

CATARACT

Special Considerations in Cataract Surgery: Five Cornea Challenges

BY LINDA ROACH, CONTRIBUTING WRITER

INTERVIEWING PRESTON H. BLOMQUIST, MD, ROSA A. BRAGA-MELE, MD, KIMBERLY A. DRENSER, MD, PHD, HERBERT E. KAUFMAN, MD, MARGUERITE MCDONALD, MD, AND ROGER F. STEINERT, MD

As the most common surgical procedure in ophthalmology, replacement of a cloudy crystalline lens with an intraocular lens (IOL) usually presents the ophthalmologist with familiar sets of surgical routines. But what about those cases that involve comorbidities or other complicating factors?

Several experts shared their perspectives on approaching out-of-the-ordinary cataract surgeries in ways that offer the best chance at optimizing patient outcomes. This month, here's a look at five challenges involving the cornea.

Challenge: Prior Refractive Surgery

Two decades after the first corneal refractive surgeries in the United States, many laser- or RK-sculpted eyes are now developing cataracts. These ablated or weakened corneas defy conventional formulas for determining IOL power, said Roger F. Steinert, MD, at the University of California, Irvine.

Avoid IOL power errors. Dr. Steinert recommends adjusting IOL power calculations for postrefractive surgery eyes with the aid of a free online tool.¹ "You put in all the info you have about the eye, and it gives you IOL power recommendations using as many formulas as it can." It is then up to the surgeon to choose from among them.

Alternatively, many surgeons use an intraoperative aberrometer, the Optiwave Refractive Analysis system, to improve the accuracy of their IOL

choices, said Marguerite McDonald, MD, of Lynbrook, N.Y. The device enables the surgeon to directly measure the eye's aphakic refractive power in the operating room.

Using intraoperative aberrometry is becoming more commonplace, as "it may help in achieving more accuracy with IOL power selection," Dr. McDonald said.

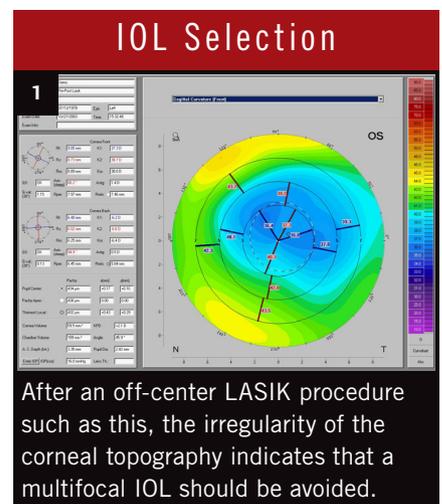
Tips on IOL selection. The chosen IOL should be shaped to neutralize spherical aberrations, said Rosa A. Braga-Mele, MD, at the University of Toronto. "In anybody who has had myopic LASIK or PRK, I think it's very important to use a negatively aspheric IOL, because these patients have more positively aberrant corneas. You don't want to use a standard IOL, which will increase their aberrations."

Multifocal IOLs also should be avoided. "A multifocal IOL is usually not recommended for [most of] these patients, because the cornea is already multifocal," Dr. McDonald said.

Challenge:

An Unhealthy Ocular Surface

It's essential to ensure that the ocular surface is as healthy as possible before surgery, said Dr. Steinert, for two reasons. 1) Dry eye syndrome and related surface-damaging disorders are likely to worsen if they are not addressed



prior to cataract surgery. 2) A dysfunctional, unstable tear film will affect the visual outcome by introducing error into the measurements on which the IOL power calculations depend, Dr. Steinert noted. "Mild to moderate dry eye can disrupt the tear film enough to affect the optics of the cornea."

Diagnostic clues. "The first step is recognition. It is easy to overlook a case of mild to moderate dry eye, particularly if the patient is asymptomatic," Dr. Steinert said.

Stepwise use of standard diagnostic tools, such as the Schirmer test of tear production, has been proposed by two expert consensus panels.^{2,3} Dr. Steinert favors corneal staining with lissamine green or rose bengal, as these agents

Special Considerations in Cataract Surgery is an occasional series on challenging situations in cataract surgery. Future installments will cover such topics as cataract surgery in the settings of other comorbidities, such as age-related macular edema, glaucoma, and diabetic retinopathy.

can reveal more subtle surface damage than fluorescein staining can.

For meibomian gland dysfunction (MGD), the key signs are meibomian gland dropout, abnormal secretions when the glands are expressed, and changes in lid morphology.³ To detect blepharitis, it is important to examine the eyelids and exert mild pressure on the central third of the lower eyelid to look for signs of meibomian gland inspissation, Dr. McDonald added.

Postpone surgery as needed. Surgery should be postponed until any surface damage has been treated and resolved as much as possible, which usually takes two to four weeks, Dr. Steinert said.

Make better use of artificial tears. Dr. Steinert said that his dry eye patients get the most benefit—both pre- and postoperatively—from artificial tears if they instill preservative-free tears both liberally and, importantly, before they experience any discomfort related to their dry eye disease.

