

Repair of a Torn Iris and a Dislocated IOL

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KENNETH ROSENTHAL, MD; AND ALAN N. CARLSON, MD

A 70-year-old man with no recollection of taking generic tamsulosin underwent surgery for a traumatic cataract. He is currently seeking a second opinion, because his original surgeon indicated that further surgical treatment would not be safe. He presents with a complaint of poor vision, diplopia (relieved by pinhole acuity testing), and symptomatic glare. The patient's family is concerned about his visibly decentered pupil. Upon examination, it is apparent that he has iridodialysis, iris atrophy, transillumination defects, pseudopterygium, and a malpositioned IOL from an asymmetric capsular fixation, with one loop in the capsular bag and the other in the sulcus (Figure 1). What would you offer to this patient who desperately desires intervention to improve his symptoms?

—Topic prepared by Alan N. Carlson, MD.

MARK GOROVY, MD

This patient has several anterior segment issues that must be addressed with further surgery. Repairs to the iris will correct his visual symptoms, but the chance of achieving a perfectly round, reactive pupil is slim. First, I would reposition the haptic in the capsular bag. The single-piece AcrySof IOL (Alcon Laboratories, Inc.) is contraindicated for placement in the sulcus. With a viscoelastic, I can usually open the capsular fornix enough to position the haptic inside of it. If this were not possible, I would exchange the lens for a three-piece IOL. A more aggressive approach would be to suture the haptic to the sclera through an opening in the capsule so that it was shielded from direct contact with the iris by the overlying capsule.

Next, I would address the iridodialysis by passing a 10–0 Prolene suture (Ethicon, Inc.) in a mattress fashion across the anterior chamber to secure the iris root to the posterior angle. I would tie the sutures onto the scleral surface but leave the cut ends long to lie flat under the conjunctiva. The scleral flaps could also be used to protect the ends of the Prolene suture from poking through the scleral surface. Figure 1 does not reveal other gross iris defects, but if they became more overt after the iridodialysis repair, I would place Siepser sutures.

The surgeon who performs cataract surgery on the patient's second eye should expect to use iris hooks or pupillary rings at the start of the procedure. In retrospect, these devices probably would have made surgery on the eye under discussion a routine case.

MINAS CORONEO, MD

It would be helpful to know if the patient's other eye is contributing to his problems. If he has a significant cata-



Figure 1. Following traumatic cataract surgery, the patient has iridodialysis, iris atrophy, transillumination defects, pseudopterygium, and a malpositioned IOL from asymmetric capsular fixation, with one loop in the capsular bag and the other in the sulcus.

ract in the other eye, I would consider treating that eye first to give the patient the best sight possible during his rehabilitation.

If the eye that has already undergone surgery is the patient's dominant eye, then efforts might be concentrated on performing surgery on the second eye before further surgery on the first eye.

I would take a thorough drug history. It is not unusual for intraoperative floppy iris syndrome (IFIS) to occur when there are no known predisposing factors.^{1,2} In addition to tamsulosin, other α -adrenergic antagonists have been associated with IFIS, including doxazosin (Cardura; Pfizer, Inc.), alfuzocin (Uroxatral; Sanofi Aventis), terazosin (Hytrin; Abbott Laboratories, Inc.), prazosin, and ergotamine as well as the mixed α - and β -adrenergic antagonists labetalol and carvedilol (Coreg; GlaxoSmithKline).¹ Some drugs with lesser-known amounts of α -receptor antagonism may also increase the risk of IFIS.^{3,4} Additionally, health supplements have been implicated,⁵ and systemic hypertension may be a risk factor for IFIS.⁶

If dry eye syndrome were present, I would aggressively treat the condition prior to performing a surgical procedure. The finding of a pseudopterygium or pterygium would seem coincidental; if the lesion were inflamed, however, there is likely an increased risk of dry eye. In the case of cystoid macular edema (CME), I would conduct endothelial cell counts and discuss the relevant risks with the patient before conducting further surgery.

I agree with Dr. Gorovoy's surgical approach with one caveat. When discussing the risks with the patient, the ophthalmologist should point out that, during any subsequent surgical procedure, the iris will still be floppy and pose problems.

