Posterior Capsular Defect After Vitrectomy

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CASE PRESENTATION

A 66-year-old man is referred to you by a retina colleague in the community. The surgeon explains that, during a macular hole procedure, visibility was lost and the case was aborted. The patient was temporarily lost to follow-up and presents to you 5 weeks after the macular hole surgery.

His visual acuity is count fingers OD and 20/20 OS. The lens of his right eye has a milky white color, and there is a large central posterior capsular defect (Figure). The patient is instilling prednisolone 1% drops b.i.d., and the anterior chamber has 1+ flare with no cells.

How would you proceed?

—Case prepared by Tal Raviv, MD.

Figure. Posterior capsular defect.

GEORGE H. H. BEIKO, BM, BCh, FRCSC

The surgical course is consistent with an inadvertent rupture of the posterior capsule. The figure appears to show an oval defect in the posterior capsule without any extension, and the case presentation states that inflammation is minimal. No IOP is given, but it could have increased due to the inflammation as well as phacolytic and phacomorphic mechanisms. The cornea appears to be quite clear, however, which suggests that the IOP has not risen significantly.

Prior to surgery, I would examine the patient to ensure that there was no retinal detachment. If this were not possible due to poor visibility, I would request an ultrasound. I would also check for a relative afferent pupillary defect.

This patient is at increased risk of posterior dislocation of the lens or lens fragments. My surgical plan would therefore be to attempt to bring the lens into the anterior chamber (AC) very early in the procedure, to place an IOL in the sulcus to act as a barrier, and then to phacoemulsify the lens in the AC with a slow-motion phaco technique.

I would stain the AC with trypan blue. When making the capsulorhexis, I would be concerned about an Argentinian flag sign, in which the anterior capsulotomy rapidly extends around the equator of the lens, increasing the risk of lenticular dislocation. I would fill the AC with a viscoadaptive ophthalmic viscosurgical device (OVD). I would be careful to put in enough of the OVD to flatten the AC but not so much that it exerted pressure, which would cause the lens to dislocate through the posterior capsular rent already present. I would make a small central AC puncture with a cystotome and immediately aspirate any liquid lens material. Then, I would add more OVD to ensure that the AC was still flat. Initially, I would make a small capsulorhexis, debulk any lens material with low-flow I/A, and then gradually enlarge the capsulotomy so as to allow the lens to prolapse into the AC.

Once the capsulorhexis is complete, hydrodissection or hydrodelineation should not be necessary, because intumescent lenses are usually quite mobile. With a spatula, I would bring the remaining lens into the AC. Even if the lens were not mobile, I would not perform hydrodissection or hydrodelineation for fear of dislocation. Instead, I would use a cystotome to gently elevate the lens. I would instill an OVD anterior and posterior to the lens fragment in the AC to act as a cushion and to protect the endothelium. I would proceed to place a three-piece hydrophobic IOL in the sulcus so as to cover the defect in the posterior capsule. A silicone lens would not be a good choice, owing to the possible future use of silicone oil, and a hydrophilic lens would be more prone to calcification if gases were used in subsequent vitreoretinal procedures. The edge of the lens' anterior optic should be rounded to prevent iris chafe if the IOL remains in the sulcus. The Sensar IOL (Abbott Medical Optics Inc.) would be my choice.

I would phacoemulsify the lens in the AC using a low-flow technique, impaling the lens with the phaco tip and chopping as possible. Next, I would use an anterior vitrector (with the I/A and vitrectomy ports separated so as to allow a bimanual technique) to clean up the remaining cortex. I have my vitrector set such that foot position one is irrigation, two is irrigation/aspiration, and three is irrigation/vitrectomy. I would completely remove the cortex using a combination of positions two and three, depending on the amount of vitreous prolapse.

To choose the power of the lens, I would rely on the results of immersion ultrasound biometry in both eyes and optical biometry in the left eye. I would also request the refractions of the patient's eyes before the initial vitreoretinal procedure. If the eyes were previously similar in refraction, then I would choose the power based on the left eye. If not, I would evaluate the ultrasound data from the two eyes to see if the axial length differed. I would have two lenses available, one for sulcus placement and one for placement in the bag. The final position of the IOL would depend on the state of the capsular bag. If the anterior and posterior capsulotomies were intact, then I would move the IOL into the bag. Otherwise, I would rotate the lens to ensure that it was stable and leave it in the sulcus.