Intraoperative tips. Dr. McDonald offered the following intraoperative tips to help protect the surface from surgical stress and minimize the chances of dry eye symptoms after surgery.

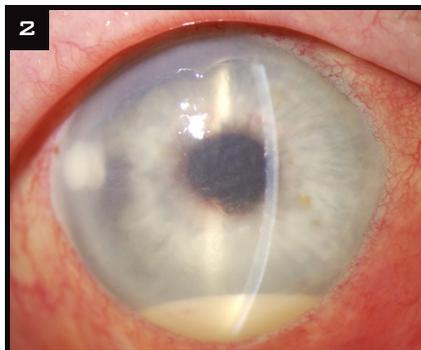
- **Use a topical viscoelastic.** “Many surgeons use viscoelastic on the cornea as a way to keep the eye moist during cataract surgery,” she said.
- **Take care with the speculum.** “Opening the speculum only as much as is necessary, and not more, helps to avoid lagophthalmos and exposure keratitis postoperatively. These flaccid older lids don’t recover so easily from the stretching and trauma they receive when the speculum is cranked open wide,” she said.

Challenge: Keratoconus

The experts offered the following tips for patients with keratoconus.

Discontinue contacts. Because of their highly aberrated corneas, many patients with keratoconus use customized, rigid gas-permeable contact lenses, which mold their corneas to compensate for the optical distortions.

“Stop contact lenses for as long as



BACTERIAL RESISTANCE. MRSA keratitis with hypopyon in a health care worker after sutureless cataract surgery.

it takes for the cornea to unmold, so that preop biometry is accurate. This means at least two consecutive visits where the manifest refraction and topography maps are virtually the same,” Dr. McDonald said. She added, “If the patient is wearing gas-permeable or soft toric lenses, they should be out of them for at least one month—and out of soft spherical lenses for three weeks—before they return for the first of at least two visits. I will wait as long as necessary to be sure that their corneas have unmolded and are finally stable.”

Reduce astigmatism. The keratoconic patient will have better pseudophakic acuity if the keratome incision is placed on the steep axis to reduce regular astigmatism, Dr. McDonald said. Manifest refractions and topographic maps should be obtained to locate the axis accurately, she said. In addition, a toric IOL also is appropriate for a keratoconic patient, because it can improve postcataract acuity in selected eyes, Dr. Braga-Mele said.

Rethink cross-linking. “Most keratoconus patients with cataracts are older and their keratoconus is stable; therefore, they will not need cross-linking,” Dr. McDonald said. “If they are younger and the keratoconus is still changing, it is best to do cross-linking first, let the cornea stabilize, and then do the cataract surgery.”

Challenge: Herpes Infections

When examining patients before cataract surgery, the clinician should be

alert to subtle clues that herpes simplex virus type 1 (HSV-1) infection of the cornea might be the real cause of a patient’s reduced acuity, said Kimberly A. Drenser, MD, PhD, of Royal Oak, Mich. If this is the case, there will be a mismatch between the severity of the cataract and the patient’s visual complaints.

A need for suspicion. When it comes to HSV-1, cataract surgeons cannot afford to let down their guard. If the virus progresses unnoticed, it can cause a necrotizing infection that “really wipes out the retina,” said Dr. Drenser.

In addition, researchers now suspect that most patients—although they may seem uninfected at the time—carry HSV-1 in their systems that could become active if their immunity were sufficiently compromised by surgery, said Herbert E. Kaufman, MD, at Louisiana State University (see “More Online,” below).

The prophylaxis problem. Perioperative prophylaxis, sometimes with immunosuppression, in people with prior HSV keratitis remains prudent, said Dr. Kaufman. However, there still are no good data on what works best before cataract surgery.

In general, Dr. Kaufman’s herpes prophylaxis regimen is similar to the one followed by many LASIK surgeons in patients with prior herpetic infections.⁴ The intensity of the regimen (outlined below) varies based on the prior infection site in the eye, on whether active disease develops despite prophylaxis, and on the degree of ocular inflammation, he said.

He considers the most serious threats to vision from HSV-1 to be severe inflammation, iritis, and stromal keratitis. “I don’t want the immune response in the eye to be too severe, and I don’t want the inflammation to damage the endothelial cells of the cornea.”

Prevention and treatment tips. Dr. Kaufman offered the following tips on preventing recurrence and treating new disease.

- **Preventing recurrence in cases of stromal disease or iritis.** Before surgery, Dr. Kaufman prescribes one or

two days of oral valacyclovir hydrochloride (Valtrex), typically given in doses of 500 mg, three times a day.⁵ The medication is then continued for two weeks postoperatively.

Generic acyclovir can be used, although it is not absorbed as readily. As with valacyclovir, generic acyclovir (typically prescribed in doses of 400 mg five times a day⁵) should be taken one or two days before surgery and then continued for two weeks postoperatively.

In addition to the systemic medication, a topical antiviral, such as ganciclovir 0.15 percent gel (Zirgan) or trifluridine 1 percent solution (Viroptic), may be used.