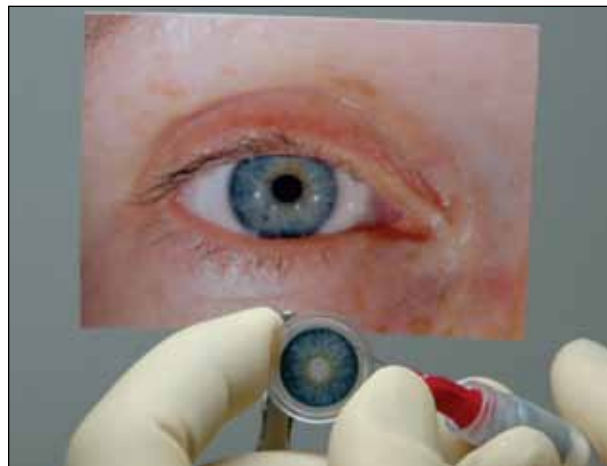


Figure 2. The customized, flexible artificial iris is manufactured based on an index photograph taken of the uninjured eye.

It might be possible to capture the optic of the IOL, with the haptics in either the sulcus or the capsular bag. Optic capture is probably the least invasive way of centering the IOL. If time has passed since the initial surgery and capsular fibrosis has occurred, however, it might be difficult to perform optic capture, especially if the capsulorhexis is small. In my experience, trying to enlarge the capsulorhexis is difficult in this setting. Because sulcus placement is not advised for a single-piece IOL, placing the errant haptic in the capsular bag is an option.

The implantation of an artificial iris could be considered after iridodialysis repair. A preoperative anterior segment optical coherence tomography scan might indicate the amount of space between the iris and the IOL. Alternatively, if the iris is behaving, an iris cerclage could be



Figure 3. The customized, flexible artificial iris can be injected into the capsular bag, under the trypan blue-stained capsular margin.

considered. Options for replacing the IOL include a photochromic or a black diaphragm IOL.

If cataract surgery were to be performed on the patient's other eye, I would use intracameral phenylephrine as well as iris hooks (instead of an iris ring) and the appropriate viscoelastic devices. I would place the iris hooks almost vertically through limbal incisions made with a 15° blade so that, when the iris hook was placed, vector forces would push the iris posteriorly. I would also consider referring the patient to an experienced laser cataract surgeon.⁷

MICHAEL E. SNYDER, MD

This patient has three underlying problems that contribute in aggregate to his symptoms: (1) iridodialysis, (2) iris pigment atrophy, and (3) a decentered, asymmetrically fixated IOL. It is unlikely that addressing any one problem will fully resolve his current symptoms. I will presume that the patient is both interested in and willing to undergo visual rehabilitation. Corneal endothelial damage and CME are not uncommon in similar cases. I will also presume that the health of the patient's endothelium, optic nerve, and macula have all been assessed and found to be without significant pathology.

The asymmetric fixation of the IOL must be addressed first. The single-piece, square-haptic PCIOL, which is contraindicated for placement in the ciliary sulcus, needs to be either repositioned in the capsular bag if it and the capsulorhexis are intact or exchanged for a three-piece IOL if the fixation of both haptics in the capsular bag cannot be guaranteed.

There are 3.5 clock hours of iridodialysis. The bridging tissue appears fairly macerated and lacks pigment epithelium. Repair with horizontal mattress sutures to the scleral wall and oversewing the more atrophic component of the iris with Siepser-style sutures may solve this patient's complaints. This approach is unlikely, however, to achieve a perfectly round pupil, and it may not adequately stretch the pupil to eliminate ambient light through the iris to the posterior segment. The result depends on the elasticity of the residual, uninjured iris tissue. Blue irides tend to be less forgiving to suture repair than more velvety, thick, brown irides.

An iris prosthesis may be the next best option if the iris cannot be repaired. My preferred device is the CustomFlex artificial iris (HumanOptics AG), which can be placed either in the ciliary sulcus or in the reopened, intact capsular bag. This silicone device is manufactured based on a photograph of the patient's unaffected eye (Figure 2). It is inserted through an injector via a 2.75-mm limbal or corneal incision (Figure 3).

Currently, iris prostheses may only be used under formal investigational device or compassionate use exemptions. A formal investigational device exemption trial of the

CustomFlex is expected to begin soon.

