

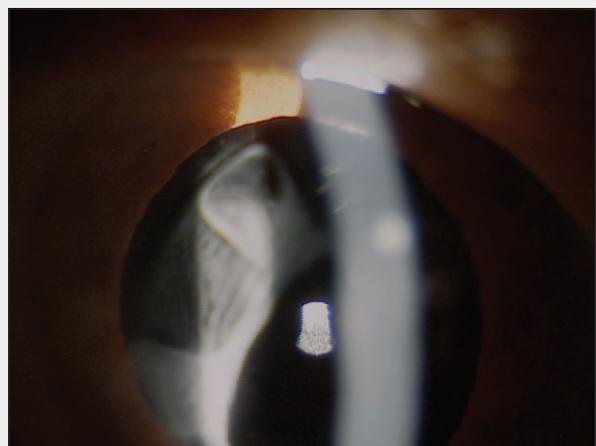
# Dislocated Bag-Lens-Aniridia Ring Complex

BY LUTHER L. FRY, MD; THOMAS A. OETTING, MS, MD; TAL RAVIV, MD; KENNETH J. ROSENTHAL, MD; MICHAEL E. SNYDER, MD; AND LISA BROTHERS ARBISSER, MD

## CASE PRESENTATION

A 62-year-old white farmer sustained a contusion injury to his right eye from a 2 × 4 board that left him with a 10-mm traumatic iridoplegia and nonsubluxated traumatic cataract. Once the eye quieted, I performed cataract surgery. Recognizing a 3-clock-hour zonulolysis, I placed Rasch-Rosenthal interdigitated aniridia rings (type 50C; Morcher, distributed in the United States by FCI Ophthalmics) in the bag—after obtaining a compassionate use exemption from the FDA and the approval of an institutional review board—to address both the zonulolysis and the blown pupil. The patient did well with a single-piece acrylic IOL centered and stable in the bag and an effective artificial pupil resulting in 20/30 visual acuity due to mild commotio retinae.

Although the patient swore to me that he wore safety glasses, he returned 4 years later with variable vision after a fall from his truck's flatbed. His visual acuity measured 20/100, and the lens-bag-aniridia complex was nasally dislocated and tilted. The eye was quiet and the pressure normal. As I lay him back in the chair, the lens might have tilted slightly, but it remained visible and accessible. I saw one fortuitous gap between the hard black PMMA fins of the aniridia ring through which I planned to sclerally fixate the bag around the capsular tension ring (CTR) of the device.



**Figure.** Preoperative appearance of the eye.

Two days later, the patient lay on the operating table with a peribulbar block in place. To my horror, I discovered that the bag and all of its contents were hinged by a few intact superior zonules and tilting down into the posterior segment (Figure).

How would you proceed?

—Case prepared by Lisa Brothers Arbisser, MD.

### LUTHER L. FRY, MD

After placing iris hooks to improve visualization, the surgeon could place a No. 26 needle through the pars plana to tip up the lens-bag-ring complex. A long, curved needle on a 10–0 nylon suture could then be inserted through the opposite pars plana, docked in this needle, and brought out, thus suspending the IOL in position. The surgeon could place a second 10–0 nylon suture if necessary to suspend the lens bag in a “hammock.” Scleral fixation of the lens-bag-ring complex could then proceed.

### THOMAS A. OETTING, MS, MD

I have also faced the horror of a vertical IOL when I had planned a suturing procedure. I love that the surgeon in this case lay the patient back in the clinic to see preoperatively if this were going to be a problem. During such a check, the IOL will usually become vertical if it is going to, and then, the ophthalmologist does not get a surprise in the OR. Maybe due to progression or just a longer time lying flat, the IOL in this case is now vertical with a few superior zonules hanging on, and the surgeon is in the OR with all of the nurses watching!

I would not typically proceed with the case. Because it seems from the history that the patient has not had a pars plana vitrectomy (PPV), I would hesitate to flirt around too much with the IOL, which is most certainly entangled in the vitreous. As I am not comfortable with PPV, I would refer the patient to a vitreoretinal surgeon to perform a vitrectomy while righting the IOL.

Just for fun, let us imagine that no vitreous is present and assume that the patient already had a vigorous PPV. I would then not have to worry about creating a retinal tear as I righted the IOL complex. I would pass a long, curved needle (eg, CTC-6L [Ethicon]) about 2 mm posterior to the limbus superiorly (in the area where the IOL is most anterior and some zonules remain). As I passed the long needle, I would gently rotate the IOL from vertical to horizontal. I would have a paracentesis ready and a second instrument like a Sinsky hook handy with which to steady the IOL in the iris plane. Because the needle is simply a tool to right the IOL, I would probably just pull out the needle. I think I would probably try to bring the inferior portion of the IOL-CTR complex anterior to the iris to keep it horizontal with my hands free. Then, I would suture the IOL-CTR complex to the sclera.

