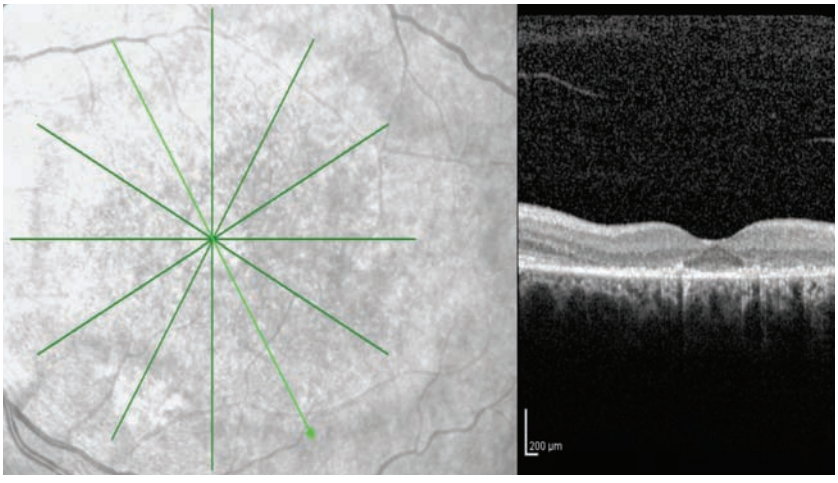
A 'Wolf' in Sheep's Clothing

Systemic lupus erythematosus (Part 2): A thorough diagnostic work-up is crucial in distinguishing SLE from other masquerading conditions to ensure proper treatment.

By Joseph Pizzimenti, OD, and Carlo Pelino, OD

In the first segment of this two-part column (*"Beware the Bite of 'the Wolf,'" January 2013*), we reviewed the basics of systemic lupus erythematosus (SLE) and the wide-ranging effects it has on various systems in the body. We discussed potential signs and symptoms, and specific ocular complications that include keratoconjunctivitis sicca, episcleritis/scleritis, uveitis, retinal vasculopathy and optic neuropathy.[1,2]

Because SLE varies in its clinical presentation, it may masquerade as other conditions—particularly rheumatoid arthritis and other autoimmune connective tissue diseases. In this second column, we discuss the diagnostic work-up, treatment and management of SLE.



Our SLE patient's SD-OCT revealed parafoveal thinning and contamination of the inner/outer segment junction line in both eyes.

When to Suspect Lupus

The American College of Rheumatology (ACR) has established 11 diagnostic criteria to help clinicians identify SLE. Four of these are needed to establish a formal diagnosis of SLE.[1,3,4] (*See "List of ACR Criteria for SLE."*) Given the complexity and heterogeneity of the disease, it is prudent for clinicians to consult rheumatologists and other subspecialists to investigate for each criterion when SLE is suspected.

Diagnostic Work-up for SLE

Diagnosis of SLE is tricky, to say the least. As a multi-system disease, it may take some time before symptoms manifest in various parts of the body—and until it does, the patient and/or clinician may not even be aware that this dangerous disease is lurking right beneath the surface. SLE, in particular, is a disease that doesn't usually develop rapidly but rather evolves slowly over time.

Further complicating the process, there is no single diagnostic test for lupus—patients often have to undergo an extensive battery of laboratory tests, sometimes more than once. These are different for every patient and vary significantly during the course of the disease. Serial evaluation of a patient's laboratory tests, along with the history and physician's observations, determine the diagnosis of SLE, its course and the appropriate treatment regimen.

Several of the ACR criteria are

List of ACR Criteria for SLE[1,3,5]

1. Malar (cheeks and nose) rash.
2. Discoid (red, raised) rash.
3. Photosensitivity (sun-related) rash.
4. Oral ulcers.
5. Arthritis.
6. Serositis (pleuritis or pericarditis).
7. Renal disorder (urinalysis and glomerular filtration rate abnormalities).
8. Neurological disorder (seizure or psychosis).
9. Blood disorder (e.g., hemolytic anemia, leuko/lymphopenia, thrombocytopenia).
10. Immunologic disorder (e.g., positive anti-Smith antibody, anti-phospholipid antibodies, anti-double-stranded DNA).
11. Abnormal anti-nuclear antibodies.

**Four of the 11 above criteria are needed for a formal diagnosis of SLE.*

easily identified by history and physical examination, as well as common diagnostic, radiologic (chest X-ray) and lab tests. In addition to routine blood and urine tests, clinicians often use autoantibody testing to help diagnose and evaluate SLE. In the interest of brevity, we will describe just a few of the key auto-antibody tests:[1,3,5,6]

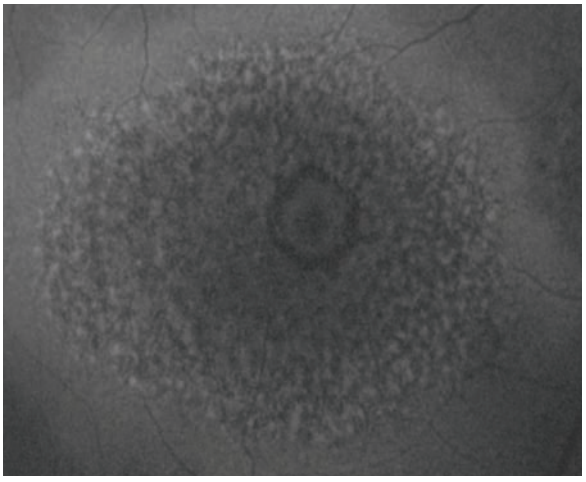
• *Anti-nuclear antibody (ANA).* Patients with SLE tend to have high titers of ANA; this test is positive in close to 100% of all people with active SLE. However, it's important to remember that these test results alone are not enough to confirm SLE, as a high ANA can be present in many healthy individuals as well as those with other connective tissue diseases.

• *Anti-Smith antibody (Anti-Sm).* While just 30% to 40% of patients with SLE have a positive anti-Sm test, it is highly specific for SLE and is rarely found in patients with other rheumatic diseases.

• *Anti-double stranded DNA antibody (Anti-dsDNA).* High results on this test indicate active SLE; it is not found in patients with other rheumatic diseases.

• *Anti-Sjögren syndrome A and anti-Sjögren syndrome B (anti-SSA and anti-SSB).* Found in primary Sjögren's syndrome, anti-SSA and anti-SSB tests may also be positive in patients with SLE.

• *Anti-chromatin antibodies.* These antibodies may be present in patients with SLE who are positive for ANA but negative for anti-dsDNA.



Autofluorescence imaging revealed a "bull's eye" pattern.

• *Antiphospholipid antibodies (APLs).* One or more APLs are frequently seen with autoimmune disorders—the most common are anticardiolipin antibodies and the lupus anticoagulant. APLs are present in 50% of people with lupus, and their presence can help confirm a diagnosis. Positive test results help identify women with SLE who are at risk for blood clots, miscarriage or preterm birth.

Treatment Approaches

The goals for treating a patient with SLE are to minimize complications by reducing tissue inflammation, preventing flare-ups and easing symptoms. Treatment plans are individualized for each patient, based on age, health, symptoms and lifestyle.[1,3]

A wide variety of medical therapies are now available for SLE, increasing the potential for enhanced patient outcomes. Patients living with SLE are treated with nonsteroidal anti-inflammatory drugs, antimalarial agents, glucocorticoids and immunosuppressive drugs.[1,3,6,7] Intravenous immunoglobulins may be used to control systemic lupus erythematosus with organ involvement or vasculitis.

Although the mechanism by which these products help is not well understood, it is thought that they reduce antibody production or promote the clearance of immune complexes from the body.[8,9] Some of the more commonly used medications used to treat symptoms include Cytoxan (cyclophosphamide, Bristol-Myers Squibb), Imuran (azathioprine, Prometheus Laboratories), Rheumatrex (methotrexate, DAVA Pharmaceuticals) and CellCept (mycophenolate mofetil, Genentech).[6-9]

Case Report

• **History.** A 42-year-old white female presented with a chief complaint of bilateral blur and visual dimming. The onset of these symptoms was gradual. Her systemic history was remarkable for SLE, which was being treated with 200mg Plaquenil BID. She had been receiving this pharmacotherapy for six years, and reported occasional flare-ups with fair control of the condition.

• **Diagnostic data.** Her best-corrected visual acuity measured 20/40 OD and OS. Clinical examination showed retinal pigment epithelium disturbances located within the central macular region of each retina. Spectral-domain OCT revealed parafoveal thinning and contamination of the inner/outer segment junction line in both eyes. Autofluorescence imaging revealed a "bull's eye" pattern. Threshold 10-2 perimetry revealed moderately dense central defects OD/OS consistent with the patient's visual function.

