Subluxated IOL After Pupillary Dilation

BY DAVID F. CHANG, MD; D. MICHAEL COLVARD, MD; ALAN S. CRANDALL, MD; MATTHEW D. KUHNLE, DO; ALAN N. CARLSON, MD; SAMUEL MASKET, MD; AND STEVEN G. SAFRAN, MD

CASE PRESENTATION

A 59-year-old man presents for a routine yearly follow-up visit 2 years after undergoing cataract surgery on both eyes. He has 20/20 UCVA OU and no major complaints. After pupillary dilation, he returns to the examination room, and you notice that the pupil has anteriorly captured the IOL-bag complex in his left eye. Looking back at the surgical report, you read that an inferior dehiscence was noted at the conclusion of the case but stabilized after the insertion of a three-piece IOL. No capsular tension ring was used.

You explain what occurred to the unsuspecting, still asymptomatic patient. You lay him back in the examination chair and try to massage the eye to no avail. Finally, you ask him to return in 24 hours, after the effect of the dilating drops wears off, and hope for self-resolution.

When the patient returns the next day, he reports no problems. His UCVA measures 20/25 OS, and the chamber is quiet. The optic and haptic of the three-piece IOL are still captured anteriorly (Figure 1) within the somewhat fibrosed capsular bag. How would you proceed?

DAVID F. CHANG, MD

Because the subluxation happened for the first time after the previous day’s dilation, I would make at least one more attempt to reposition the IOL in the posterior chamber. I would use 0.5% tropicamide combined with 2.5% phenylephrine to redilate the pupil. Then, I would attempt to displace the IOL posteriorly at the slit lamp with a handheld gonioprism lens. If this were successful, I would instill topical 2% pilocarpine and ask the patient to recline for the rest of the day and return the following morning. If the IOL remained well positioned, I would recommend against routine pupillary dilation in the future. I would explain that a surgical suture-fixation procedure might be necessary at some future time.

Surgical 9–0 polypropylene scleral suture fixation of the subluxated haptic would be my preferred approach if the IOL could not be successfully repositioned in the office. Whether symptomatic or not, I would not want my own IOL to be left subluxated in this position. I would plan to tie the knot so that it lay buried at the base of a half-thickness scleral groove made parallel to the limbus and approximately 1.5 mm posterior to the limbus. Each of the double-armed straight transscleral needles (FCI Ophthalmics, Inc., Marshfield Hills, MA) can be passed through a clear corneal incision made 180º opposite to the problematic haptic. One will pass above and one below the haptic, which will remain encased in the capsular bag. To guide out each of the 9–0 Prolene needles (FCI Ophthalmics, Inc.), I would pass a 25-gauge disposable needle ab externo through the base of the scleral groove, behind the iris, and into the pupillary space. The first straight 9–0 Prolene needle is threaded into the lumen of a 25-gauge needle, which can then guide the Prolene needle out through
the base of the groove. This maneuver is repeated for
the second Prolene needle so that it exits adjacent to
the first needle pass.

**D. Michael Colvard, MD**

The question is whether to intervene surgically now
or just to carefully monitor the situation. If the patient
were free of symptoms during the next few weeks, I
would favor continued observation.

He might do well without intervention for quite a
while. The iris is brown, so the pupil’s irregularity will be
hard to notice. The IOL is now supported inferiorly by
the iris, which will reduce gravitational stress on the
remaining superior zonules. The IOL is covered by the
capsule, which will reduce chafing of the iris. I would not
intervene if the patient retains good visual acuity; he is
happy and comfortable; and there is no evidence of in-
flammation, cystoid macular edema, or IOP elevation
with pigment dispersion or corneal decompensation.
(Figure 1 seems to suggest iris depigmentation, so disper-
sion may become a problem sooner rather than later.)

Sutured IOLs tend to have a relatively short lifetime.
Not all do well, and those that do often become unsta-
ble again after 6 to 8 years, requiring a third interven-
tion. This patient is only 59 years old, so it would be
nice to help him borrow some time. Having said this, I
would act quickly if things began to head south. The
position of the IOL is advantageous. It would be rela-
tively easy to place a Prolene loop through the capsule
and the IOL’s inferior loop and then fix it either to the
peripheral iris or sclera.

**Alan S. Crandall, MD**

Although the patient’s visual acuity is good and he is
asymptomatic, the lens and bag are unstable. If he were
older, one could explain the situation to the patient and
observe him. In this situation, however, the lens’ posi-
tion could cause uveitis and pigment dispersion with
glaucoma, and the tilt might lead to decreased visual
acuity. I would therefore suggest surgical intervention.

