

Early Cataract After Vitrectomy

BY JAMES T. BANTA, MD; ANNA S. KITZMANN, MD; BRIAN C. LITTLE, FRCO_{PHTH};
KEVIN M. MILLER, MD; AND RAHUL T. PANDIT, MD

CASE PRESENTATION

A 61-year-old man is referred to you by the Retina Service for cataract surgery on his right eye. His past ocular history is significant for a macula-off retinal detachment, status post pars plana vitrectomy, endolaser photocoagulation, a scleral buckle, and an air-fluid exchange in his right eye 3 weeks before the referral.

On examination, the UCVA of the patient's right eye is count fingers at 3 feet (Figure 1). The crystalline lens has 2+ nuclear sclerosis and a 3+ to 4+ posterior subcapsular cataract. There is a hole in the posterior capsule peripherally from the 7- to the 8-o'clock position.

Given the hole in the posterior capsule from the patient's recent vitreoretinal surgery, how would you approach cataract surgery?



Figure 1. The slit-lamp findings for the patient's right eye.

JAMES T. BANTA, MD

There are three basic principles to follow in a case such as this:

1. avoid overpressurizing the eye
2. adjust your phaco settings to allow compartmentalization of the eye with a dispersive viscoelastic
3. be patient

After making standard incisions, I would create a capsulorhexis measuring slightly less than 5 mm. I typically make a larger capsulorhexis, but with a violated posterior capsule, I prefer to use a three-piece acrylic IOL with its haptics in the sulcus and the optic prolapsed through the intact capsulorhexis. If the capsulorhexis is too large, the IOL can tilt and induce astigmatism. I would extract the lens without hydrodissection or hydrodelineation. Using the slow-motion phaco settings popularized by Robert Osher, MD, I would debulk and remove as much of the

nucleus as possible. I would then perform viscodissection in each quadrant and fold the epinucleus toward the center before removing it with the phaco handpiece. As the viscoelastic dissects around the quadrant with the preexisting defect, it will act as a tamponade between the posterior and anterior segments—similar in theory to the management of a posterior polar cataract. By allowing the capsular bag to remain compartmentalized, the slow-motion settings will keep the viscoelastic in place and prevent the posterior loss of lenticular material.

I would perform cortical cleanup with similar settings (reduced bottle height, vacuum, and aspiration). I would implant the IOL in the manner already described. After the IOL's prolapse through the intact capsulorhexis, I would use normal I/A settings to evacuate the dispersive viscoelastic, because the IOL will now act as a barrier between the anterior and posterior segments. It would be wise to have a retina specialist available in case of difficulties.

ANNA S. KITZMANN, MD

Because the cataract has developed quickly after the repair of the macula-off retinal detachment, I would explain to the patient that his postoperative vision could be limited by the retinal detachment. The hole in the posterior capsule could complicate cataract surgery, so I would spend additional time discussing the potential problems with the patient.

Because the cataract procedure could be difficult, I would perform surgery with a retrobulbar block rather than topical anesthesia. My approach to this case would be similar to that for a posterior polar cataract. I would try not to make an extremely large capsulorhexis so that a sulcus-fixated lens would have adequate support if implantation of an IOL in the bag were not possible. I would avoid hydrodissection and would instead perform gentle hydrodelineation. I would not try to spin the lens. Instead, I would sculpt a large central groove and attempt to crack the nucleus in half. Then, I would try to remove the halves using slow-motion phacoemulsification with low vacuum and flow rates. Next, I would

attempt to viscodissect the epinucleus away from the capsule with Viscoat (Alcon Laboratories, Inc., Fort Worth, TX) and remove the epinucleus. I would repeatedly inject Viscoat over the hole in the posterior capsule while removing the cortex.

If surgery proceeded smoothly and there were only a small hole in the posterior capsule, then I would place a single-piece acrylic IOL in the bag. If the case became complicated with an extension of the hole in the posterior capsule, I would temporarily close the temporal wound with a 10–0 nylon suture and enlarge the superotemporal paracentesis. I would make an inferotemporal paracentesis slightly wider than 1 mm. Next, I would perform a triamcinolone-assisted anterior vitrectomy. I would place a three-piece IOL in the sulcus using a Monarch B cartridge injection system (Alcon Laboratories, Inc.). Finally, I would add Miochol-E (Novartis Ophthalmics, Inc.) and suture the temporal wound as well as both of the paracentesis wounds.