• **Management.** Consultation with the patient's rheumatologist was obtained. After trying both nonsteroidal and steroid therapies, the patient was eventually switched to Benlysta, a novel immunomodulatory agent.

In addition, some agents—including Plaquenil (hydroxychloroquine, Sanofi-Aventis), prednisone and aspirin—have been FDA approved specifically for the treatment of SLE.

A monoclonal antibody-based treatment, Benlysta (belimumab, Human Genome Sciences), is the first new medication approved for lupus in more than 50 years.[10] When added to standard therapy, this intravenous drug can reduce the level of SLE activity, such as joint pain, in patients whose disease is auto-antibody positive, according to the FDA.

Newer drug therapies hold promise, and are potentially more effective and less toxic than traditional treatments. Astute eye care providers should monitor for systemic lupus erythematosus in patients with and without ocular manifestations. Additionally, you must properly screen for unwanted ocular side effects of treatments, especially in patients who use corticosteroids or antimalarial agents. ■

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A History of Bad Genes

This patient was more than willing to undergo genetic testing for a progressive eye disease. Find out why. **By Mark T. Dunbar, OD**

A 70-year-old white female presented for an eye examination with a chief complaint of a painless, progressive visual blur in both eyes that had persisted for 18 months. Her last eye exam was more than four years ago. At that time, we recommended that she use reading glasses. The glasses helped for a little while, but she now believed that her prescription was not strong enough.

Her medical history was significant for hypertension and familial polyposis adenomatous (FAP), which required partial intestinal removal.

On examination, her entering visual acuity measured 20/30 OD and 20/25 OS, with a manifest refraction of 20/20 OU. Extraocular motility testing was normal. Confrontation visual fields were full to careful finger counting OU. Her pupils were equally round and reactive, with no evidence of afferent defect. Her anterior segment examination was remarkable for 1+ nuclear sclerotic cataracts OU.

Dilated fundus examination of both eyes revealed small cups, with good rim perfusion and coloration. We noted obvious macular changes in both eyes (*figures 1 and 2*). Further, we documented retinal pigment epithelium (RPE) changes in her left eye (the vessels and periphery were normal, however).

Additionally, we ordered a spectral-domain optical coherence tomography (SD-OCT) scan (*figures 3 and 4*).

Take the Retina Quiz

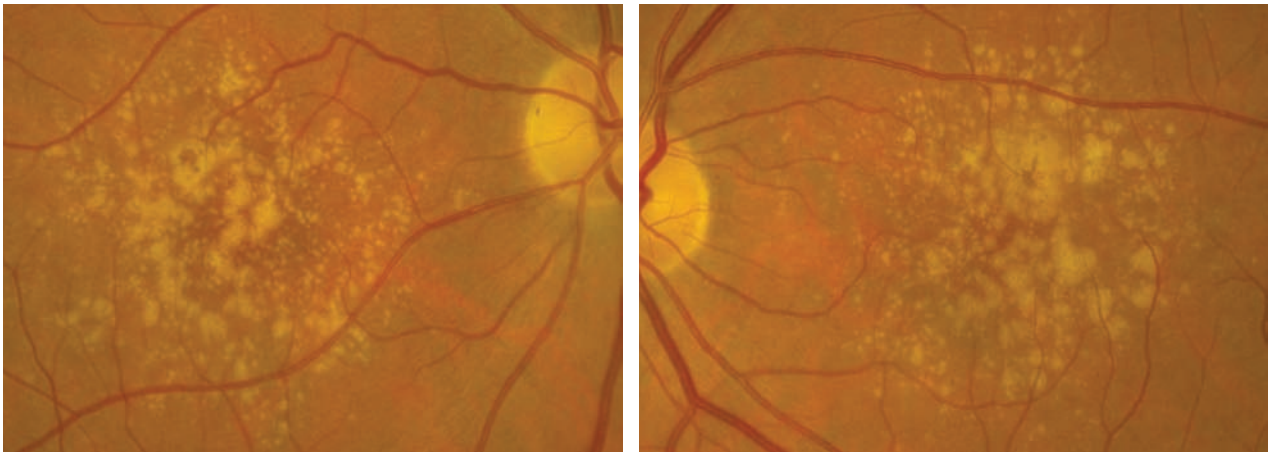
1. What do the posterior poll changes represent OU?
   a. Drusen.
   b. Exudate.
   c. Lipofuscin.
   d. RPE atrophy.

2. What findings do the SD-OCT scans reveal?
   a. Drusen at the level of the RPE.
   b. Geographic atrophy.
   c. Occult choroidal neovascularization (CNV).
   d. Nonspecific subretinal fluid.

3. What is the correct diagnosis?
   a. Dry AMD.
   b. Wet AMD.
   c. Stargardt's macular degeneration (SMD).
   d. Fundus albipunctatus.

4. What additional testing would be most helpful for this patient?
   a. Fluorescein angiogram.
   b. Genetic testing.
   c. Fundus autofluoresence (FAF).
   d. All of the above.

5. How should this patient be managed?
   a. Observation.
   b. Intravitreal anti-VEGF injection.



1, 2. Fundus images of our patient show obvious macular changes (OD left, OS right). What do these findings represent?

c. Nutritional supplements that contain lutein and zeaxanthin.

d. Management decisions are contingent upon the outcome of further testing.

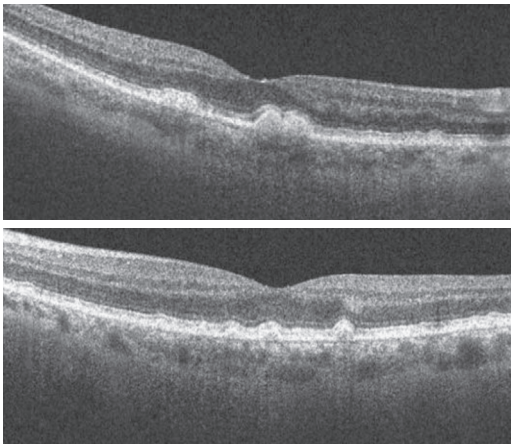
For answers, go to page 122.

Discussion

The changes seen in our patient's maculae represent drusen, which are almost always pathognomonic for macular degeneration. But, is the macular degeneration dry or wet? This is always one of the key questions to address when examining any patient with AMD.

Sometimes it's fairly obvious. But, in other instances, you have to rely on clues in your examination (e.g., the presence of subretinal fluid, exudate or even hemorrhage) to determine if CNV is present. In the absence of these findings, it can be challenging and, at times, nearly impossible. Fortunately, the advent of OCT has made it much easier to determine if the patient has converted from dry to wet AMD.

Even though our patient exhibits extensive drusen, we did not detect any of the key features indicative of CNV. Additionally, her maculae looked completely flat—so I was fairly certain that she had not converted.



3, 4. What clinical findings are revealed on SD-OCT (OD top, OS bottom)?

Nonetheless, we obtained an SD-OCT not only to confirm our suspicions, but also to provide essential baseline information for future follow-up. The SD-OCT revealed focal elevations at the level of the RPE in both eyes, which represented the drusen. More importantly, the scan documented no subretinal fluid in either eye. Fortunately, both the clinical evaluation and ancillary testing supported a diagnosis of dry AMD.

Despite her "favorable" diagnosis, we had to address several critical questions. How should she be followed? Considering the extensive drusen formation, should she be seen more frequently than once or twice a year? And, most importantly, what was her overall risk of converting to wet AMD?

Based on the amount of drusen, we intuitively assumed that her conversion risk was reasonably high. But, to be absolutely certain, we discussed the option of genetic testing.

Macula Risk (ArcticDx) is a genetic test that can be performed in the office with a simple cheek swab. The test accounts for all the known genetic components of AMD that predispose a patient to disease progression. The test analyzes the effects of inflammation (via the complement factor proteins), oxidative damage and mitochondrial health, as well as adjusts for a history of tobacco smoking.

Following testing, Macula Risk assigns a patient to a risk category—ranging from 1 to 5. Patients in categories 4 and 5 have the highest risk of progression, with more than an 83% predictive value.[1] Such individuals should be seen three to four times per year, and undergo careful fundus evaluations and retinal imaging (e.g., SD-OCT or FAF).

