

CATARACT

Fixing, and Avoiding, the Malpositioned IOL

BY BARBARA BOUGHTON, CONTRIBUTING WRITER

Single-piece, hydrophobic, acrylic intraocular lenses have enjoyed tremendous popularity since they were introduced in 2000. With floppier haptics than three-piece acrylic IOLs, one-piece models can be more easily injected through small incisions, resulting in reduced wound size.¹ Single-piece, acrylic IOLs are also easily handled by the cataract surgeon: They center well, are biocompatible and are available with toric and multifocal options, according to Samuel Masket, MD, clinical professor of ophthalmology at the University of California, Los Angeles. In fact, he said, their popularity has increased so much that they account for about half of all lenses implanted annually.

Trouble outside the bag. Yet single-piece IOLs also have haptics that are thick and tacky and without angulation, and they can lead to iris chafing when in contact with the posterior iris. That's why these lenses should be implanted entirely in the capsular bag, and not in the ciliary sulcus, according to Dr. Masket. And yet, he said, single-piece acrylic IOLs are sometimes placed either partly or wholly outside the capsular bag, resulting in iris chafing that leads to pigment dispersion with transillumination defects, an inflammatory response, elevated IOP and microhyphema. In fact, a number of cases of UGH (uveitis-glaucoma-hyphema) syndrome have recently been associated with single-piece acrylics placed in the sulcus. "In the

last few years I've had to replace 17 of these implants because they've induced UGH syndrome. They were placed either partly or completely in the sulcus during complicated cataract surgery," Dr. Masket said.

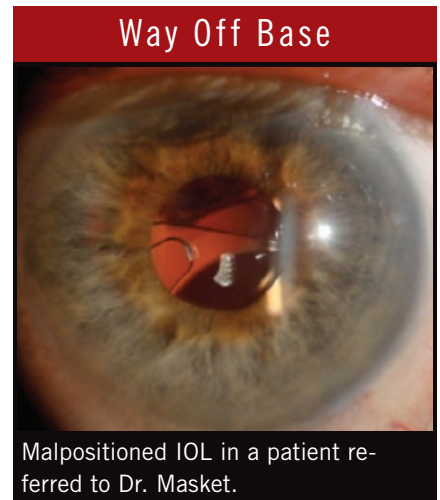
At this year's Joint Meeting, Dr. Masket and his practice colleague, Nicole R. Fram, MD, will be presenting a poster on cases of UGH they've seen occur after placement of single-piece IOLs in the ciliary sulcus.

Reasons Behind Poor Placement

There are several reasons why surgeons may choose sulcus placement, Dr. Masket said. If the posterior capsule ruptures and the surgeon does not have an appropriate backup lens, he or she may place the IOL in the sulcus. The surgeon can also miss getting both haptics inside the capsular bag. "I call that pilot error," Dr. Masket said.

Dr. Fram said many of the patients whom she and Dr. Masket see with a lens in the sulcus may have the entire optic or simply one haptic in the sulcus. "This problem can occur if you don't carefully check if the lens is in the appropriate position immediately after surgery. Proper positioning of the intraocular lens is critical to the surgical outcome."

Dr. Fram added that a surprising number of physicians need education about the dangers of misplacement: During last year's Cataract Spotlight session at the Joint Meeting, an informal audience poll indicated that more than 40 percent of ophthalmologists



Malpositioned IOL in a patient referred to Dr. Masket.

believe that it's acceptable to place a single-piece, acrylic IOL outside the capsular bag.

Why It's a Problem

Robert H. Osher, MD, professor of ophthalmology at the University of Cincinnati, agrees that one-piece, acrylic IOLs should not be placed in the ciliary sulcus, although he hasn't seen an upsurge of UGH cases from his referral practice. But he highlighted other problems:

- If the haptic-to-haptic distance is much shorter than the sulcus diameter, the IOL can move or rotate and cause inflammation or a capsular tear.
- Asymmetric haptic fixation—in which the one haptic is placed in the bag and the other in the sulcus—can cause a lens to dislocate.
- Angulated lenses placed in the sulcus can create pupillary capture if they are placed backward.