In cases like this one, I have a game plan with at least
two backups, depending on what I find. If the dehis-
cence noted at the original surgery existed preopera-
tively (ie, previous trauma), then the superior zonules
might be normal. If so, one could use a lasso technique
to fixate the lens to the sclera. If the lens were less sta-
ble than expected, my next choice would be to raise the
optic and then use iris fixation (Siepser knot technique).
Another option would be an IOL exchange for an
ACIOL or for a PCIOl fixated to the iris or sclera.

I would prefer one of the first two options and using
the existing lens, because both can be performed
through small incisions. I always stain the vitreous to
ensure that none is presenting forward. I would perform
a bimanual vitrectomy and use 23-gauge high cutting
(2,500 cuts/min), which can be performed through a
standard clear corneal stab incision. I use 10–0 or 9–0
Prolene (Ethicon, Inc., Somerville, NJ) for iris fixation
and 9–0 Prolene or 8–0 Gore-Tex (W. L. Gore & Associat-
es, Inc., Newark, DE; off-label use) for scleral fixation.

**Matthew D. Kuhnle, DO,**
**and Alan N. Carlson, MD**

Anterior displacement of this patient’s capsular bag-
IOL complex that is causing optic tilt and pupillary cap-
ture will certainly require intervention despite his rela-
tive absence of symptoms. A slit-lamp examination,
including gonioscopy of both eyes, will help the surgeon
to assess the angle structures and will provide other
cues to the eye’s predisposition. It will also indicate
whether or not this situation resulted from a single
event (surgical or preexisting trauma) or an ongoing
process weakening zonular integrity (pseudoexfoliation,
Marfan syndrome). In addition, we would investigate
the status of the anterior hyaloid face, vitreous, and
remaining capsule superiorly.1

Repositioning the IOL and securing it with either a
transscleral or McCannel iris suture would be our first
choice, provided the patient has a correctly powered
IOL that does not compromise the health of his eye.2
Unfortunately, our experience in similar cases is that
longstanding capsular contraction has permanently dis-
torted the loop haptics and asymmetrically shortened
the IOL. Capsular fibrosis would likely prevent us from
opening the capsule to insert a capsular tension ring.
Attempts to secure this IOL in a transscleral fashion
would require meticulous attention to the anterior
peripheral vitreous. Mismanagement could lead to
chronic cystoid macular edema or worse problems such
as anterior vitreous loop traction that can lead to a reti-
nal detachment and proliferative vitreoretinopathy.3,4

If the IOL could be surgically moved to a reasonably
normal position (ideally with zonular support evident
superiorly and without vitreous entanglement), we would
favor securing the inferior loop with a McCannel-style
suture (Ethicon STC-6 needle [Ethicon, Inc.], 10–0 poly-
propylene suture). A second suture might be needed superiorly to ensure stability, as assessed by the Osher bounce test.5

If the IOL were clearly distorted or the zonular support were extremely limited, an exchange would be a reasonable choice. ACIOLs fell out of favor in the 1980s, but work by the late David Apple, MD, supports the use of a Kelman-style multiflex ACIOL. The angle must otherwise be normal, however, and the patient must have an adequate corneal endothelial cell count and no history of glaucoma.6

SAMUEL MASKET, MD

Cases such as this one are amenable only to surgery. I have managed several and varied my approach according to the status of the capsule and remaining zonular fibers. Most often, I attempt a minimally invasive procedure, eschewing IOL exchange in favor of suture fixation of the existing IOL. I employ the following options.

First, if the anterior capsular remnant is not fibrotic or phimotic and the posterior capsule is intact, I attempt to reopen the capsular bag by blunt and viscodissection. Next, I place an Ahmed Capsular Tension Segment (Morcher GmbH, Stuttgart, Germany; distributed in the United States by FCI Ophthalmics, Inc.) with a preloaded suture and anchor it through a Hoffman scleral pocket. I have used both 10–0 polyester and 8–0 Gore-Tex. Once the bag is open, I evaluate the status of the zonular fibers and consider the need for a second Ahmed segment or a sutured Cionni Ring for Sclera Fixation (Morcher GmbH; distributed in the United States by FCI Ophthalmics, Inc.).

My second option is suturing the haptic(s) to the sclera. Should the condition of the capsular bag render its opening undesirable, I would perform a lasso suture of the haptic through the peripheral capsule, again with use of a Hoffman pocket. I would evaluate the support for the opposing haptic and place an additional scleral suture as needed (Figures 2 and 3).

Finally, if scleral suturing is contraindicated (coagulopathy, extensive previous glaucoma filtration surgery, massive scleral scarring or thinning, etc.), the bag-IOL complex may be sewn to the iris with 10–0 polyester or polypropylene suture material. One must be certain to incorporate the IOL’s loops with the suture. Either a McCannel or a Siepser method of tying the suture may be employed, and a peripheral iridectomy is performed.