Interestingly, our patient specifically inquired if genetic testing was available, because her mother had suffered vision loss from AMD. Further, she suggested that a distant relative developed colon cancer as a result of FAP several years ago. At that time, her primary care physician recommended genetic testing for FAP. To her surprise, the test was positive. Additional testing revealed that she had early colon cancer, which resulted in partial removal of her large intestines. So, needless to say, our patient was a strong believer in genetic testing.

We performed Macula Risk testing on our patient, which placed her in category 4. Indeed, she was at considerable risk for AMD progression. As a result, we recommended nutritional supplementation with lutein, zeaxanthin and omega-3 fatty acid.

We instructed her to return for follow-up in four months, and will continue to monitor her at least three times per year. ■

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Gone, But Not Forgotten

Don't turn a blind eye to a blind eye.

By Joseph W. Sowka, OD, and Alan G. Kabat, OD

As eye care practitioners, we are professionally charged with maintaining the ocular health and vision of our patients. Periodically, however, we encounter a patient with a blind eye. When vision is totally lost, we sometimes believe that our role is unnecessary. But, that may not be the case.

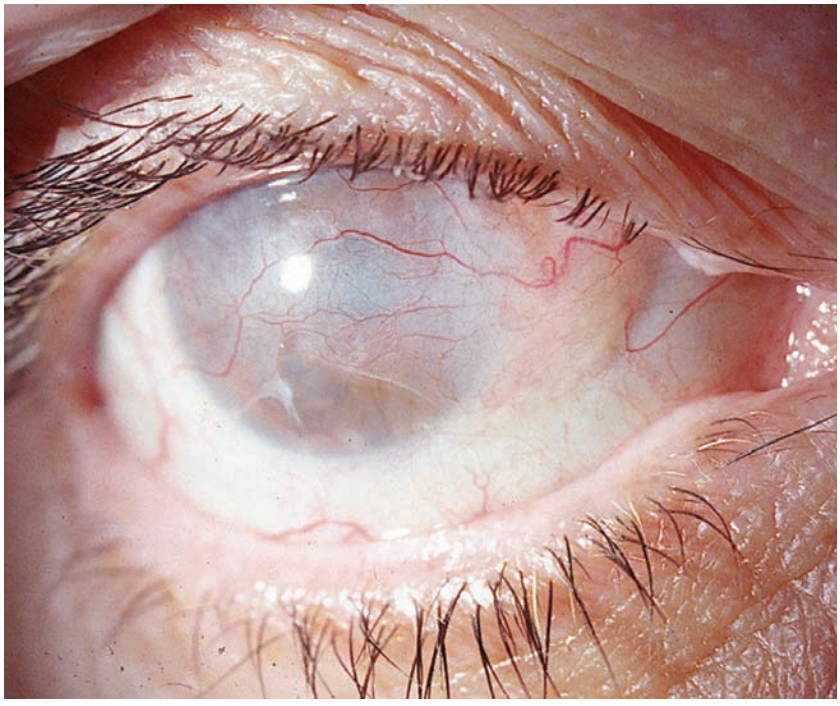
Here, we'll discuss potential management options for two patients who presented with painful, blind eyes.

Patient One

The first patient was a 33-year-old female with near total hearing loss and mild intellectual disability. Her ocular history was significant for blunt trauma to her right eye caused by a rock many years earlier. She received basic first aid at the time, but nothing more. Her family reported that she had very poor vision in that eye—but it was difficult to assess, given her cognitive impairment.

She presented with a totally blind right eye, which—according to her family—had been causing intermittent pain for many months. (They were unsure of the pain level because the patient tolerated discomfort well and did not express herself completely.) Her right cornea was edematous, with microcystic edema and bullous keratopathy. The anterior chamber was free of cells and flare.

The intraocular pressure (IOP) in that eye measured 72mm Hg, and there was total glaucomatous atrophy of the optic disc. Gonioscopic evaluation revealed a total angle recession.



Even in a blind eye, as seen here, therapeutic intervention may be necessary to control pain or improve appearance.

When confronted with the diagnosis and educated about the condition, the patient's family expressed a desire for the patient to be pain free and exhibit a cosmetically normal eye.

Patient Two

The second patient was a 52-year-old female with a longstanding history of blunt trauma in her left eye. Like patient one, she presented with a painful, totally amaurotic eye. She had significant angle recession in that eye as well as a hypermature lens, which displaced laterally behind the iris, leaving her functionally aphakic.

She had a mild anterior chamber reaction, likely due to phacolysis. She also had a left constant exotropia, presumably from the longstanding visual deprivation. She exhibited microcystic edema and bullous keratopathy, which accounted for her pain. Further, her IOP measured 55mm Hg OS.

Previously, she had used multiple glaucoma medications and reported that, when she

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stopped using the medications, her eye became painful. The patient was concerned that she spent too much money treating a blind eye and wanted to explore other options.

What to Do?

It is a common question that we get from students and residents: "Do you treat a blind eye?" As there may be no overall consensus that covers every situation, we approach each case individually. However, we have found that there are many instances when patients do benefit from therapeutic intervention in a blind eye. So, the short answer to this question: "Yes, you do treat a blind eye."

There are numerous causes of painful, blind eyes, including glaucoma, neovascular disease, chronic retinal detachment with resultant ischemia, ocular ischemic syndrome and intraocular tumors, to name a few. Probably one of the most commonly encountered causes of painful, blind eyes is uncontrolled glaucoma with extremely elevated IOP.

In chronic glaucoma, IOP rises slowly for many years. When this happens, the eye typically autoregulates and adapts to the elevated IOP from a corneal perspective, while the optic nerve suffers. However, after prolonged periods of elevated IOP (typically exceeding 50mm Hg), the eye loses its ability to compensate, and the endothelial sodium-potassium pumps—charged with preventing aqueous from breaching and reaching the stroma—begin to malfunction.

The result is aqueous seeping through the endothelium into the stroma, causing corneal edema. This results in a slightly cloudy cornea. If the eye has vision, the patient will complain of halos around lights at night, because light is diffracted differently through the edematous cornea. As the edema accumulates, the microcysts can form larger bullae, which may migrate to the corneal surface, rupture and cause significant pain.

Over time, the rupturing bullae, as well as the persistent edema, create a neurotrophic environment. Then, the corneal nerves—which are responsible for reflex tearing—deaden. The cornea becomes dry and atrophic, and scar tissue and blood vessels replace the normally clear stroma.

"It is a common question that we get from students and residents: 'Do you treat a blind eye?' The short answer to this question: 'Yes, you do treat a blind eye.'"

Based upon this vicious cascade, it is evident that IOP needs to be reduced—even in a blind eye—to prevent the development of corneal edema, bullae (with resultant pain) and corneal scarring.

Treatment Options

In these situations, heroic treatment measures are not necessary. A blind eye does not require IOP as low as a sighted eye with glaucoma. It seems that an IOP less than 40mm Hg is sufficient to prevent the aforementioned cascade from occurring.

• *Topical therapy*. Any of the common glaucoma medications can be used sparingly—provided that there are no systemic contraindications—in order to reach an IOP less than 40mm Hg. If there is any degree of pain or inflammation present, a cycloplegic (e.g., atropine) and steroid (e.g., prednisolone) can be given once or twice per day. These measures may be employed indefinitely. Always remember to use the least amount of medication possible to achieve a painless, cosmetically acceptable eye.

• *Traditional surgical intervention*. If topical therapy cannot control IOP, there are more invasive options. Traditional glaucoma surgery, such as trabeculectomy, will not be performed on a sightless eye because surgeons cannot justify the procedure when there is no visual potential.

In cases of severe glaucoma that does not respond to topical therapy, cyclodestructive procedures can be employed.[1-3] These techniques destroy the secretory neuroepithelium of the ciliary body. By doing so, aqueous production is diminished and IOP is reduced. The secretory neuroepithelium of the ciliary body can regenerate, however, necessitating multiple procures in some cases.

Older procedures have accomplished this with either cryotherapy or Nd:YAG photodestruction—the energy used to debilitate the ciliary body is applied externally across the sclera.

The advantages are that the globe isn't opened and the procedure can be performed in the office. The primary disadvantage is that more energy is used to achieve the aim, creating more inflammation and possibly worsening the situation. Further, these procedures increase the risk of postoperative uveitis, hyphema, IOP spike, ciliary-block glaucoma, hypotony and phthisis bulbi.

• *Advanced surgical intervention*. A modern approach is to employ endoscopic diode laser cyclodestruction. This usually is done while the globe is open during cataract surgery on patients with concurrent glaucoma. However, this procedure is performed only in eyes with visual potential, and would not be done in a sightless eye (where the older techniques are more likely to be employed).