With a centrally positioned IOL and augmented iris plane, I would expect the patient's photic complaints and reduced vision to improve but not be fully resolved. Prior CME might result in a residual deficit, the degree of which might remain unknown until the patient's recovery has plateaued.

KENNETH J. ROSENTHAL, MD

This patient presents with a condition that, unfortunately, I see and treat with increasing frequency in my referral practice. He has two risk factors for developing iris thinning that led to transillumination defects. The first is probable IFIS associated with α -1 blockers such as tamsulosin, caseterazosin (formerly Hytrin; Abbott Laboratories, Inc.), doxazosin, alfuzosin, and silodosin (Rapaflo; Watson Pharmaceutical, Inc.). The second factor is a single-piece acrylic IOL that is partially in the ciliary sulcus and the haptic of which is visibly exposed behind the temporal iridodialysis, which causes iris chafing. Unfortunately, the iris defects in this light-colored iris are extensive and diffuse, coupled with a loss of pupillary sphincter tone and presumably an absent pupillary reflex, making primary iris repair by suture alone ineffective. Suture repair would require extensive intraocular manipulation and would likely be frustrating, given that the shift in tensioning caused by a sutured closure in one area of the iris would cause stretching and a new transillumination defect in another.

Based on my experience, a prosthetic iris device would best reduce the glare, improve the patient's visual quality, and restore a more normal cosmetic appearance, possibly in concert with an IOL exchange or with reopening of the capsular bag and dialing of the errant haptic back into the bag. To avoid excessive manipulation in this vulnerable eye, and if the IOL decentration were not so profound as to be visually significant, the surgeon could place an interposing, flexible, custom-made iris prosthesis (CustomFlex) between the iris and the lens. This measure would provide a newly formed pseudopupil as well as protect the posterior iris from the exposed haptic. The flexible silicone prosthesis, which is hand painted to match the natural iris' color, would also provide an excellent cosmetic repair. Moreover, because the device can be inserted through a sub-3-mm incision using a traditional silicone IOL inserter, the risk of further billowing and stretching of the iris would be minimized. The surgeon should suture the iris prosthesis either transsclerally or to an area of the iris that is sufficiently robust to hold it to ensure its stability and centration. Probably only one or two safety sutures would suffice, due to the presence of an intact capsular bag. It is anticipated that an FDA clinical trial of the CustomFlex will begin soon, and I will be presenting a more detailed discussion of this subject at the upcoming American Academy

of Ophthalmology Annual Meeting during the Cataract Spotlight session.

Although it is not always required, in this instance, I would also recommend suture closure of the temporal iridodysis, as the iris prosthesis may not completely mask that defect and, in my experience, temporal iris defects produce more persistent and intense symptoms of glare than those defects that appear elsewhere. This intervention can be accomplished by passing a 9-0 or 10-0 double-armed polypropylene Prolene suture ab interno through the iris, while placing a 26-gauge hypodermic needle through a beveled slit in the sclera 1.5 mm posterior to the limbus, at the level of the ciliary sulcus, then docking and completing the externalization of the suture. Once the second needle is passed in a similar fashion, the surgeon can tie the suture within the scleral bevel, covering the suture and the knot.

ALAN N. CARLSON, MD

This month's installment of the "Phaco Pearls" column features an unfortunate patient with an extremely complex and unexpected surgical outcome that left the original surgeon frustrated and unable to offer a viable solution. The contributing authors, all of whom were specifically chosen for their vast experience handling such complicated outcomes after cataract surgery, recognized and addressed several complex problems (structural, anatomic, functional, aesthetic) in their solutions for this patient. As my video on Eyetube.net demonstrates, I repositioned the IOL to achieve symmetric fixation in the capsular bag, because the IOL was an appropriate design and of proper power and remained without defect. Multipiece, loop-designed IOLs are more likely to have deformed loops from capsular contraction and to require an exchange compared with this "Gumby," single-piece acrylic IOL, which is more resilient. In cases like this one, it is important to verify that the capsular bag is intact and completely open to prevent forces that could decenter the IOL's optic. I prefer to use a cohesive viscoelastic instead of a dispersive agent to open a scarred capsular bag. The use of an artificial iris is an excellent suggestion but, fortunately, was not needed in this circumstance. In the end, anatomical and functional success was achieved. The patient was also happy with his improved comfort and the cosmetic appearance of his iris. ■



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