Management of Anterior and Posterior Capsular Tears

Preparedness can reduce the amount of stress associated with this and other cataract complications.

BY NIC J. REUS, MD, PhD

In cataract surgery, it is not a question of whether a complication will occur, but when. And when a complication does occur, it best to be prepared. Having knowledge of how to handle a complication reduces the amount of stress associated with addressing the complication and increases the chances of a good visual outcome for the patient. This article focuses on managing tears in the anterior or posterior capsule and offers my experience in dealing with these complications.

ANTERIOR CAPSULAR TEARS

Tears of the anterior capsule, although relatively rare, may occur during the capsulorrhexis, lens sculpting, and removal of nuclear fragments. The greatest risk of an anterior capsular tear is that it can wrap around the equator and extend into the posterior capsule, increasing the risk for a subsequently dropped nucleus. Tears in the anterior capsule are often difficult to see because of the underlying cortex. Therefore, anterior capsular tears are often unnoticed until after cortex removal. If an anterior capsular tear has not wrapped around the posterior capsule by the time you start removing the cortex, then this is unlikely to occur.

The risk of an anterior capsular tear wrapping around to the posterior capsule increases with the amount of tension on the capsule and the capsulorrhexis, and therefore the amount of stress applied to the capsule and the capsulorrhexis must be minimized. Placement of an ophthalmic viscosurgical device (OVD) in the anterior chamber will flatten the anterior capsule, thus reducing stress on the capsule. Refraining from hydrodissection or rotating the lens in the bag also minimizes stress on the capsule.

With a softer lens, I may perform central sculpting, often followed by gentle hydrodissection or viscodissection of lens material. Because the epinucleus and cortex now can collapse centrally, less pressure is put on the capsule itself. With a harder nucleus, central sculpting may be difficult. In such situations, I try to perform an in situ nuclear fracture technique by sculpting the lens without rotating it. The Kelman bent tip allows me to sculpt laterally in these cases. I try to make the grooves as far away from the anterior capsular tear as possible.

Even in the presence of an anterior capsular tear, the capsular bag is often strong enough to sustain implantation of a foldable IOL. It is recommended, however, that the haptics of the IOL be positioned perpendicular to the tear to prevent the lens from luxating into the sulcus and causing IOL tilt. If I am in doubt whether the tear wraps around the equator, I opt to implant a three-piece IOL in
the sulcus. I refrain from using one-piece IOLs in the sulcus because they are more prone to decentration and to iris chafing, which can cause uveitis or raised intraocular pressure (IOP).

After surgery, I place pilocarpine ointment in the eye to constrict the pupil and ensure that the IOL cannot luxate into the anterior chamber. On postoperative day 1, I check that the IOL is well centered and the tear has not wrapped around to the posterior capsule.

**POSTERIOR CAPSULAR TEARS**

A tear in the posterior capsule is a common complication of cataract surgery. It may occur at various steps in the procedure, including during hydrodissection, lens sculpting, nuclear fragment or cortex removal, and lens implantation.

When a posterior capsular tear is noticed, a common reaction is to stop continuous irrigation and remove all instruments from the eye. However, this will often make matters worse; it is of utmost importance to maintain positive pressure in the anterior chamber so that the vitreous base and vitreous gel are pushed back. Failing to do so will allow the anterior chamber to collapse and the vitreous to prolapse through the tear into the anterior chamber. Moreover, nuclear fragments may then drop into the vitreous cavity.

The first thing I do when I notice or suspect a posterior capsular tear is to inject an OVD into the anterior chamber to maintain anterior chamber stability, keep the bag inflated, and tamponade the tear. I prefer an OVD with dispersive characteristics, such as Viscoat (Alcon Laboratories Inc., Fort Worth, Texas) or hydroxypropyl methylcellulose (HPMC) 2%. Only then is it safe to remove the instruments from the eye, giving me some time to think of the next sensible step. Compared with cohesive OVDs, dispersive OVDs are better at maintain-
Before taking out the vitrectome and the irrigating system, it may be time to place an IOL in the eye. The nuclear fragments and most of the cortex have been removed. I usually inject triamcinolone in the anterior chamber segment once having removed all visible vitreous. I usually inject diluted triamcinolone in 10 mL of balanced salt solution, and this mixture stains the vitreous very well. Any vitreous is easier to clean up than unstained, poorly visible vitreous.

When you suspect vitreous may have entered the anterior segment, it is important to clean up the vitreous before trying to clean up residual lens fragments or cortex. The easiest way to identify vitreous that has prolapsed into the anterior chamber is to stain it with triamcinolone. I usually dilute a vial of triamcinolone in 10 mL of balanced salt solution, and this mixture stains the vitreous very well. All vitreous will be clearly visible as white strands. In my experience, more vitreous becomes apparent after staining with dilute triamcinolone; stained, clearly visible vitreous is easier to clean up than unstained, poorly visible vitreous.

When you perform anterior vitrectomy to clean up any prolapsed vitreous, it is important to use the cut-I/A setting on your machine. This means that the vitrectome cuts in footpedal position 2 and starts aspirating only in footpedal position 3, which allows you to reduce traction on the vitreous and retina by cutting through the strands before aspirating them.

With a large posterior capsular tear, it is important to clean up vitreous strands up to the level of the tear. After having removed all visible vitreous, I usually inject dilute triamcinolone in the anterior chamber segment once more to make sure that no vitreous has been left behind. To maintain anterior chamber pressure, I like to keep the irrigation cannula inside the eye while injecting the diluted triamcinolone.

When the anterior segment is clear of vitreous and the nuclear fragments and most of the cortex have been removed, it may be time to place an IOL in the eye. Before taking out the vitrectome and the irrigating system, I fill the anterior segment with OVD. With a posterior capsular tear, the bag itself cannot support a lens. However, an IOL can often be placed in the sulcus. Therefore, I select a lens that is appropriate for sulcus placement. Because regular one-piece IOLs are often not designed to fit in the sulcus, I often implant a three-piece IOL in the sulcus with optic capture. I gently push the optic of the IOL through the intact anterior capsulorhexis to ensure a centered and stable IOL. I then usually apply pilocarpine or another miotic to constrict the pupil.

If intracameral antibiotic injection is not routine in your practice, now is a good time to use it, as an eye with a posterior capsular tear and vitreous loss is at an increased risk of developing endophthalmitis. Because patients who have had a posterior capsular tear with vitreous loss are at increased risk for endophthalmitis, elevated IOP, cystoid macular edema, and retinal detachment, it is wise to follow them at more frequent intervals, especially in the first days after surgery, than your uncomplicated cataract patients. At the regularly scheduled last follow-up visit (in my practice at 4 weeks), I also inspect the retina for any retinal tears that may have developed.

CONCLUSION

As with any complication that occurs during surgery, it is important to inform the patient and provide good instructions about when and how to contact you. I hope that having shared these personal experiences will help you to be better prepared for any capsular tears that may—and, unfortunately, will—occur in your future. It is my experience that being prepared beforehand will reduce the amount of stress for you and allow a better visual outcome for your patient.

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