Another option is a neurolytic block via retrobulbar alcohol injection. The alcohol infiltrates the long and short posterior ciliary nerves, causing coagulation and protein/lipid precipitation.[4] Although this doesn't control IOP, the pain diminishes from destruction of these sensory nerves.

If the nerves are not completely destroyed, pain can remain and will correlate with the amount of neural preservation. Keep in mind that these nerves can partially regenerate, and pain may return after the procedure. Repeat injections may be necessary, but pain relief can last approximately two years.

More recently, chlorpromazine has been used in this fashion rather than alcohol. The action appears to be cell lysis resulting in membrane stabilization of the ciliary ganglion. There is a higher success rate of pain control with chlorpromazine compared to alcohol, with effective pain relief for an average of 12.5 months.[5]

Additionally, retrobulbar chlorpromazine may decrease IOP through an unknown mechanism. There are numerous potential complications with retrobulbar blocks, however, including ophthalmoplegia and retrobulbar hemorrhage.

• *Enucleation and evisceration*. The most extreme options to address a painful, blind eye are enucleation and evisceration.[6]

Enucleation usually is reserved for patients with severe ocular disfigurement, phthisical eyes, orbital tumors or when other methods of pain control have failed. The procedure involves removal of the entire globe, with only the extraocular muscles remaining. Pain relief is achieved within six months of globe removal. A cosmetically acceptable prosthesis is then inserted.

Evisceration is the complete removal of the inner contents of the eye, leaving only the scleral shell and extraocular muscles. The

advantage of evisceration over enucleation is a faster recovery, less damage to orbital tissues, and better cosmesis and prosthesis movement. Additionally, pain relief is achieved within six weeks to six months following treatment. After removal of the orbital contents, an inert, porous implant is placed within the scleral shell to fill the volume of the orbit.

We prescribed numerous glaucoma medications for our first patient. Despite maximum medical therapy, her IOP never fell below 40mm Hg OD. We decided that she should undergo cyclodestruction to control pain and reduce medication dependency. Following two cyclodestructive procedures, her IOP still did not drop below 40mm Hg. However, she was maintained in a pain-free state with the use of atropine and prednisolone 1.0% QD and Combigan (brimonidine tartrate/timolol maleate) BID.

Unfortunately, the chronic IOP over 40mm Hg led to corneal scarring and opacification. Despite the cosmetic appearance, the patient's family is happy that she is pain free, and wishes to avoid enucleation and prosthesis use for as long as possible.

The second patient elected to undergo a retrobulbar alcohol injection. She tolerated the procedure well and remained pain free for seven months. Her IOP remained unchanged and, following a period of pain relief, she decompensated.

We educated her about the potential benefits and limitations of repeat injection and enucleation, but she declined any further surgical intervention.

She was then successfully managed with atropine and prednisolone acetate 1% QD and dorzolamide hydrochloride/timolol maleate BID. ■

Thanks to Olena Moiseiykina, OD, of Davie, Fla., for inspiring this month's column.

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Aspirin Linked to Wet AMD?

Several recent reports suggest a link between aspirin use and wet AMD. But, should this change our patient care? **By Diana L. Shechtman, OD, and Paul M. Karpecki, OD**

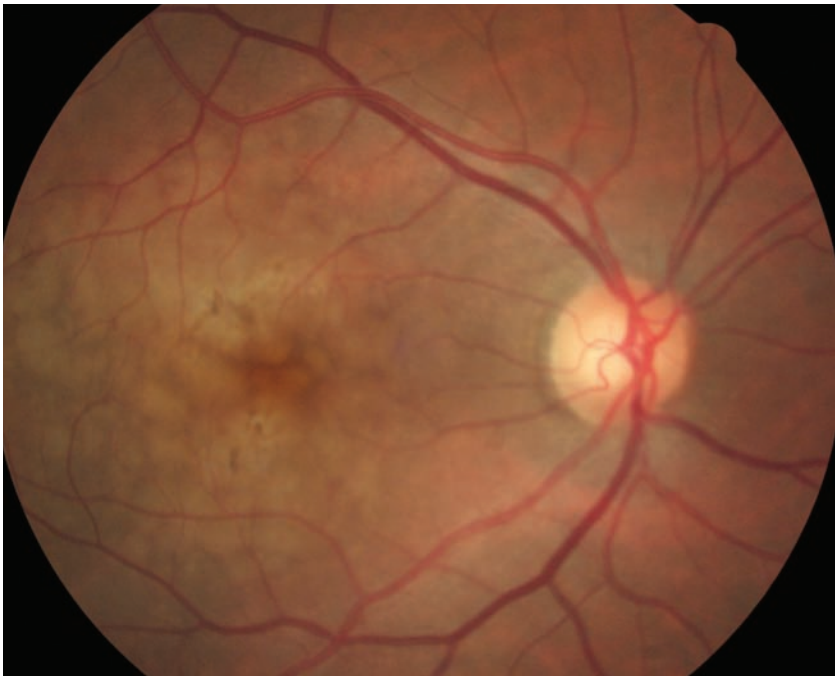
A 65-year-old white female presented for a routine eye examination. She had no visual complaints. Her ocular history was unremarkable. Her systemic history was significant for a stroke, which occurred two years earlier. She reported taking no medications, with the exception of a "baby aspirin" every day.

Her best-corrected visual acuity measured 20/20 OU. All preliminary testing was within normal limits. The slit lamp examination uncovered no anterior segment pathology. A dilated fundus examination revealed moderate-stage age-related macular degeneration (AMD), which was associated with both pigmentary changes and large areas of confluent soft drusen located throughout the macula OU. We uncovered no evidence of a choroidal neovascular membrane.

So, what recommendations should you make to this patient's primary care physician (PCP), considering her medical history, current medication use and recent ocular diagnosis?

Risk Factors

AMD is the leading cause of blindness in elderly Americans.[1] Advanced AMD, which is typically associated with visual impairment, is observed in roughly 10% of all cases.[1] Although extensive research has been devoted to the understanding of the condition, its pathogenesis has not been completely elucidated. The cause of AMD likely is associated with a multitude of factors. Its prevalence and progression has been associated with cardiovascular disease, age, inflammation, gender, ethnicity, smoking, genetics, obesity, UV exposure and aspirin use.[1-6]



Our patient's right eye exhibited signs of moderate AMD. Should she avoid aspirin use?

Aspirin Use and AMD

Two recent studies indicated that prolonged aspirin use was associated with an increased incidence of wet AMD.[2,6] The first study—published by Barbara Klein, MD, MPH, and associates in December 2012—used participants from the Beaver Dam Eye Study.[2] This was a longitudinal, population-based analysis of age-related eye diseases. It included 4,926 participants at baseline, who were evaluated every five years during a 20-year follow-up period.

One study subset evaluated patients who used aspirin at least twice a week. The researchers took retinal photographs, which were graded for the presence and severity of AMD.

After 15 years, 512 cases of early AMD and 117 cases of wet AMD were documented.[2] The researchers noted a statistically significant correlation between aspirin use and of the incidence of wet AMD.[2] Specifically, 1.76% of individuals who used aspirin regularly for 10 years developed wet AMD compared to 1.03% of non-users.[2] No correlation was documented between long-term aspirin use and an increased incidence of early AMD. Further, the researchers noted that the amount


of aspirin taken had no impact upon overall AMD incidence.[2]

The second study was authored by Gerald Liew, PhD, and associates in January 2013.[6] Like the aforementioned study, Dr. Liew's group determined that prolonged aspirin use was associated with the development of wet AMD.[6]

This prospective analysis evaluated an Australian cohort comprised of nearly 3,000 participants. Approximately 10% of the participants used aspirin regularly. Baseline retinal photographs were taken and graded to screen for the presence and/or stage of AMD.

After 15 years, 24% of the participants developed wet AMD.[6] When adjusted for age, body mass index and existing cardiovascular complications, the researchers determined that aspirin users were 2.5 times more likely to develop wet AMD than non-users. More specifically, the incidence of wet AMD among non-regular aspirin users was 0.8% at five-year follow-up, 1.6% at 10 years and 3.7% at 15 years.[6]

On the other hand, the incidence of wet AMD among aspirin users was 1.9% at five-year follow-up, 7% at 10 years and 9.3% at 15 years.[6] This suggests that the r isk for wet AMD with regular aspirin use might be contingent upon the cumulative dosage. It is worth noting that the researchers did not uncover an association between aspirin use and an increased incidence of geographic atrophy.[6]

Study Inconsistencies

While Dr. Klein's study revealed a statistically significant association between aspirin use and wet AMD, the incidence was relatively low.[2] Because advanced AMD is somewhat rare, the increased incidence translates into a negligible overall risk. Additionally, the study did not review exact cause and effect. AMD is a multi-factorial disease associated with numerous risk factors—and yet, not all confounding risk factors were assessed.

