

WHITE CATARACT WITH SILICONE OIL AFTER RECURRENT RETINAL DETACHMENT

BY ANITA NEVYAS-WALLACE, MD; GRACE SUN, MD; CHARLES COLE, MD;
AND LISA BROTHERS ARBISSER, MD

CASE PRESENTATION

Years ago, a 45-year-old myopic man had a failed scleral buckle with proliferative vitreoretinopathy, followed by pars plana vitrectomy and silicone oil placement in his left eye. The patient never saw too well thereafter and was told no further surgery would be helpful. He had traveling vision until recently.

Upon presentation, the visual acuity in the fellow eye is 20/20 with a -8.00 D spherical refraction, and an indirect indented retinal examination shows lattice degeneration with no tears or other significant pathology in his right eye. There is less than a

0.6 log unit relative afferent pupillary defect (RAPD) in the left eye by reverse pupillary examination and no view of the fundus. Ultrasound of the left eye shows an attached retina. Vision with light projection is hand motion. The anterior segment is normal except for a slightly shallow chamber compared to the fellow eye, posterior synechiae, a poorly dilating pupil, and a white cataract.

How would you counsel this patient? What would your surgical plan be?

—Case prepared by Lisa Brothers Arbisser, MD.



ANITA NEVYAS-WALLACE, MD

I would counsel the patient that, although proliferative vitreoretinopathy limits the visual potential of his left eye, the cataract is so opaque that surgery might nonetheless improve his vision. His ability to discern light projection and the mildness of the RAPD suggest that retinal and optic nerve function might permit useful vision. The risk/benefit ratio is favorable, and surgery would both prevent complications of lens hypermaturity and allow the left eye to be the best “spare tire” possible.

I would target myopia of 0.50 to 0.75 D in the left eye. The patient would continue wearing his -8.00 D contact lens on his right eye.

Because this dense, white cataract blocks light, A-scan ultrasonography rather than laser interferometry would be used to measure axial length. I would take the presence of silicone oil in the eye into account when assessing axial length from the A-scan.

The silicone oil will make surgery more challenging, because the oil’s buoyancy increases posterior pressure. Silicone oil neutralizes a biconvex IOL’s posterior radius, so I would favor a convex-plano IOL. I would avoid a silicone IOL, because silicone oil will stick irregularly to its surface, damaging the implant’s optical quality. This might also occur with an acrylic

IOL, particularly hydrophilic acrylic.¹ A convex-plano PMMA implant such as the MC60CM (Alcon) would be a good choice. If I used a three-piece biconvex hydrophobic acrylic IOL such as the Tecnis ZA9003 (Johnson & Johnson Vision [J&J Vision]), then knowing its posterior radius of curvature could permit calculation of an IOL power that would avoid a hyperopic result. Alternatively, if the IOL power calculated conventionally were less than 20.00 D (likely in an 8.00 D myope), I would add about 6.00 D to the calculated power based on advice from Warren Hill, MD.

My surgical plan would be as follows. I would make two paracenteses and a 2.75-mm incision, then perform synechiolysis using a dispersive ophthalmic viscosurgical device (OVD). Given the shallow anterior chamber, I would enlarge the pupil using iris hooks rather than a Malyugin Ring (MicroSurgical Technology). I prefer polypropylene or nylon iris hooks to metal, because the former are thicker and less likely to damage the pupillary margin.

After placing a thin layer of balanced salt solution between the anterior capsule and the OVD, I would paint trypan blue onto the anterior capsule. I would then instill Healon5 or Healon GV (both from J&J Vision) onto the capsule in a “soft-shell” technique, both to provide better protection of the endothelium with the dispersive OVD and to firmly indent the anterior capsule to prevent tearing out of the capsulorhexis (Argentinian flag sign). Next, using a 23-gauge needle on a 3-mL

syringe half-filled with balanced salt solution, I would pierce the center of the anterior capsule and aspirate liquefied cortex to decompress the bag.

After creating a capsulorhexis slightly smaller than the diameter of the IOL's optic (to allow optic capture if needed), I would perform hydrodissection and hydrodelineation. I would emulsify the nucleus using a zonule-friendly vertical chop phaco technique. This would mean cracking the nucleus between the phaco tip and the Seibel vertical chopper, while exerting the least possible pull on the zonule. After phacoemulsification, I would initiate sideport infusion and use a curved, textured 27-gauge cannula (Nevyas-Wallace Cortex Liberating Cannula; Katena) on a 3-mL syringe to dissect cortex from the capsule, rather than risk tearing the silicone oil-billowed posterior capsule with the I/A tip. I would implant the IOL under a cohesive OVD. If I chose the PMMA IOL, I would enlarge the incision before implantation and place sutures afterward.



