

GRADUAL REDUCTION IN VISUAL ACUITY AFTER VITRECTOMY

What is the best approach to bilateral surgery?

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CASE PRESENTATION

A 58-year-old man with myopia presents for a cataract surgery evaluation. The patient's medical history is significant for a vitrectomy in his left eye for a retinal detachment 5 years ago. After recovery, postoperative visual acuity was pretty good, but it has worsened gradually. The patient reports that he cannot pass a driver's test because visual acuity in his right eye has decreased.

On examination, visual acuity is hand motion OS and 20/60 OD. The anterior chamber is slightly shallower in the left eye compared to the right eye. A dense brunescent cataract is present in the left eye, which otherwise appears to be within normal limits. The right eye exhibits 3+ nuclear sclerosis, consistent with the visual acuity.

How would you proceed?

—Case prepared by Lisa Brothers Arbisser, MD



SUMIT “SAM” GARG, MD

I would proceed carefully! A clear discussion of expectations with respect to the risks and planned outcome of the proposed surgical plan is required at the outset. The shallow anterior chamber in the left eye demands assessment. Is it solely because of the large cataract, or could there be some occult zonulopathy or capsular compromise (not unheard of after pars plana vitrectomy)? Admittedly, the cause is unlikely to be a compromised capsule this long after surgery, but, if the cataract developed quickly after vitrectomy, the possibility is higher. I would like to review B-scan ultrasonography of the left eye and check for a relative afferent pupillary defect to make sure that the vision loss is not from some other pathology.

The patient reports pretty good vision after retinal detachment repair in the left eye. He was probably depending on the unaffected vision in his right eye, so what “pretty good” means cannot be understood without more information.

With respect to surgery, I would operate on the left eye first. A three-piece monofocal IOL would be my preference. I would compare IOL power calculations for each eye to see if perhaps they are slightly off in the left eye because of the shallow anterior chamber, which can lead to an overpowered IOL. I anticipate some zonular weakness and would have my OR prepared accordingly, including having a capsular tension ring (CTR) and capsular tension segments available.

Depending on the outcome of surgery on the left eye, I would likely proceed in a similar fashion for the right eye. Although a presbyopia-correcting IOL could be considered, I generally am more conservative in situations similar to this one, especially when not all details are available.



SOON-PHAIK CHEE, FRCOPHTH, FRCS(G), FRCS(ED), MMED(S'PORE)

The challenges of operating on a myopic eye with a brunescent cataract and a history of vitrectomy include an unusually deep anterior chamber, potential zonular weakness, and difficult disassembly of a thick, dense nucleus. The shallow anterior chamber raises suspicion of zonular weakness. Essential preoperative assessments include ultrasound biomicroscopy for zonular status, endothelial cell count, OCT for macular pathology, and B-scan ultrasonography for retinal status. The fundus of the right eye should be carefully examined for retinal breaks.

Monofocal IOLs would be my preference in this case because of the potential inaccuracy of biometry and possible zonular and visual compromise from the previous retinal detachment. Monovision using one of the new-generation monofocal IOLs with a broad defocus curve in each eye would be a good strategy for reducing this patient's dependence on spectacles. I would schedule the procedures 1 week apart and offer bilateral laser cataract surgery to reduce the amount of phaco energy used, facilitate nuclear disassembly, and reduce zonular stress.

The internal lip of the clear corneal incision would be widened to improve maneuverability of the phaco needle and minimize wound burn. Preservative-free lidocaine 1% would be injected intracamerally. The bottle height or IOP would be low initially and increased slowly. Irrigation would be performed after the iris was lifted from the anterior lens capsule in order to prevent lens–iris diaphragm retropulsion syndrome. These steps can prevent sudden deepening of the anterior chamber, minimize stress on the zonules, and reduce ocular pain from ciliary body traction when infusion is initiated. If the zonules are lax, capsular hooks would be placed to support the lens during phacoemulsification. Capsular tension devices would be inserted as necessary to stabilize the capsular bag and center the IOL.



ABHAY R. VASAVADA, MS, FRCS

The first thing to decide is which eye to operate on first. The left eye has a denser cataract, worse visual acuity, and a shallower anterior chamber. It is also, however, the eye that has undergone a vitrectomy, so visual

recovery is likely to be suboptimal. Because the right eye is the patient's better-seeing eye, I would operate on it first. Detailed pre- and postoperative retinal evaluations are important for both eyes.

I would plan to perform cataract surgery on the left eye 4 to 6 weeks after surgery on the right eye. This would allow me to evaluate the refractive outcome and address retinal complications, if they are encountered, on the first eye.

Laser cataract surgery would be my preference for both eyes. In the left eye, the laser can facilitate the creation of a 5.1-mm capsulotomy and a partially if not completely divided nucleus. If necessary, division of the nuclear fragments would be completed with a horizontal chop technique, and the pieces would be removed carefully and as far away from the corneal endothelium as possible. I find the use of torsional ultrasound (Alcon) to be efficient for the removal of a dense cataract.