A review of the literature suggests that the association between aspirin use and wet AMD is rather inconsistent. In fact, multiple reports have cited no significant association.[4,5,7] One study published in 2009 concluded that a 10-year history of regular aspirin use (100mg every other day) was not associated with an increased risk of wet AMD.[8] Even more interesting, another study indicated that combination aspirin and statin use actually protected individuals with early AMD from progressing to more advanced stages.[9]

As for Our Patient…

Despite mixed reports regarding aspirin use and the risk of wet AMD, we decided to send a summary letter to the patient's PCP about our findings. The patient is being closely monitored for any macular changes or disease progression, and was asked to return to our clinic for further baseline testing.

At this time, we believe that there is insufficient evidence to change the current clinical practice when managing AMD patients who have a history of cardiovascular disease or stroke. Instead, AMD patients on aspirin therapy should be evaluated closely and actively comanaged with their PCPs. ■

A Note on Aspirin Use

Aspirin is one of the most commonly used drugs today. In fact, one in five adults use aspirin on a regular basis.[10] Moreover, nearly half of elderly Americans take aspirin every day.[10]

Aspirin is used to relieve pain, reduce fever and treat inflammatory conditions, such as rheumatoid arthritis. Further, it suppresses clotting actions, which is why physicians often recommend aspirin as a preventive treatment for myocardial infarction and stroke.

Several adverse effects have been reported in patients who use aspirin regularly, including allergies, bleeding and stomach ulcer.[10] And, because aspirin reduces blood viscosity, it should not be used prior to surgery or in conjunction with anticoagulants, such as warfarin.

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Product Review

Contact Lenses

Unilens C-Vue HydraVue Multifocal

Unilens Vision introduces C-Vue HydraVue Multifocal—its latest silicone hydrogel disposable contact lens. Available in high and low add power ranges (from +6.00 to -10.00), the new monthly replacement lenses provide near, far and in-between visual outcomes without the need to wear bifocal or reading glasses.

The silicone hydrogel material also offers the benefit of higher oxygen transmissibility, the company says. Unilens provides eye care practitioners with a display cabinet and trial program with a 120-day performance guarantee on the lenses.

Visit www.unilens.com.

Exam Room Equipment

Reliance 8700 Instrument Stand

Looking to spruce up your exam room? Then you might be interested in the new 8700 instrument stand from Reliance Medical Products. It pairs well with the 520 exam chair, but can be used with any Reliance exam chair. This wheelchair-compatible stand comes with a pole-mounted, counterbalanced slit-lamp arm that adjusts with one arm.

The 8700 instrument stand holds instruments from 35 to 65lb. (any Haag-Streit slit lamp model). The upper refractor arm accommodates instruments up to 20lb., as well as an optional third arm that has a 50-pound capacity. Three recharging wells provide a steady power supply for hand instruments, and backlit membrane switches control the chair, stand, and indirect lighting.

Visit www.haag-streit-usa.com.

Lenses

Costa Rx Progressive Sun Lenses

Costa's Rx division designed its new C-scape progressive sun lenses to accommodate the distance vision needs of watersports and outdoor enthusiasts.

Dry Eye

Allergan Refresh Optive Advanced

Refresh Optive Advanced Preservative-Free lubricant eye drops, the latest addition to Allergan's dry eye portfolio, is designed to work on all three layers of the tear film to relieve dry eye symptoms. Its triple-action formula stabilizes the lipid layer to help reduce tear evaporation, hydrates the aqueous layer, and provides an advanced lubricating and protective shield to the mucin layer while further protecting epithelial cells from hypertonic stress, the company says.

Refresh Optive Advanced Preservative-Free delivers <0.1uL of lipid per drop and is available in 30 count single-use vials, as well as a preserved multi-dose formula. Both may be used in combination with dry eye prescription therapies and do not require shaking prior to use.

Visit www.allergan.com.

Frames

Eyes of Faith Spring 2013 Collection

Adding to its Eyes of Faith collection, Eyes of Faith Optical debuts four new lightweight, stainless steel, retro-chic styles for Spring 2013. All four offer adjustable nosepads, TR-90 temple tip covers and the Wear & Share logo and inspirational scripture inside each temple. Available for immediate distribution to independent eye care professionals throughout the US, the frames come with a branded cleaning cloth and eco-friendly case that ships and stores flat.

1021 in Black Satin

1022 in Navy Satin

1023 in Denim Wash

1024 in Sepia Wash

• *Styles 1021 and 1022* are progressive frames with durable, scalloped TR-90 temples and the Eyes of Faith logo printed in matte metallics. Both Style 1021 (size 52-18-140) and Style 1022 (51-16-140) are available in three satin-finish colors: black satin, navy satin and sepia satin.

• *Styles 1023 and 1024* have prominent metal fronts and unique acid-wash colors. Style 1023 (size 48-18-140) is a cat eye style for petite faces, available in denim wash, sepia wash and forest wash.

The softened square structure of unisex style 1024 (size 50-19-140) is progressive-friendly and available in denim wash, charcoal wash and sepia wash. Spiritual verses are inscribed in the frame temples.

Visit www.eofoptical.com.

Calvin Klein Spring 2013 Collection

The new Calvin Klein Spring 2013 line for men and women features two-toned color blocking, new metal designs and mixed materials.

Women

• *CK7859S/CK7861S*. Available in black, tortoise, navy sand and burgundy mauve, a metal slice is incorporated onto the zyl fronts of these silhouettes.

• *CK7874S/CK7357/CK7891*. Inspired by color blocking, the Meridian Series fuses acetate, metal and color, creating a stripe effect on the temple. These retro-inspired shapes are available in black, havana, olive horn and mahogany horn.

CK7859S

CK7874S

CK7357

CK7891

• *CK7893*. Featuring an interesting mix of metal and plastic, this frame is available in crystal nude and crystal moss.

CK7893

Men

• *CK7345SP/CK7346SP*. These pilot-inspired shapes have a new refined temple design that showcases a blend of zyl and metal, with a wire rim that wraps across the top of the frame. They are available in black, gunmetal, brown, green and blue.

CK7345SP

CK7346SP

• *CK7869SP*. Available in black tort, soft tort and black smoke, these square lenses are thick-rimmed in two-toned zyl, which creates a subtle fading effect.

CK7869SP

• *CK7348*. A double-nose bridge complements the pilot-inspired front of this metal frame, adorned with zyl accents. It is available in light gunmetal, gunmetal and brown.

CK7348

• *CK7484*. Available in gunmetal, brown, olive and slate, this classic flat metal frame front is modernized in titanium.

CK7484

• *CK7888*. This vintage-inspired frame incorporates a mix of materials, including zyl fronts and crystal temples, which create a pattern on the core wire. It's available in black, gray, havana and walnut.

CK7888

Visit www.marchon.com.

C-scape widens the field of view from left to right and enhances peripheral vision, allowing Costa's Rx sunglasses to be worn all day without eyestrain and headaches, the company says.

• *Costa's 580 Rx sun lenses* are available in glass (580G) or lightweight, impact-resistant Trivex (580P) and feature a C-wall lens coating that repels oil, water and dust from the front of the lens as well as an anti-reflective coating on the back of the lens.

Costa 580P Rx lenses are available with Waypoint technology—which is designed to eliminate the blurry edges that can bother active wearers of wrap sunglasses—for both single vision and C-scape progressive vision. The 580G Rx lens is available in single vision. Both 580G and 580P Rx lens colors include gray, copper, blue mirror, green mirror and silver mirror.

• *Costa's 400 Rx sun lenses* are available in CR-39 (400P) and with an optional anti-reflective coating on the back of the lens. Available with Waypoint technology for both single vision and C-scape progressive vision, Costa 400P Rx lenses come in gray and amber.

Visit www.costadelmar.com.

Optical Display

Eye Designs Muro Wall Display

Eye Designs unveiled its newest display system—Muro, which means *wall* in Italian. These stylish wall displays are designed to serve as feature pieces in the optical dispensary, showcasing leading frames and top performing brands.