BRIAN C. LITTLE, FRCOPHTH

At this point, the air in the posterior segment will have been reabsorbed, and the treated retinal break will have firmly closed. Cataract surgery at this time is therefore unlikely to risk a repeat detachment.

The eye was vitrectomized via a pars plana approach, and there is an iatrogenic break in the posterior capsule from a lens strike during the vitrectomy. Detailed counseling of the patient together with a carefully planned surgical strategy are needed because of the consequently high risk of dropping the whole nucleus or nuclear fragments. A strong argument could be made for sending this patient directly to a (different!) vitreoretinal surgeon. He or she could make a capsulorhexis and then remove the nucleus with a fragmatome using a posterior approach via the pars plana, over a cushion of heavy liquid. Next, he or she could place an IOL in the sulcus and trap the optic in the capsulorhexis.

I would advise anterior segment surgeons not to use pars plana incisions unless a vitreoretinal surgeon is standing by who could examine the peripheral retina and deal with any of the many potential complications. A surgeon handling this case solo should be wary of two big traps. The laxity of the lens-iris diaphragm in a vitrectomized eye is the first. The other is the almost inevitable posterior dislocation of the nucleus if subcapsular hydrodissection is attempted.

I would make a carefully sized (a goal of 1 mm smaller than the optic) and well-centered capsulorhexis. Too large a capsulorhexis will render the optic's capture insecure.

The technical difficulty of removing the nucleus will depend on how hard it is. At 61 years of age and only

3 weeks after vitrectomy, the nucleus is unlikely to be more than moderately dense. I would "bowl" out the nucleus as much as possible without any initial hydrodissection. Hydrodelineation could be tentatively carried out to define, isolate, and mobilize the endonucleus. I would not crack the nucleus, because the centrifugal force could extend the posterior capsular opening. Lens-iris diaphragm retropulsion syndrome (as described by Dr. Osher) is likely to result in significant deepening of the chamber. It could be readily reversed and stabilized, however, by lifting the edge of the pupil to allow the equilibration of fluid between the anterior and posterior segments. This step is important, because otherwise, the posterior capsule will be under stretch from pressurization of the chamber.

After thinning the nucleus as much as possible, the surgeon could mechanically collapse the walls of the bowl using either a right-angled, blunt-tipped horizontal chopper or the ever-reliable Sinsky hook. A dispersive ophthalmic viscosurgical device could also be injected into the subcapsular space to assist the central collapse of the nucleus' walls or to prolapse the bowl forward through the capsulorhexis. If at any point either the whole or part of the nucleus dropped posteriorly, it would rapidly disappear from sight, because there is no vitreous supporting it. In that instance, I would recommend abandoning the procedure and handing the case over to a vitreoretinal colleague.

A lucky scenario would be if the hole in the posterior capsule were a circular punched-out defect, which would be stable.

If the cataract procedure goes well, the surgeon will need to remove the remaining soft lenticular matter and cortex. I would use bimanual anterior vitrectomy instruments set on aspiration-cut or dual linear if available via limbal sideport incisions. I would check for vitreous using preservative-free triamcinolone acetonide. Then, I would place a three-piece foldable IOL with open J-haptics of appropriate power in the sulcus and capture the optic in the capsulorhexis.

With the exponentially increasing use of intracameral injections of antivascular endothelial growth factor, this sort of case is becoming ever more prevalent and poses a significant surgical challenge.

KEVIN M. MILLER, MD

I have seen a case like this one a few times before. It is important to identify posterior capsular ruptures at the slit-lamp biomicroscope before operating. A rapid loss of vision after vitrectomy is a helpful clue, but that history may not be present if the patient had poor vision preoperatively. Iatrogenic capsular tears usually develop for one of two reasons. When the tears are peripheral, as in this case, they

usually result from an anteriorly placed sclerotomy. When the holes are central, they usually result from an overly aggressive removal of anterior cortical gel. The port sclerotomy for the infusion cannula is the likely culprit here.