I like to use the sliding internal knot (SLIK) technique that my colleagues and I reported a few years ago (<http://on.fb.me/1rlGhcV>).<sup>1</sup> With the SLIK technique, we pass one end of a double-armed suture through the sclera, under the iris, under the CTR, out through the capsule, and then out of the eye through the cornea. We typically use a 9-0 double-armed Prolene suture (Ethicon) with CTC-6L needles. Next, we make a pass with the other side of the double-armed needle but go above the IOL-CTR-capsule complex. Then, we tie an internal sliding knot to complete the SLIK technique. In a perfect world, I would place two sutures 180° across from each other to secure the IOL-CTR complex. I realize, however, that it might be tough to find places to suture this IOL complex because of the existing aniridia ring,

### **TAL RAVIV, MD**

With the capsule-IOL-iris diaphragm-CTR complex lacking sufficient zonular support, fixing the problem requires addressing both the pseudophakic correction and the frozen mydriatic pupil.

The first option, as planned by Dr. Arbisser, would be to sclerally fixate the existing complex. This could normally be accomplished by hooking two (or more) transscleral sutures around the CTR, as was intended.

With posterior dislocation, a posterior-assisted levitation technique, whether performed by a retina surgeon or with a one-port PPV by the anterior segment surgeon, would be an option to bring the complex forward for suturing.

I have heard one anecdotal report of a heroic surgeon in

a surgicenter (lacking PPV equipment or retina coverage) who addressed a similar situation by placing the patient in a prone position, situating him- or herself somehow beneath the patient, and capturing the IOL to the cornea with a long needle pass before turning the patient back and properly sclerally fixating the IOL.

Another possibility, should the bag-IOL-CTR complex require complete explantation, would be to sclerally fixate (sutures or glued intrascleral haptic fixation) a new three-piece IOL attached to an ArtificialIris (HumanOptics; not FDA approved).

### **KENNETH J. ROSENTHAL, MD**

This patient had a traumatic cataract, which implies a loss of zonular integrity unless otherwise proven. Although the Rasch-Rosenthal iris prosthesis is built on the backbone of a CTR, it cannot overcome the often considerable zonular weakness in such eyes. Also, this iris prosthesis is heavier than a CTR, and the patient in this case is active. With 20/20 hindsight, therefore, the current problem is not surprising.

To stabilize the devices, I would make four paracenteses, two about 2 clock hours apart and two 180° away from this but very close together. I would pass a 9-0 polypropylene suture on a long needle through the first set of paracenteses, lift the IOL-capsular bag-iris prosthesis complex with an end-grasping forceps, and elevate it to just behind (or in front of) the iris plane. Then, passing the suture under the complex, I would dock it into a 27-gauge cannula at the opposite side. I would pass the needle through its immediate neighboring paracentesis and back across under the complex to create a trapezoidal “net” in which to suspend the complex.

Next, using a linear 57 blade, I would create three equidistant scleral grooves with a 45° angulated incision 2.5 mm behind the limbus. A 9-0 polypropylene or CV8 Gore-Tex suture (W.L. Gore & Associates; an off-label use but my preference in this very active patient) could be passed through the paracenteses and docked on a 25-gauge needle passed in a double-armed fashion through each scleral groove. With 9-0 polypropylene, the needle can be used to pierce the open space between the iris implant’s interleaves. The Gore-Tex suture is most easily used by cutting off the needle, using a 25-gauge hypodermic needle to pierce this area, and then inserting an end-grasping vitreoretinal forceps through the scleral groove prior to docking. When necessary, one can simply pierce the now fibrotic anterior capsule or wrap the suture around the iris prosthesis in the same manner.

Alternatively, the surgeon could consider using an iris prosthesis made by HumanOptics (and currently in FDA clinical trials), although at a higher cost. The 50C iris implant would be cut, removed in sections (along with the IOL), and abandoned. These prostheses are made of lighter-weight

silicone rather than the PMMA of the Morcher devices and are less prone to dislocation, because they can be sutured to the scleral wall or to an existing or concomitantly placed IOL. In this case, one could suture the IOL to the posterior surface of the iris prosthesis or implant a separate sclera-fixed IOL.

### **MICHAEL E. SNYDER, MD**

This case demonstrates well that neither a standard CTR nor its cousins, like the Rasch-Rosenthal ring in this case, can prevent future zonulopathy after their insertion. This is an important point for eyes with progressive zonulopathies such as in pseudoexfoliation, retinitis pigmentosa, or, as in this case, repeated trauma. Really, this case can be extrapolated to any case with a subluxated bag and intact bag contents. My approach has evolved over time.