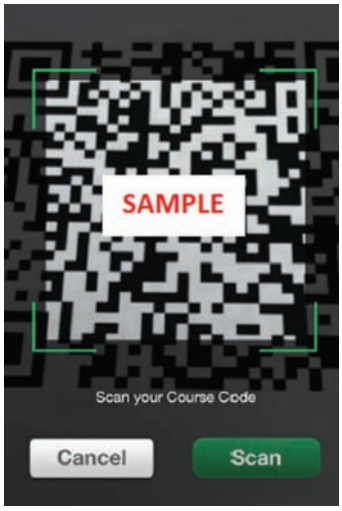
In addition to cases and modern decorative accents, Muro has LED-illuminated shelves for displaying frames, point-of-purchase materials and signage. These display units attach directly to the wall and are available in multiple configurations and sizes.

Visit www.eyedesigns.com.

Mobile App

ARBO OE Tracker Mobile App

Recording CE course attendance can be arduous for both COPE administrators and CE attendees. That's why the Association of Regulatory Boards of Optometry (ARBO) developed a new OE Tracker mobile app for Android and iPhones that is free for optometrists and COPE-approved administrators.



Optometrists, CE providers and licensing boards can use the OE Tracker to electronically track, report and audit CE attendance. Attendees can simply scan a course-specific QR code that submits the data directly into OE Tracker immediately after a course is completed. ODs can also fax their CE certificates to the ARBO office to have the hours entered into their OE Tracker account.

Visit www.arbo.org/smart_app.php.

Fundus Camera

Optovue iCam

The FDA recently granted 510(k) clearance to

Diagnostic Equipment

Normative Database for iVue SD-OCT

Optovue has received FDA 510(k) clearance of a normative database for the iVue SD-OCT system. Enhancing the iVue's suite of clinical applications, the normative database provides quantitative comparisons of the retina, retinal nerve fiber layer, ganglion cell complex and optic disc measurements to help the practitioner evaluate various ocular pathologies.

After scans are captured, the normative comparison analysis adjusts for the patient's age, optic disc size (for optic nerve head scans only) and scan signal strength. Symmetry and change analyses—combined with normative comparisons—support patient evaluation and management.

The normative database is included with any iVue SD-OCT system purchase and a new software update will be provided at no cost to current iVue owners.

Visit www.optovue.com.

Haag-Streit Lenstar LS900

The Haag-Streit Lenstar LS900 optical biometer now features two additional IOL calculation formulas. The Masket and Modified Masket formulas are now available for post-laser refractive patients with a known history of the refractive change induced by the laser surgical procedure.

- *The Masket Method formula* provides IOL power calculations for post-myopic and hyperopic LASIK and PRK patients when clinical history is available.
- *The Modified Masket formula* uses the linear relationship between the spherical equivalent of the total amount of the stable laser vision correction to adjust the IOL power calculation, based on the Holladay I formula. Like the Masket Method, the Modified Masket is appropriate for myopic and hyperopic LASIK and PRK patients.
- *The Shammas No-History formula*—already incorporated into Lenstar's software—addresses the challenge of calculating IOL power for patients after myopic LASIK and PRK, when no clinical history is available.

Visit www.mylenstar.com.

Optovue's iCam Non-Mydriatic compact fundus camera. Producing 45° color fundus images of the eye as well as external ocular structures, the iCam includes a variety of features that enable eye care practitioners to document and manage ocular health with high-quality images. A 12-bit CCD sensor is used to provide deep, rich colors with lower noise than typical eight-bit CMOS sensors used in competing cameras, the company says.

An easy user interface allows for image review and EMR communication, and simple joystick control, focusing and positioning aids expedite the photography process. The expected release of iCam to the US market is scheduled for early second quarter 2013.

Visit www.optovue.com.

Vision Screening Tools

EyeSpy 20/20

Developed by a children's eye surgeon and a technology developer, EyeSpy 20/20 is a vision screening video game for ages four and up that takes the child on a virtual treasure hunt.

This vision screening assessment requires minimal training to administer and mimics the results of a trained specialist even when administered by a parent or untrained volunteers, the company says.

EyeSpy 20/20 screens for visual acuity, depth perception and childhood vision disorders, including amblyopia, strabismus, cataracts, nearsightedness, extreme farsightedness and astigmatism.

For preverbal children or those with special needs, the program integrates with other validated technologies. The software generates a printout of the student's results at the end of testing and recommends whether additional follow-up with an eye doctor is needed.

Compared to traditional methods, EyeSpy 20/20 may reduce the cost of vision screening by half, the company says.

Visit www.visionquest2020.org. ■

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Meetings + Conferences

March 2013

■ **24.** *"Practicing Full Scope Primary Care Optometry: 2013 and Beyond."* Tinley Park Convention Center, Tinley Park, Ill. Hosted by: Illinois Optometric Association. Featured speaker: Pamela Lowe, OD. Email ioa@ioaweb.org or visit www.psseyecare.com.

April 2013

■ **5-7.** *Primary Care Eye Update.* Hill University Center, UAB Campus, Birmingham, Ala. Hosted by: UAB School of Optometry. CE Hours: 18. Contact Candie Bratton at uabsoce@uab.edu or call (205) 934-5701. Visit www.uab.edu/optometry.

■ **12.** *American Conference on Pediatric Cortical Visual Impairment.* Time: 7:30 a.m. - 5:00 p.m. Children's Hospital & Medical Center, Omaha, Nebr. Contact CME Coordinator Sara M. Olsen, MEd, at solsen@childrensomaha.org or (402) 955-6070.

■ **12-13.** *OAOP Annual Spring Congress 2013.* Embassy Suites & Conference Center, Norman, Okla. Hosted by: Oklahoma Association of Optometric Physicians. Visit www.oaop.org.

■ **12-14.** *American Optometric Society 4th Annual Meeting & CE Seminar.* Westin Riverwalk Hotel, San Antonio, Texas. Hosted by: American Optometric Society. CE hours: 12. Email janis@optometricsociety.org or visit www.optometricsociety.org.

■ **13-14.** *5th Annual Symposium on Ocular Disease.* Crowne Plaza, Tyson's Corner, Va. Hosted by: PSS EyeCare. Featured speakers: Deepak Gupta, OD, and Kimberly Reed, OD. CE hours: 18. Email education@psseyecare.com or call (203) 415-3087. Visit www.psseyecare.com.

■ **13-14.** *Nutrition and the Eye VI.* JCPenney Conference Center, North Campus, University of Missouri–St. Louis. Hosted by: Ocular Nutrition Society and UMSL School of Optometry. CE hours: 12. Call Jennifer Clemente at (314) 516-5994 or visit www.umsl.edu/divisions/optometry/Continuing Education/Nutrition2013.html.

■ **19-20.** *Educational Meeting 2013.* Mission Inn, Howey-in-the-Hills, Fla. Hosted by: the Florida Chapter of the American Academy of Optometry. Featured speakers: Carlo Pelino, OD, Albert Woods, OD, and John McClane, OD. CE hours: 10. Contact Arthur T. Young, OD, at eyeguy4123@msn.com or (239) 542-4627.

■ **19-21.** *WFOA Spring Seminar 2013.* Hilton Sandestin Beach Golf Resort & Spa, Destin, Fla. Hosted by: West Florida Optometric Association. Contact Jennifer Major, OD, at wfoatreasurer@gmail.com. Visit www.wfoameeting.com.

■ **20-21.** *21st Annual Suncoast Seminar.* Hyatt Regency Clearwater Beach Resort & Spa, Clearwater, Fla. Hosted by: Pinellas Optometric Association. CE hours: 14 (including medical errors and jurisprudence). Email idoc1@aol.com or call (727) 446-8186.

■ **24-28.** *11th Annual Education Conference.* Hilton Embassy Suites Kingston Plantation, Myrtle Beach, SC. Hosted by: New Jersey Chapter of the American Academy of Optometry. CE hours: 16. Featured speakers: Diana Shechtman, OD, and Carlo Pelino, OD. Contact Dennis H. Lyons, OD, at dhl2020@aol.com or (732) 920-0110.

■ **25-29.** *2013 ArOA Spring Convention.* The Peabody and Statehouse Convention Center, Little Rock, Ark. Hosted by: Arkansas Optometric Association. Contact Executive Director Vicki Farmer at aroa@arkansasoptometric.org or call (501) 661-7675. Visit www.arkansasoptometric.org.

