

Vitreous Prolapse

**BY LISA BROTHERS ARBISSER, MD; JAMES T. BANTA, MD; GEOFFREY BROOCKER, MD;
AND THOMAS A. OETTING, MS, MD**

CASE PRESENTATION

A 62-year-old man has no profound history of trauma but does have a history of boxing while in the military. He developed a functionally significant cataract over time and presented with a mature cataract. On examination, a white cataract was visible with no folds in the capsule and no phacodonesis. The anterior chamber was quiet. The iris was normal with no rubeosis despite the patient's history of diabetes controlled with oral medication. He denied using any medication in the past for benign prostatic hyperplasia.

At the start of the case, the surgeons noticed that the iris was drawn into the paracentesis (Figure 1). With the initial thought of intraoperative floppy iris syndrome (IFIS), the ophthalmologists planned to place a Malyugin Ring (MicroSurgical Technology) after staining the capsule. It becomes clear, however, that the iris was drawn into the paracentesis due to the prolapse of vitreous around the zonules in the area of the paracentesis (Figure 2).

How would you proceed?

—Case prepared by Thomas A. Oetting, MS, MD.



Figure 1. A peaked pupil after the paracentesis.



Figure 2. Vitreous coming through the paracentesis.

LISA BROTHERS ARBISSER, MD

A subtle warning of zonular dehiscence is asymmetry of the anterior chamber depth on the IOLMaster (Carl Zeiss Meditec, Inc.), although we surgeons can be taken by surprise, as in this case.

When testing an incision for vitreous loss, a scissor should be in hand (as pictured in Figure 2) to immediately relieve the traction created by the sponge's capillary action. Once vitreous loss is identified, I use triamcinolone (Triesence; Alcon Laboratories, Inc.), diluted 10:1 with BSS (Alcon Laboratories, Inc.) irrigated through the main incision, to identify the extent of prolapse. For a discrete strand around zonules, I would use an intraocular scissors to sever the posterior attachment of the

escaped vitreous. Next, I would reposition the stump of vitreous into the posterior segment with a dispersive ophthalmic viscosurgical device (OVD) and compartmentalize the eye with a low-viscosity cohesive OVD. If there were a large sheet of vitreous that could not be sharply amputated, then I would proceed to an anterior vitrectomy through a pars plana incision to amputate all attachment,¹ followed by the compartmentalization described earlier. Only at that point, when traction had been relieved, could the remaining anterior portion of the strand of prolapsed vitreous be safely removed with the sponge, allowing the paracentesis to be closed.

I would support the bag in this region with capsular hooks before proceeding with thorough hydrodissection.

I would wait to place the capsular tension ring (CTR) until the bag was clean. Phacoemulsification should proceed with lowered fluidics, and I would be mindful to replace the dispersive OVD over the area of missing zonules if the agent dissipated. Vertical chopping would place minimal stress on the zonules. I would be careful when removing the last fragments from the flaccid bag.

Cortical removal should be routine with hooks supporting the bag. After placing a standard CTR, I would insert a single-piece IOL in the bag and remove the hooks. Based on the extent of the zonular loss and the bag's centration, I would consider adding an Ahmed Capsular Tension Segment (Mocher GmbH, distributed in the United States by FCI Ophthalmics, Inc.) sutured to the sclera. I would manually remove the OVD without allowing the chamber to become shallow at any point. Using Triesence, I would verify the absence of a re-presentation of vitreous and ensure that the incisions had closed reliably.

JAMES T. BANTA, MD

What a nightmare! There are multiple ways of approaching this case, and much depends on the individual surgeon's comfort level. It would certainly be nice to know how much zonular injury is present before deciding how to proceed.

I would start by staining the capsule, filling the eye with an OVD, and then initiating a capsulorhexis (while avoiding the entrapped vitreous). The capsulorhexis often tells the story. If there is diffuse, severe zonular loss, an argument could be made for having a retina colleague remove the lens via the pars plana. If zonular support is acceptable (an assessment that will vary from surgeon to surgeon), I would support the weak areas with iris or capsular hooks around the intact capsulorhexis. A limited vitrectomy to cut back the prolapsed vitreous could be performed, followed by compartmentalization of the eye with an OVD. Using slow-motion phaco settings (vacuum and aspiration levels below that required for removal of the OVD), I would extract the lens and determine the integrity of the capsular support system.

Cortical cleanup gives a clear indication of zonular integrity. If the zonules were damaged focally (≤ 4 clock hours), I would insert a CTR and proceed with posterior capsular placement of the IOL. If there were more diffuse injury, my preference would be to remove the capsular bag in its entirety (simply grabbing it with a forceps and removing it from the eye), perform an anterior vitrectomy, induce miosis with acetylcholine, and suture a three-piece IOL to the iris using a Siepser sliding knot technique.

GEOFFREY BROOCKER, MD

The chamber appears to be shallow, and there is an intumescent, dense, nuclear cataract. After removing externalized vitreous with a cellulose sponge spear, I would fill the anterior chamber with a dispersive OVD, my initial aim's being the pupillary margin where vitreous prolapsed through a zonular aberration. If the anterior chamber did not deepen considerably, I would consider tapping the anterior vitreous cavity with a 27-gauge needle (3.5-4 mm posterior to the limbus) of about 0.2 mL of liquid vitreous. The eye would soften, and the anterior chamber should deepen with less propensity for persistent vitreous prolapse. I would then stain the capsule with trypan blue.

I would create a sclerocorneal tunnel in case conversion to larger-incision extracapsular/intracapsular cataract extraction were necessary. During attempts at the capsulorhexis, if I noted severe movement of the lens, I would enlarge the wound and perform an intracapsular cataract extraction, followed by an anterior vitrectomy and placement of an ACIOL (barring preoperative IOP issues or gonioscopic evidence of significant angle abnormalities). If there were little movement of the lens, capsular hooks and/or a prephaco CTR could be placed. A large capsulorhexis would facilitate the hydrodissection of an extremely hard nucleus into the anterior chamber for delivery with extracapsular cataract extraction. An alternative would be to keep the nucleus in the bag and perform phacoemulsification using a chopping technique to limit stress on the remaining zonules.

After completing cortical cleanup and filling the bag with a cohesive viscoelastic, if I did not use a CTR, I would place a three-piece acrylic IOL in the capsular bag, oriented in the meridian of the initial stab incision to act as a miniature tension ring in that area. After removing the capsular hooks/viscoelastic, I would ensure no vitreous was still present and consider suturing the wound.

THOMAS A. OETTING, MS, MD: HOW THE CASE WAS MANAGED

Our third-year resident, Matthew Ward, and I used dilute and preservative-free triamcinolone to stain the vitreous in the anterior chamber. We performed a bimanual vitrectomy to remove the vitreous from the paracentesis and used the automated vitrector to trim the vitreous to the level of the iris. We used a sideways Arshinoff shell with a viscous dispersive OVD in the area of the weak



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zonules and a cohesive OVD across from it to push the dispersive agent into the area of the weak zonules. We felt this would help seal the area of weak zonules and prevent further vitreous prolapse. The capsulorhexis was uneventful and revealed only mild zonular laxity, most pronounced in the area of the paracentesis.

We used a cohesive OVD to dissect the capsule from the lens and create a space for a standard CTR, which we injected. After inserting the CTR, we proceeded with phacoemulsification using very low vacuum and a low bottle height (slow motion), and we removed the cataract in a typical fashion. After implanting the IOL, we instilled acetylcholine (Miochol-E; Bausch + Lomb) to ensure that the pupil was not peaked. The IOL was stable postoperatively, and the patient's visual function improved. ■

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