GRACE SUN, MD, AND CHARLES COLE, MD

Communicating with the patient regarding a guarded visual prognosis would be critical to this informed consent. Although the patient's final visual acuity will depend

on his retinal function, expressing cautious optimism would be reasonable, given his recent history of better vision, an examination revealing a mild RAPD, and a flat retina on B-scan.

Surgical planning begins with IOL selection. Ultrasound biometry is needed for this white cataract, with a correction for axial length, given the presence of silicone oil. Because the oil will likely remain in the eye indefinitely, the final IOL power must be adjusted for the difference in refractive index of silicone oil versus vitreous. Adding 3.00 D for a plano-convex PMMA IOL or at least 6.00 D for a biconvex IOL would be a reasonable adjustment. Alternatively, a low-powered piggyback sulcus IOL could be placed and then removed should the oil not remain. Because of the previous buckle, a comparison to the fellow eye would not be terribly useful.

Intraoperatively, we would instill a cohesive OVD in the anterior chamber, break the synechiae using two Kuglen hooks, and stain the anterior capsule with trypan blue under the OVD. We would then rinse the viscoelastic from the eye and replace it with a denser OVD such as Healon5 to maintain pupillary dilation. Alternatively, a Malyugin Ring or iris hooks could be used. We might attempt to aspirate some cortical material to decompress this white cataract before beginning the capsulorhexis. We would exercise caution during hydrodissection and phacoemulsification, because previous retinal surgery may have violated the posterior capsule. We would plan to place the IOL in the bag, but if that proved impossible, we would implant the lens in the sulcus. Finally, we would consider performing an inferior peripheral iridotomy.



WHAT I DID: LISA BROTHERS ARBISSER, MD

In a case such as this, discussion of the refractive aim should center on both the likelihood of silicone oil removal and its effect on refraction. Unless the patient wears contact lenses routinely, it is prudent to avoid anisometropia with the sound eye in hopes of gaining useful

central vision in the operative eye. Axial length measurement must take into account the presence of silicone oil. Theoretically, should the plan be to remove the silicone oil, a lens with its power predicted for the absence of oil can go in the bag, and a sulcus piggyback lens can be placed to account for the change in refraction caused by the presence of the oil. Upon removing the oil, the sulcus lens is removed as well. Eyes such as this one tend to be large and sick and to have a poor visual prognosis. Piggybacking carries risks, especially in the United States, where there is no lens designed for sulcus stability. For this patient, I elected in-the-bag placement of an IOL appropriate to the eye's current silicone oil-filled state and mild asymmetry, because he was accustomed to glasses and myopia. With a targeted postoperative refraction of -6.00 D, I would expect a result close to plano if the oil is ever removed.

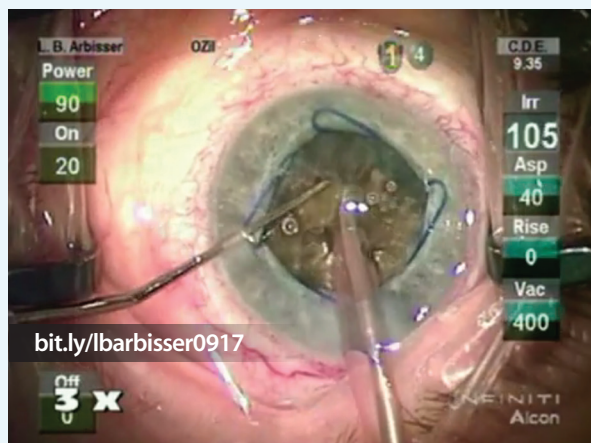
Because the patient was unable to fixate reliably on and follow a muscle light, I opted for peribulbar anesthesia with a Honan balloon to "deturgesce" the orbit. I started him on a topical nonsteroidal anti-inflammatory drug 1 week before surgery because of prior evidence of inflammation. Fifteen minutes prior to the start of surgery, a bolus of mannitol 1/4 g/kg intravenous push was instilled to minimize the posterior pressure from the presence of silicone oil.