Where are the data? “One problem is that the scientific literature has not been very helpful on this question. There are just a few papers that have looked at this issue with very small numbers of cases, and their findings have been conflicting,” Dr. Masket said. Some studies have indicated that placing these IOLs in the sulcus was an acceptable practice,^{2,3} while others documented iris chafing, pigment release and secondary glaucoma.⁴

In one report, surgeons placed single-piece acrylic IOLs in the sulcus in 20 eyes after posterior capsular rupture during phacoemulsification. The ophthalmologists then followed their patients for an average of 17 months. Seven of the 20 eyes developed pigment release, and three eyes developed secondary glaucoma. The mean duration of the onset of secondary glaucoma was 13 months.⁵ “We initially surmised that the single-piece SA60AT (Alcon) was suitable for sulcus fixation because its planar haptics minimize axial displacement and A-constant unpredictability, and because it can withstand greater deformation forces. Its thinner optics allow greater separation from the posterior iris surface, thereby minimizing iris chafing,” the authors write. But the unpolished thicker haptics caused trauma to the surface of the iris, resulting in release of pigments into the aqueous, which then moved to the trabecular meshwork. The ultimate result was an increase in IOP, the authors conclude. Instead, they recommend a multipiece acrylic IOL or a single-piece PMMA IOL for sulcus fixation. They also caution that patients who have a

single-piece acrylic lens implanted in the sulcus may need regular ophthalmic visits to screen for pigment release and secondary glaucoma.

Managing UGH

Patients who do develop UGH syndrome from a single-piece acrylic IOL placed in the ciliary sulcus can be treated with antihypertensive drops to lower eye pressure and anti-inflammatory agents to reduce inflammation. “If the patients respond well, they can be observed. But if they have repeated symptoms, the only option is to do a lens exchange,” Dr. Masket said. Most of the patients he’s seen with UGH from malpositioned IOLs have undergone lens exchange, in which case, Dr. Masket uses iris sutures to fixate the lens.

Preop pics. Dr. Fram added that preoperative imaging of patients with UGH from a malpositioned IOL is also important. Their practice has been chosen as a beta site to test a new portable version of ultrasound biomicroscopy (UBM). “UBM gives you a high-resolution image of the anatomy behind the iris and allows the physician to see exactly where the lens is malpositioned, if not evident by slit-lamp examination. After the IOL exchange is performed, you can see if the lens is in the appropriate place. This adjunctive imaging gives you confidence that you’ve resolved the anatomic reason for the UGH syndrome, for example,” Dr. Fram said.

Preemptive Solutions

So what can a surgeon do if capsular support is lost during a procedure or

the capsule is torn? The best option for preventing poorly positioned lenses is by having a backup lens that’s appropriate for the sulcus should the posterior capsule rupture, according to Dr. Masket. Generally, three-piece IOLs are well-tolerated in the sulcus. Dr. Masket prefers a silicone lens with a 6.3-mm optic with angulated loops of 13.5 or 13.0 mm.

“There are a number of options,” Dr. Osher said. “One is to place a larger lens in the sulcus as long as a bounce test shows you the lens has good support and it is long enough for the eye.” If the surgeon has an intact capsulorhexis, he or she can also place the haptics in the sulcus and pop the optic through the capsulorhexis—a type of optic capture, Dr. Osher said. If the surgeon is working with a single-piece acrylic lens with square sharp haptics and places the lens in the bag only to realize it is torn, he or she again can leave the haptics in the torn bag and pop the optic forward through the capsulorhexis.

“You also have to remember to change the power of the lens appropriately if you place a lens in the sulcus,” Dr. Osher said. “Placing a lens in the sulcus moves it anteriorly, so the power of the lens needs to be changed as well.”

However, Dr. Osher notes that if the lens is sized properly and has the right design, sulcus fixation can be safe. Still, he prefers to place a lens into the capsular bag, even if torn, whenever possible.

1 Chang, D. F. *Br J Ophthalmol* 2004;88:727–728.

2 Taskapili, M. et al. *J Cataract Refract Surg* 2005;31(8):1593–1597.

3 Taskapili, M. et al. *Eur J Ophthalmol* 2007; 17(4):595–600.

4 LeBoyer, R. M. et al. *J Cataract Refract Surg* 2005;31(7):1421–1427.

5 Uy, H. S. and P. S. Chan. *Am J Ophthalmol* 2006;142(2):330–332.

Dr. Fram has no related financial interests.

Dr. Masket is a consultant for Alcon and has received honoraria from Allergan, Bausch & Lomb and Carl Zeiss. Dr. Osher is a consultant for Alcon.

Cataract Monday Lineup

- **Spotlight on Cataracts: Clinical Decision-Making With Cataract Complications**—8:15 a.m. to 12:15 p.m. (event code “Spo3”). Includes the Kelman Lecture, given by Robert H. Osher, MD.
- **ASCRS Symposium: Complications of Premium IOLs**—2 to 4 p.m. (“Sym22”).
- **Around the World in 80 Minutes: New IOL Technologies, A Look Toward the Future**—4:15 to 5:35 p.m. (“Sym 25”).

For more information on these three events, visit the Online Program database at www.aao.org/2009 and search by event code.