■ **26-27, 29-30.** *CE in Italy: Venice* and/or *Bolzano and the Italian Dolomite Alps, Italy.* To register for one or both of these programs, contact James Fanelli, OD, at jamesfanelli@ceinitaly.com or call (910) 452-7225. Visit www.ceinitaly.com.

■ **26-28.** *28th Annual Morgan/Sarver Symposium.* DoubleTree Hotel, Berkeley Marina, Berkeley, Calif. Hosted by: University of California, Berkeley, School of Optometry. CE hours: 20. Email optoCE@berkeley.edu or call (800) 827-2163. Visit http://optometry.berkeley.edu/ce/morgan-sarver-symposium.

■ **27-28.** *18th Annual Miami Nice Symposium 2013.* Westin Colonnade Hotel, Coral Gables, Fla. Hosted by: Miami-Dade Optometric Physicians Association. CE hours: 17. Email mdopa.board@gmail.com or call Dr. Steve Morris at (305) 668-7700. Visit www.miamieyes.org.

May 2013

■ **1-4.** *2013 Annual Educational Conference & Exposition.* Hilton Garden Inn, Missoula, Mont. Hosted by: Montana Optometric Association. Contact Executive Director Sue Weingartner at sweingartner@rmsmanagement.com or (406) 443-1160. Visit www.mteyes.com.

■ **2-4.** *MWCO Annual Congress.* Caesar's Palace, Las Vegas. Hosted by: Mountain West Council of Optometrists. Contact Tracy Abel, CMP, at tracyabel@earthlink.net or call (888) 376-6926. Visit www.mwco.org.

■ **5-9.** *ARVO 2013.* Washington State Convention Center, Seattle, Wash. Hosted by: Association for Research in Vision and Ophthalmology. Email arvo@arvo.org or visit www.arvo.org.

■ **9-10.** *117th Annual Meeting and Spring Seminar.* DeVos Place, Grand Rapids, Mich. Hosted by: Michigan Optometric Association. Contact Amy Possavino, at amy@themoa.org or call (517) 482-0616. Visit www.themoa.org.

■ **11-18.** *AEA Optometric Cruise Seminar.* Alaska-Inside Passage–Aboard the Star Princess. Itinerary: Seattle, Juneau, Skagway, Glacier Bay National Park, Ketchikan, Victoria, Seattle. Email aeacruises@aol.com or call (888) 638-6009. Visit www.optometriccruiseseminars.com.

■ **17-19.** *2013 AZOA Spring Congress.* Hilton Tuscon El Conquistador Golf & Tennis Resort, Tucson, Ariz. Hosted by: Arizona Optometric Association. Contact Kate Diedrickson, at kate@azoa.org or call (602) 279-0055. Visit www.azoa.org.

■ **17-29.** *Nova Southeastern University's 17th Annual Eye Care Conference & Alumni Reunion.* NSU College of Optometry, Fort

Lauderdale, Fla. Contact Vanessa McDonald at oceaa@nova.edu or visit http://optometry.nova.edu/ce.

June 2013

■ **7-9.** *Ocular Symposium: Pearls in Ocular Diagnosis.* Holiday Inn Golden Gateway, San Francisco. CE hours: 24. Contact Lorraine Geary at ocularsymp@aol.com or call (415) 278-9940.

■ **13-16.** *Maui 2013.* Wailea Beach Marriott Resort & Spa, Maui, Hawaii. Hosted by: *Review of Optometry*. Meeting chair: Paul Karpecki, OD. CE hours: 14. Contact Lois DiDomenico at ReviewMeetings@Jobson.com or (866) 658-1772. Visit www.revoptom.com/conferences.

July 2013

■ **1-5.** *CE in Belize 2013.* Belize Yacht Club Resort & Marina, Ambergris Caye, Belize. Hosted by: International Academy of Optometry. Meeting chair: Edward Paul, OD, PhD. CE hours: 16. Contact Elizabeth Cramond at elizabeth.landfalleye@gmail.com or (910) 256-6364. visit www.CEinBelize.com.

■ **25-28.** *Bermuda 2013.* Fairmont Hamilton Princess, Bermuda. Hosted by: *Review of Optometry*. Meeting chair: Paul Karpecki, OD. CE hours: 14. Contact Lois DiDomenico at ReviewMeetings@Jobson.com or (866) 658-1772. Visit www.revoptom.com/conferences.

August 2013

■ **3-4.** *Colorado Vision Summit.* Crowne Plaza Hotel Denver International Airport, Denver, Colo. Hosted by: Colorado Optometric Association. Visit www.coloradovisionsummit.org or call (303) 863-9778.

■ **3-5.** *Annual Educational Retreat 2013.* South Seas Island Resort, Sanibel, Fla. Hosted by: Southwest Florida Optometric Association Inc. CE hours: 14. Contact Brad Middaugh, OD, at swfoa@att.net or (239) 481-7799. Visit www.swfoa.com.

September 2013

■ **20-22.** *New Technology & Treatments West Coast 2013.* Marriott Del Mar, San Diego. Hosted by: *Review of Optometry*. Contact Lois DiDomenico at ReviewMeetings@Jobson.com or (866) 658-1772. Visit www.revoptom.com/conferences.

October 2013

■ **8-12.** *COVD 43rd Annual Meeting.* Rosen Shingle Creek, Orlando, Fla. Hosted by: College of Optometrists in Vision Development. Visit www.covd.org or call (330) 995-0718. ■

To list your meeting, contact:
Colleen Mullarkey, Senior Editor
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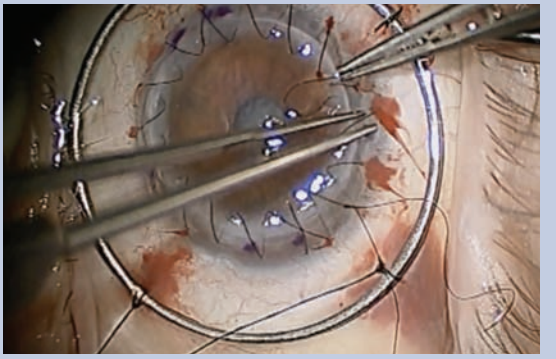
PK: Right on the Button

When all else fails, penetrating keratoplasty offers a chance for better acuity.

By Derek N. Cunningham, OD, and Walter O. Whitley, OD, MBA



Photo/video courtesy of corneal specialist John Sheppard, MD, MMSc, Virginia Eye Consultants.

Go to www.revoptom.com or scan the QR code at left to see video footage of the procedure.

On The Web ›› View a narrated video of penetrating keratplasty.

Penetrating keratoplasty (PK) is a full-thickness transplant in which the damaged central cornea (7mm to 9mm) is removed and replaced with donor tissue. Compared with other types of tissue transplants, it has a long and outstanding record of success; more than 46,000 corneal transplants were performed in 2011, according to Eye Bank Association of America.

The most common indications for penetrating keratoplasty are regrafting, keratoconus, Fuchs' endothelial dystrophy, pseudophakic bullous keratopathy, perforated corneas, traumatic scars and viral keratitis.

The advantages of penetrating keratoplasty include the full removal of damaged corneal tissue, improved optical clarity, restored corneal anatomy, ease of performance compared to other corneal transplant procedures, improved cosmetic appearance and the potential for good optical results.

Some disadvantages are a higher risk of graft rejection, post-op astigmatism, suture management, intraocular complications and traumatic corneal rupture.

Variations of the procedure include deep anterior lamellar keratoplasty (DALK), Descemet's stripping endothelial keratoplasty (DSEK) and Descemet's membrane endothelial keratoplasty (DMEK). The choice of procedure (PK or one of the above variations) depends on which corneal layers have been affected.

The procedure begins with the preparation of the donor tissue. A trephine (a circular cutting device) is used to cut the donor cornea, followed by trephination of a similar sized portion (7mm to 9mm) of the patient's cornea. Once the recipient's corneal button has been removed, the anterior chamber is filled with balanced salt solution or sodium hyaluronate and the donor button is placed into position.

Four cardinal sutures of 10-0 nylon are placed at 90° intervals in the donor graft, just above Descemet's membrane. The sutures are then passed into the recipient's cornea at the same level, at approximately 1.5mm into the host tissue. Once the needle is passed though, the suture is tied and buried. After the cardinal sutures are in place, suturing can be completed with a single running suture or interrupted sutures.

Postoperatively, patients are prescribed topical antibiotics for one to two weeks as well as topical steroids, which are tapered over several months. Many times, patients are kept on low-dose topical steroids to reduce the risk of graft rejection and failure. Sutures can be removed as soon as two to three months, if needed. Or, if a patient has little astigmatism and the sutures are not causing any problems, they can be left in place for many years.