For cases such as this one, I have capsular tension rings and segments as well as capsular hooks on hand. I find that tight incisions (including a 0.5-mm paracentesis) help maintain a controlled environment. For the soft-shell, I use a highly cohesive (Healon GV) or viscoadaptive OVD (Healon5) to maintain space, keep the lens dome flat, and prevent the rapid egress of lens milk under pressure and a dispersive OVD for endothelial protection. I perform gentle blunt synechiolysis and place a Malyugin Ring (preferred to obviate the need for additional incisions, which risk leaks with iris hooks) to secure an adequately sized pupil. I stain the capsule with trypan blue to enhance visibility.

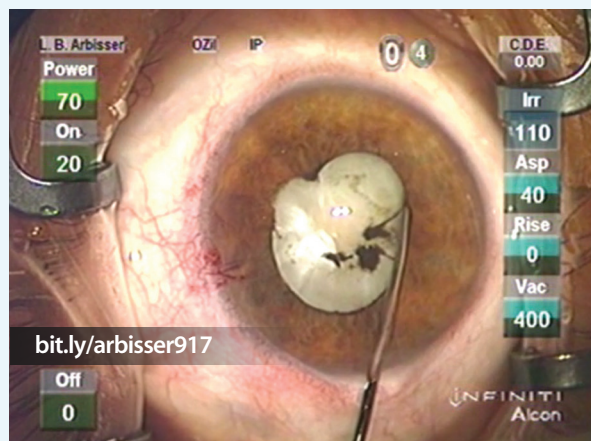
I carefully fashioned a 5-mm capsulorhexis to allow anterior capture of the lens optic in the event of complications (calipers ensured correct proportions for this eye that measured 14 mm white to white). Minimal hydrodissection achieved a free nucleus. I filled the anterior chamber with Viscoat (Alcon) and covered the zonules to prevent the seepage of silicone oil through a potentially weak network. I introduced the phaco handpiece while in foot position 0. With the chopper, I elevated the iris off the peripheral anterior capsular rim to avoid reverse pupillary block and overdeepening of the anterior chamber, which would have placed stress on the zonules before foot position 1 initiated irrigation. I always establish

WATCH IT NOW

Lisa Brothers Arbisser, MD, demonstrates her technique for circumferential disassembly with cross-action chop.



See how Dr. Arbisser managed this case.



flow in foot position 2 prior to applying ultrasound to prevent wound burn in an OVD-filled environment. I used my cross-action vertical chop disassembly technique with circumferential debulking as needed (see *Watch It Now*).²

When removing the phaco or I/A tip from the chamber, I instill viscoelastic through the sideport incision to prevent the anterior chamber from collapsing. Posterior pressure exerted by the silicone oil makes this precaution necessary. If the chamber collapses at any point, not only may beads of endothelium-toxic silicone oil droplets breach the zonular network, but fluid misdirection may develop when the I/A tip is inserted in the presence of a flat anterior chamber, thereby increasing posterior pressure. Irrigation and aspiration must be thorough, and posterior capsular polishing should be attempted in these eyes, although some fibrosis or pigment is often present on the back of the posterior capsule.

There was no need for a capsular tension ring in this case. I inserted a one-piece IOL and centered it under the capsulorhexis. In my experience, the tackiness of the hydrophobic acrylic will generally keep the IOL in position, even in a big bag. I verified that all incisions were secure prior to OVD removal (again to prevent chamber collapse). When immediate removal of silicone oil is planned, a suture should be placed, but it was unnecessary in this case. I used intracameral triamcinolone acetate (Triesence; Alcon) and moxifloxacin (off label) for this surgery. At the conclusion of the case, I administered a drop of atropine to reduce inflammation.

Postoperatively, the patient had an uneventful recovery, with -6.50 D sphere by retinoscopy on day 1 through a clear cornea. His BCVA was 20/100, associated with macular pathology. The patient regained traveling vision with an attached retina. I referred him to a retina colleague for an evaluation of potential silicone oil removal and ongoing follow-up. ■

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2. Arbisser LB. Advanced phaco techniques for brunescient nuclei: cross-action chop circumferential disassembly. In: Chang DF, ed. *Phaco Chop*. 2nd ed. Thorofare, NJ: Slack; 2013:121-129.

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