Given an intact posterior capsule, I might be inclined to impose upon a vitreoretinal colleague to perform a core vitrectomy and lift the complex back into the iris plane. While he or she held the complex, I would attempt to lift the anterior capsulorhexis off the IOL's surface and to viscodissect open the bag in one quadrant. I would then place a CV-8 Gore-Tex suture in the scleral wall at the ciliary sulcus and place the other end through the fixation eyelet of a type 6D capsular segment device (Morcher, distributed in the United States by FCI Ophthalmics). I would then manually place the device in the capsular fornix.<sup>2</sup> The end of the suture could be similarly retrieved through the scleral wall and gently snugged to allow the retinal surgeon to "let go" and remove the posterior support.

Considering this patient's propensity for repeated eye injury, the remaining zonules are likely to be or to become of poor quality. I would therefore place another capsular tension segment 180° away, while making sure the sutures remained radially symmetric at the two fixation elements (torque and countertorque to prevent tilting of the complex). Outside the United States, an AssiAnchor (Hanita Lenses) can similarly fixate a loose bag complex and only requires a 1.5-clock hour space to insert this "clip" along the capsulorhexis' margin, because the device supports the complex by this margin rather than the equatorial fornix.

If an Nd:YAG capsulotomy was already performed, reopening for placement of capsular segments is not viable. An exchange for another iris device "on the fly" would be impossible due to regulatory barriers. In such cases, one could either exchange the complex for a standard sutured PCIOL with the photic sequelae thereof or refixate the device by one or both of two mechanisms. Often, there is incomplete overlap of Morcher's 50-series devices, in which case a suture could be slung around the CTR backbone of the rings to fixate the device to the scleral wall. Assia has also shown that 9-0 or 10-0 polypropylene sutures with

sharp needles can be placed through an acrylic optic (but not through the black PMMA iris device) for scleral fixation.

Whatever option selected, this case will require extraordinary dexterity from the surgeon to complete.

### **WHAT I DID: LISA BROTHERS ARBISSER, MD**

I seriously considered cancelling the case on the table and asking my vitreoretinal surgeon partner to deal with the pathology. Given the patient's propensity for poor compliance, the demand farming placed on him for hard labor, the large incision that would have been needed to remove the stiff aniridia ring complex, the difficulty of securing another IOL due to iridoplegia, and his status post peribulbar injection, I decide to proceed.

To avoid losing the lens posteriorly, I first lassoed it from behind through a scleral groove 1.5 mm from the limbus with a curved 9-0 Prolene needle through the gap in the aniridia rings. I then placed a straight, hollow, bored needle from pars plana to pars plana 3.5 mm behind the limbus to lift the lens complex into the proper plane and eliminate its tendency to hang backward. Leaving this needle in place for stability, because the PMMA of the aniridia rings blocked any other access to the periphery of the bag, I speared the IOL with a 26-gauge needle through the periphery of the lens optic itself, 180° from the lasso suture. This maneuver, first described by Assia, was facilitated by counterpressure from above with an intraocular forceps. Docking the suture needle into the hollow-bore needle allowed fixation of the complex to the sclera. Using triamcinolone acetate for particulate identification, I removed any entrapped vitreous with a biaxial vitrectomy. I kept the irrigation cannula anterior through a paracentesis while I employed the vitrector alternately through an anterior paracentesis and a pars plana sclerotomy. The lens required three-point fixation for proper centration and stability. All was done through small self-sealing incisions. Purkinje images confirmed minimal, if any, tilt.

Postoperatively, a dispersed vitreous hemorrhage had to resolve, and it cleared within 2 weeks, returning to the patient his previous 20/30 acuity. With a long taper of steroids and a prolonged course of nonsteroidal anti-inflammatory drugs, the eye appeared quiet at the 6-week visit, and the patient was scheduled for a 3-month postoperative return appointment. Unfortunately, he was lost to follow-up and returned 4 months after surgery with a visual acuity of 20/100 due to cystoid macular edema. This complication proved hard to reverse, waxing and waning with topical medication. He ultimately required an intravitreal steroid injection given by my vitreoretinal partner that eventually resulted in a quiet eye and 20/50 visual acuity.



I am sad to report that the patient later suffered a penetrating injury to his fellow eye that he failed to report until 3 days after its occurrence, when he presented with mixed-pathogen endophthalmitis. Ultimately, this eye recovered a visual acuity of 20/200, and the eye with the previously dislocated bag-lens-aniridia complex is the one on which he must depend. ■

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