If severe intraocular inflammation or recurrent herpetic disease develops postoperatively, add 80 mg/day of oral prednisolone for one week (unless contraindicated). Add a topical antiviral (ganciclovir or trifluridine) if it is not already in use.

- **Reducing frequency of recurrence in cases of epithelial ulcers.** Use topical ganciclovir or trifluridine for one or two days preoperatively and two weeks postoperatively.
- **Treating new disease in cases of stromal keratitis or iritis.** If the condition is severe, treat with two weeks of oral valacyclovir hydrochloride or acyclovir, and add one week of oral prednisolone at 80 mg/day (unless contraindicated).
- **Treating new disease in cases of epithelial ulcers.** Use a topical antiviral (ganciclovir or trifluridine) until healed.

One last note regarding treatment from Dr. Kaufman: "After cataract surgery, herpes recurrences are typically not dendritic and are difficult to diagnose from appearance. Any prolonged epithelial defect should be suspect."

Challenge: Bacterial Resistance

After studying the spread of methicillin-resistant *Staphylococcus aureus* and *S. epidermidis* (MRSA, MRSE) in the United States, Preston H. Blomquist, MD, became convinced that cataract surgeons can do more to prevent resis-

tant bacteria from entering the eye and causing endophthalmitis.

A need for suspicion. Certain patients are at increased risk of carrying resistant bacteria asymptotically, said Dr. Blomquist, at the University of Texas Southwestern Medical Center. They include health care workers, cataract surgery candidates who were recently hospitalized or who reside in nursing homes, and those who are part of large groups of people who are in close contact (such as athletes, prison inmates, and military personnel). These patients should receive preop topical gentamicin prophylactically, he said.

The prophylaxis problem. Like many ophthalmologists, Dr. Blomquist uses a fourth-generation fluoroquinolone drop perioperatively for most cataract patients. However, this routine changes for patients he knows are colonized with MRSA or MRSE, as these bacteria are, for the most part, resistant to fourth-generation fluoroquinolones such as moxifloxacin and gatifloxacin.

Instead, Dr. Blomquist prescribes topical gentamicin, an aminoglycoside that still works against resistant microbes, for use three days before and one week after surgery.

One alternative to the fluoroquinolones, cefuroxime, has been found to reduce endophthalmitis when used intracamerally.⁶ However, the drug is not readily available in the United States. Moreover, it is not effective against MRSE or MRSA, Dr. Blomquist said. Some cataract surgeons instead routinely use intracameral vancomycin, a practice he discourages for fear of promoting resistance to this last-ditch medication for resistant staphylococci. ■

MORE ONLINE. For more about recent research on herpes keratitis as well as tips on minimizing the risk of a bacterial infection, see this article at www.eyenet.org.

1 Available at <http://iolcalc.org>. Accessed Feb. 20, 2014.

2 *Ocul Surf.* 2007;5(2):67-142. Free download in multiple languages at www.tearfilm.org.

3 *Invest Ophthalmol Vis Sci.* 2011;52(4). Free download in multiple languages at www.tearfilm.org/tearfilm-reports.php.

4 de Rojas Silva V et al. *J Cataract Refract Surg.* 2007;33(11):1855-1859.

5 For a typical dosing regimen, see webeye.ophth.uiowa.edu/eyeforum/cases/160-HSV.htm.

6 Shorstein NH et al. *J Cataract Refract Surg.* 2013;39(1):8-14.

Preston H. Blomquist, MD, is professor of ophthalmology, vice-chairman for education, and director of the ophthalmic residency program at the University of Texas Southwestern Medical Center in Dallas. Financial disclosure: None.

Rosa Braga-Mele, MD, is professor of ophthalmology at the University of Toronto and director of professionalism and biomedical ethics and director of cataract surgery at the Kensington Eye Institute in Toronto. Financial disclosure: Consults for Alcon and has received lecture fees from Alcon, Allergan, and AMO.

Kimberly A. Drener, MD, PhD, is clinical professor of ophthalmology at the William Beaumont Oakland University College of Medicine and a partner in Associated Retinal Consultants in Royal Oak, Mich. Financial disclosure: Has equity interest in FocusROP and Retinal Solutions and has received lecture fees from ThromboGenics.

Herbert E. Kaufman, MD, is professor emeritus of ophthalmology, pharmacology, and microbiology at Louisiana State University in New Orleans. Financial disclosure: Holds several royalty-generating patents, and consults for Bausch + Lomb and RPS Diagnostics.

Marguerite McDonald, MD, is clinical professor of ophthalmology at New York University's Langone Medical Center and adjunct clinical professor of ophthalmology at Tulane University in New Orleans, and she practices with Ophthalmic Consultants of Long Island in Lynbrook, N.Y. Financial disclosure: Consults for 15 ophthalmic companies, including Alcon, Allergan, AMO, Bausch + Lomb, Pfizer, and TearLab.

Roger F. Steinert, MD, is professor and chair of ophthalmology at the University of California, Irvine. He also directs the university's Gavin Herbert Eye Institute. Financial disclosure: Has patent/royalty interests in Rhein Medical, has received grant support from AMO, and consults for AMO, OptiMedica, ReVision Optics, and WaveTec.