I approach these cataracts in the same way I do posterior polar cataracts. I avoid hydrodissection and nuclear rotation. Instead, I sculpt a central groove and perform multiple hydrodelaminations from within the groove. After removing the nucleus and epinucleus, I aspirate the cortex and stay away from the hole until the very end. Before I remove any instruments from the eye, I inject plenty of an ophthalmic viscosurgical device to maintain the chamber. Often, a fibrotic plaque will form around iatrogenic holes to keep them from extending.

If the edges of a hole are strong, I will place an IOL in the capsular bag and orient the haptics away from the rupture. If the hole extends, I will place a STAAR Elastimide lens (model AQ2010V; STAAR Surgical Company, Monrovia, CA) in the sulcus. If an anterior vitrectomy must be performed, the procedure is easy because the retina surgeon has already done most of the work.

RAHUL T. PANDIT, MD

Given the tear in the posterior capsule, care should be taken not to overinflate the anterior chamber at the beginning of the case during the injection of viscoelastic. Overpressurizing the anterior chamber can cause the posterior capsular tear to enlarge and the nucleus to drop. Furthermore, the integrity of the zonules may be in question, even without overt preoperative phacodonesis, given the prior vitrectomy. Under these circumstances, I prefer to use a modest amount of a viscoadaptive agent such as DisCoVisc (Alcon Laboratories, Inc.) or Healon5 (Abbott Medical Optics Inc., Santa Ana, CA).

After forming the capsulorhexis, the surgeon should not perform hydrodissection given the risk of enlarging the tear. Careful hydrodelineation could be attempted, but extreme caution is needed to avoid overinflation of the capsular bag and extension of the tear, which could cause the nucleus to drop. The aspiration flow rate and bottle height should be lowered.

After aspirating the anterior cortex, I would use a dry chop technique, in which I performed a horizontal chop without any prior hydrodelineation by estimating the position of the nuclear edge and placing the edge of the chopper just distal to it. With the phaco tip embedded centrally, I would perform two chops in the nasal quadrant, and I would tease the nuclear fragment into the anterior chamber with a combination of vacuum from my phaco tip and manual undermining and lifting with the chopper. I would then emulsify the fragment in the anterior chamber. With more space in the capsular bag, I could perform mild

hydrodelineation, thereby allowing rotation of the remaining nucleus, and would then repeat the chopping maneuver. Alternatively, because this cataract does not appear to be very dense, one could create a second paracentesis 180° opposite to the first and perform a prechop with two instruments moving in opposite directions to each other.

I would perform cortical removal, beginning with the quadrants farthest away from the posterior capsular tear and using slow flow settings (a low aspiration flow rate and low vacuum). Finally, I would place a three-piece IOL in the sulcus with capture of the optic in the capsulorhexis. ■

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. Oetting may be reached at (319) 384-9958; thomas-oetting@uiowa.edu.

James T. Banta, MD, is an associate professor of clinical ophthalmology at Bascom Palmer Eye Institute, University of Miami Miller School of Medicine. Dr. Banta may be reached at (305) 326-6185; jbanta@med.miami.edu.



Anna S. Kitzmann, MD, is an assistant professor in the Department of Ophthalmology & Visual at the University of Iowa in Iowa City. She acknowledged no financial interest in the products or companies she mentioned. Dr. Kitzmann may be reached at (319) 356-8118; anna-kitzmann@uiowa.edu.

Brian C. Little, FRCOphth, is a consultant ophthalmologist and training director of the Cataract Service at Moorfields Eye Hospital NHS Trust in London. Dr. Little may be reached at +011 44 20 7566 2018; brian.little@moorfields.nhs.uk.



Kevin M. Miller, MD, is the Kolokotronis professor of clinical ophthalmology at the Jules Stein Eye Institute, David Geffen School of Medicine at UCLA, Los Angeles. He acknowledged no financial interest in the products or companies he mentioned. Dr. Miller may be reached at (310) 206-9551; kmiller@ucla.edu.



Rahul T. Pandit, MD, is an assistant professor of ophthalmology at Weill Cornell Medical College in New York City and is in practice at Methodist Eye Associates in Houston. He acknowledged no financial interest in the products or companies he mentioned. Dr. Pandit may be reached at (713) 441-8843; rtpandit@tmhs.org.