Because vitrectomized eyes may have weak zonules and posterior capsular dehiscence, it is important to avoid repeated shallowing of the anterior chamber. Additional amounts of a dispersive OVD would be injected as needed to protect the corneal endothelium and keep the posterior capsule from trampolineing forward when instruments are withdrawn from the eye.

It is not unusual for plaque to form on the posterior capsule in a vitrectomized eye. If small, centralized plaque is encountered, a posterior capsulotomy encompassing the plaque would be performed. A greater extent of plaque would require an Nd:YAG capsulotomy.

A monofocal IOL would be implanted in each eye. A toric model may be selected if indicated for the amount of preexisting corneal astigmatism.

Periodic postoperative retinal evaluations of both eyes are warranted because of the preexisting myopia.



WHAT I DID: LISA BROTHERS ARBISSER, MD

The patient stated preoperatively that he would prefer to drive without spectacle correction. During informed consent, I explained to him that, for him to achieve the daily function he desired and avoid anisometropia, either the myopic right eye would require a contact lens after a successful result was achieved with cataract surgery on the left eye, or bilateral cataract surgery would be necessary. The patient agreed to proceed with surgery on the left eye first and chose a refractive goal of emmetropia, with surgery on the right eye to follow as needed.

The shallower anterior chamber of the left eye relative to the right eye made me suspect zonulopathy, so a CTR was on the cataract instrument tray for this case. Because the eye had developed dense nuclear sclerosis over a 5-year period, I was not particularly concerned about the integrity of the posterior capsule. Topical anesthesia was planned.

Before surgery, I generally rate the predicted level of difficulty of the case according to the following levels:

- 1 for routine;
- 2 for a dense lens or small pupil;
- 3 for suspected zonulopathy so that the case is scheduled at the end of the morning; and
- 4 when I know that iris or scleral fixation and anterior segment reconstruction are required. These cases are scheduled at the end of the OR day.

This rating system helps to keep a busy OR schedule on track by avoiding, for the most part, delays that increase the anxiety level of patients and the staff. This case was scheduled as a level 3. As it turned out, the staff and



I missed lunch that day. (Scan the QR code now to watch the case.)

The significant opacity of the cataract prompted me to stain the

capsule with trypan blue dye to facilitate creation of the capsulorhexis. During hydrodissection, the nucleus was surprisingly immobile. An exploratory slight indentation of the globe revealed a temporal area of missing zonules. I immediately covered this area with a dispersive OVD, making a reverse Arshinoff shell in addition to my standard technique for protecting the endothelium.

I placed Yaguchi-Kazawa capsular hooks (Handaya). Capsular hooks manufactured by MicroSurgical Technology would be an alternative but were unavailable at the time. The end of a Yaguchi-Kazawa capsular hook is shaped like the nose of a hammerhead shark, and it distributes forces nicely along the edge of a continuous curvilinear capsulorhexis in my experience. The hooks suspended the bag so that I was able to perform my routine vertical chop circumferential disassembly of the brunescant cataract.^{1,2} I was careful to avoid the floppy posterior capsule when removing the final lens fragments because the capsule was not yet supported by a CTR. I also carefully cleaned the capsular bag, which required some manual stripping of the cortex in the area of zonulolysis, and I inserted a CTR without difficulty.

The next step was to place an Ahmed Capsular Tension Segment (CTS; Morcher). A small amount of lidocaine was injected beneath Tenon capsule and over the area of intended scleral fixation before a fornix-based flap was created (given the use of topical anesthesia). A

superior paracentesis was then made. Docking into a thin catheter to avoid grabbing corneal tissue, I retracted the needles through the paracentesis to achieve a better angle for the ab externo approach, given that the missing zonules had been noted almost temporally. A CTS was sutured to the sclera over the area of perceived zonulolysis. Care was taken to tie the suture knot over one of the ab externo puncture wounds so that the knot was easily buried intrasclerally without the need to rotate the suture.

At this point, thinking I was nearly done, I went to implant a one-piece acrylic lens but found, to my shock and dismay, that the zonulolysis was far more extensive than I had suspected. As I tried to place the trailing lens haptic, the entire capsular bag tilted backward with the CTS as the pivot point because there was no vitreous body to support it. It was clear that another CTS would have to be placed 180° away from the first CTS. The capsular hooks (which had been set aside to await the end of the case) were again placed in the eye to bring the bag into the correct plane and stabilize it during insertion of a second CTS and the IOL.

The patient was cooperative and was kept comfortable with small intravenous aliquots of alfentanil HCl (Alfenta, Akorn) and midazolam (Versed, Roche) as needed. The procedure was otherwise uneventful.

Postoperatively, the IOL was well centered, and the eye was quiet. UCVA was 20/40. The patient had mild metamorphopsia associated with the prior retinal detachment but was happy with the surgical outcome. He underwent cataract surgery on the contralateral eye 1 month later after a careful evaluation of the peripheral retina. ■

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