As comanaging optometrists, our main concern is the long term management and visual function. Postoperatively, corneas may take anywhere from 18 to 24 months to fully stabilize, so be sure to continuously monitor patients for adequate visual acuity and functional vision. Communicate with your corneal specialist to decide when patients are sufficiently stable for contact lenses. A specialty contact lens (GP or hybrid) may be considered as soon as three months after surgery, but may need several changes and modifications once the sutures are removed. ■

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Diagnostic **Quiz**

New Found Glory

By Andrew S. Gurwood, OD

History

A 66-year-old white male presented with a chief complaint of poor vision in his right eye that had persisted for one week. The patient explained that he knew he had a "lazy right eye" that required surgical correction when he was younger. Although the patient admitted he never saw well with his right eye, he insisted that his vision recently decreased significantly.

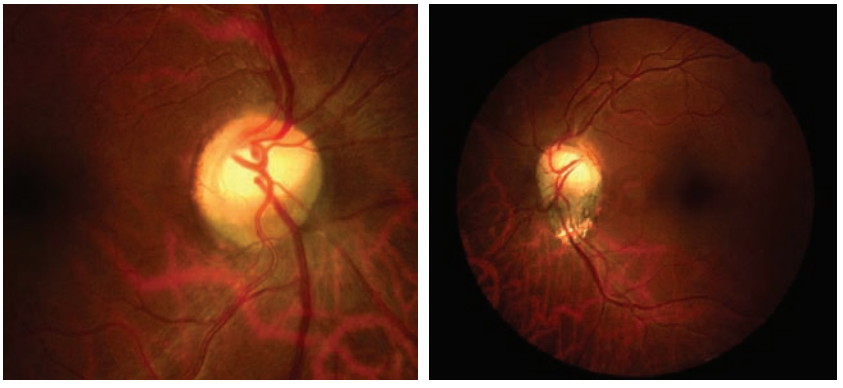
When the left eye was covered, he described the vision in his right eye as if he were looking through Vaseline-smeared glass (which was particularly noticeable in the left field). Further, the patient remarked that a previous eye care provider informed him that his right retina had an "unusual appearance."

He denied using any prescription medications and reported no known allergies.

Diagnostic Data

His best-corrected entering visual acuity was 20/400 OD and 20/30 OS at distance and near (refraction and pinhole testing yielded no improvement). His pupils were equal, round and reactive to light, with a grade II afferent defect OD. Extraocular muscle movements were full OU.

Confrontation fields revealed a left hemifield loss in the right eye. Slit lamp examination uncovered normal anterior segment structures and anterior chambers. His IOP measured 18mm Hg OU.



Fundus photographs of our 66-year-old patient who presented with poor vision in his right eye (OD left, OS right). What do you notice?

Your Diagnosis

How would you approach this case? Does the patient require any additional testing? What is your diagnosis?

How would you manage this patient? What is the most likely prognosis?

To find out, please visit www.revoptom.com. Click on the cover icon for this month's issue, and then click "Diagnostic Quiz" under the table of contents. ■

Retina Quiz Answers *(from page 94):* 1) a; 2) a; 3) a; 4) d; 5) d.

Next Month in the Mag

Our April issue features the 37th Annual Contact Lens Report. Topics include:

- *Proper Coding for the Contact Lens Fit*
- *The Presbyopic Contact Lens Market—It's Yours to Lose*

Also in April:

- *Optometric Study Center: Disorders of the Nasolacrimal System* (earn 2 CE credits)
- *The Business of Dry Eye Practice: Make it Worth Your While*
- *Are Hospital Privileges Worth the Effort?*

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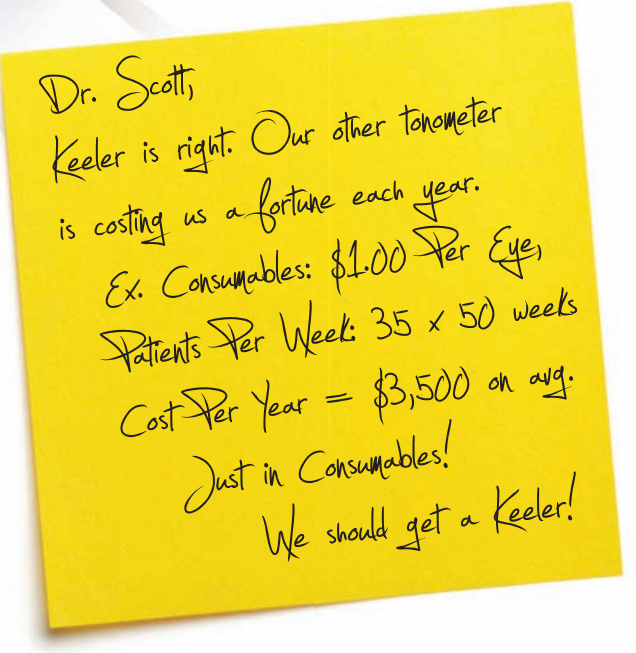

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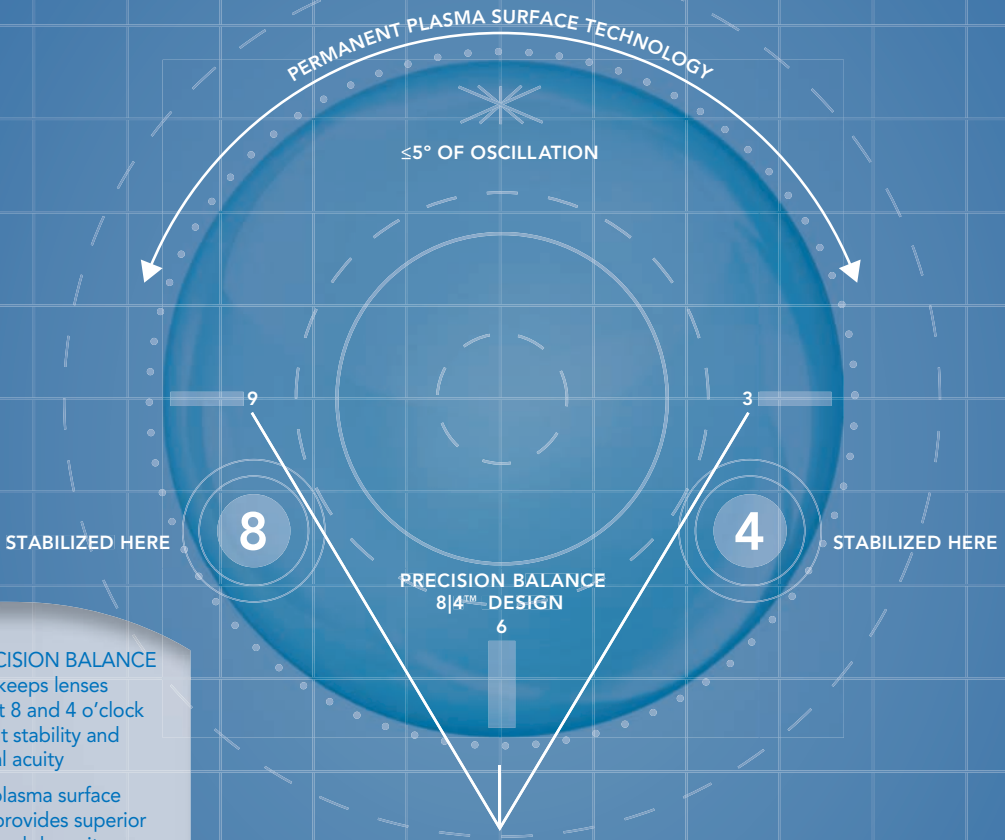

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References: 1. In vitro measurement of contact angles on unworn spherical lenses; significance demonstrated at the 0.05 level; Alcon data on file, 2009. **2.** Ex vivo measurement of lipid deposits on lenses worn daily through manufacturer-recommended replacement period; AOSept Plus used for cleaning and disinfection; significance demonstrated at the 0.05 level; Alcon data on file, 2008. **3.** Nash W, Gabriel M, Mowrey-Mckee M. A comparison of various silicone hydrogel lenses; lipid and protein deposition as a result of daily wear. *Optom Vis Sci.* 2010;87:E-abstract 105110. **4.** Davis RL, Eiden SB. Evaluation of changes in comfort and vision during weeks 3 and 4 of monthly replacement silicone hydrogel contact lenses. American Academy of Optometry; 2012; E-abstract 125401.

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