STEVEN G. SAFRAN, MD

This relatively young patient has extensive zonular weakness and prolapse of the IOL-bag complex through the pupillary aperture. The inferior zonules are completely absent, and the remaining areas of zonular attachment must be considered suspect at best. The multiple options for repairing this problem include lassoing of the IOL-bag complex and suturing it to the sclera, an IOL exchange for an anterior chamber lens, an IOL exchange for an iris-fixated or sclera-fixated posterior chamber lens, or removal of the current implant from the bag and, most likely, a vitrectomy as well.

In my experience, the most reliable option in cases...
“The most reliable option in cases such as this one is to remove the bag-IOL complex.”
— Steven G. Safran, MD

such as this one is to remove the bag-IOL complex via a scleral tunnel incision made on the steep axis. Next, I suture a single-piece PMMA implant (eg, P366UV [Bausch + Lomb, Rochester, NY] or CZ708D [Alcon Laboratories, Inc., Fort Worth, TX]) to the sclera with 9–0 Prolene sutures placed under scleral flaps. The scleral tunnel incision used for an IOL exchange can be used as one of the scleral flaps to cover a 9–0 Prolene suture. I would combine this procedure with a pars plana vitrectomy and I would take advantage of the pars plana infusion to give myself better control throughout the procedure. A video of the type of IOL exchange I would prefer in this situation may be found at http://www.youtube.com/watch?v=lsdo0Ca5Lvw. I have observed my patients for as long as 19 years after the scleral suturing of PCIOLs without seeing the sutures break or the IOL dislocate. In fact, after performing hundreds of these procedures, I have observed only one dislocation (occurring during vitreoretinal surgery), so I believe that this is a long-term rather than a temporary fix.

Another option would be to replace this lens with a three-piece IOL with its haptics placed within the sclera in a scleral groove (or within a groove under the flap), but I do not yet have personal experience with this technique. The approach has inherent advantages, including a smaller incision (associated with a foldable implant) and the avoidance of suture material. I have some concerns, however, about placing the haptics under so much tension in certain eyes. I am also a bit worried that placing a forceps externally through the ciliary sulcus to externalize a haptic for this technique might increase the risk of cyclodialysis, bleeding, and wound leaks. If other surgeons continue to report positive experiences with this technique, I will likely try it in the near future.

Section Editor Bonnie A. Henderson, MD, is a partner in Ophthalmic Consultants of Boston and an assistant clinical professor at Harvard Medical School. Thomas A. Oetting, MS, MD, is a clinical professor at the University of Iowa in Iowa City. Tal Raviv, MD, is an attending cornea and refractive surgeon at the New York Eye and Ear Infirmary and an assistant professor of ophthalmology at New York Medical College in Valhalla. Dr. Raviv may be reached at (212) 448-1005; tal.raviv@nylasereye.com.

Alan N. Carlson, MD, is a professor of ophthalmology and chief, corneal and refractive surgery, at Duke Eye Center in Durham, North Carolina. He acknowledged no financial interest in the products or companies he mentioned. Dr. Carlson may be reached at (919) 684-5769; alan.carlson@duke.edu.

David F. Chang, MD, is a clinical professor at the University of California, San Francisco, and is in private practice in Los Altos, California. He acknowledged no financial interest in the products or companies he mentioned. Dr. Chang may be reached at (650) 948-9123; dceye@earthlink.net.

D. Michael Colvard, MD, is a clinical professor at the University of Southern California Keck School of Medicine and clinical director of the Colvard Eye Center in Los Angeles. Dr. Colvard may be reached at eyecolvard@earthlink.net.

Alan S. Crandall, MD, is a professor, the senior vice chair of ophthalmology and visual sciences, and the director of glaucoma and cataract for the John A. Moran Eye Center at the University of Utah in Salt Lake City. He is a consultant to Alcon Laboratories, Inc. Dr. Crandall may be reached at (801) 585-3071; alan.crandall@hsc.utah.edu.

Matthew D. Kuhnle, DO, is a captain (P), Medical Corps, United States Army, and a clinical associate at Duke Eye Center in Durham, North Carolina. He is a consultant to Alcon Laboratories, Inc. Dr. Kuhnle may be reached at (310) 229-1220; avcmasket@aol.com.

Steven G. Safran, MD, is in private practice in Lawrenceville, New Jersey. He is a speaker for Bausch + Lomb and Heidelberg Engineering GmbH. Dr. Safran may be reached at (609) 896-3931; safran12@comcast.net.