Because postoperative inflammation will likely be greater than after a standard procedure, I would plan to increase the frequency with which the patient administered steroid drops to q2h while awake (vs q.i.d. for 4 weeks) and review at 1 week.

I would ask my retinal colleague whether or not he/she wanted to time the macular hole surgery to immediately follow cataract surgery. It is reassuring to know that the patient still needs a retinal procedure, at which time any dislocated lens fragments could be addressed.

JOSEPH GIRA, MD

With a probable defect in the posterior capsule, there is a good chance that the lens will fall posteriorly, which should be thoroughly discussed with the patient preoperatively. At the time of surgery, trypan blue would enhance visualization of the anterior capsule. The use of a dispersive OVD would help keep the anterior capsule from bulging forward, a frequent problem with white cataracts that can cause the anterior capsulotomy to radiate out (the Argentinian flag sign). The surgeon should make the largest anterior capsular opening possible to allow him or her to prolapse the entire lens in the AC, where it could be safely phacoemulsified.

Any hydrodissection would have to be carefully performed, because this is when the posterior capsular defect could blow open, causing a loss of lens support. Hydrodelineation would be a safer option, because it would create a thick epinuclear shell that could shield the posterior capsular defect until the nucleus could be completely removed. Many quickly formed cataracts are white yet soft, which sometimes allows their aspiration without any hydrodissection or hydrodelineation whatsoever. Careful irrigation and aspiration of the cortex should be carried out starting from an area away from the defect and working toward it so as to avoid enlarging the defect.

Oftentimes, small defects in the capsule can self-seal with scarring arising from an inflammatory response of the exposed lens material. OVDs can be used to plug the defect during any point of the procedure to keep back the vitreous (if there is any left). Lowering the bottle might help to decrease the pressure in the eye and prevent the posterior defect from enlarging. Fortunately, if the lens drops, the patient already has a relationship with a retinal surgeon.

ZOLTÁN Z. NAGY, MD

I would perform a femtosecond laser-assisted capsulotomy (laser fragmentation only if the lens were hard) of the crystalline lens and create corneal incisions in this eye. Thereafter, I would stain the anterior capsule, remove it, and perform very gentle hydrodissection.

If the lens were hard, I would lift it into the AC to break it along the fragmentation line. I would use a lot of OVDs to support the endothelial cells. If the lens were soft, I would remove it with I/A only. The extent of the posterior capsular damage would dictate

where I implanted a three-piece hydrophobic IOL: a small amount might allow the lens to be placed in the bag; more would demand implantation in the sulcus. I would suture the corneal wound and, if necessary, perform a 23-gauge anterior vitrectomy or postpone macular surgery.

WHAT I DID: TAL RAVIV, MD

Considering the large central posterior capsular opening, I believed posterior dislocation of the lens was a significant risk and arranged to have the retinal surgeon present for simultaneous closure of the macular hole.

Intraoperatively, I treated the case like a posterior polar cataract and avoided hydrodissection. I made a 5.5-mm capsulorhexis to permit anterior lens prolapse and sulcus placement of the IOL with optic capture. I attempted to bring the lens supracapsularly with hydrodelineation. After safe removal of the endonucleus and peripheral epinucleus, I tried to free the central posterior epinuclear plate, but it was strongly attached to the posterior capsulomy's edge for 360°. Persistent nudging with I/A broke the adhesion but not without some extension of the posterior capsular defect and posterior dislocation of some cortical material. I placed a three-piece hydrophobic IOL in the sulcus with optic capture and turned the case over to my retina colleague for the planned pars plana vitrectomy and macular hole repair. The patient did well postoperatively and had a routine postoperative course.

The main take-home message is that the presence of a retina surgeon covered all possible eventualities. Just as importantly, I had peace of mind during a complex case. ■

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