Vitreous Loss

Anterior segment surgeons' approach to the diagnosis and management of intraoperative vitreous loss.

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Vitreous loss during cataract extraction occurs at a rate of between 0.45% and 14.7%.[1] This rate is dependent on the experience of the surgeon and the complexity of the procedure. Thus, higher-volume cataract surgeons have a lower rate of this complication.[2]

Vitreous loss is associated with greater rates of vision-threatening conditions, such as retinal detachment, cystoid macular edema, and endophthalmitis. Unfortunately, all cataract surgeons will experience vitreous loss at some point, so knowing how to manage this complication appropriately is necessary.

(Courtesy of Uday Devgan.)

Figure 1. After initial vitreous removal, triamcinolone acetonide (Kenalog; Bristol-Myers Squibb, Co., Princeton, NJ) can be injected into the anterior chamber to help surgeons visualize any remaining vitreous. Here, balanced salt solution has been used to swirl the Kenalog around to ensure contact and to wash out any excess.

DIAGNOSIS

The first step in the proper management of vitreous loss is its diagnosis. Signs of a rent in the posterior capsule include the deepening of the anterior chamber, decreased mobility of nuclear pieces, and a lateral displacement of nuclear fragments. When we suspect a rent in the posterior capsule, early identification is helpful to reduce complications. If the problem presents during the removal of the nucleus, we stop phacoemulsification and inject a dispersive viscoelastic prior to exiting the eye in order to minimize fluctuations in the anterior chamber's pressure. This process helps to prevent further anterior displacement of the vitreous. We use surgical scissors to trim any vitreous that prolapses at the site of the incision.

REMOVAL OF THE LENS NUCLEUS

At this point, we evaluate the eye carefully. If we notice a rent in the posterior capsule and vitreous is present in the anterior chamber, we remove the remaining nuclear material without using phacoemulsification, as this would place traction on the vitreous and increase the risk of retinal tears and detachment. Residual nuclear material is gently manipulated with the assistance of viscoelastic and then manually removed from the eye with a Sinskey hook, lens loop, or forceps. In the presence of larger nuclear fragments, we may need to enlarge the wound. It is not advisable to attempt to remove nuclear material that has advanced past the posterior capsule, as this has been shown to increase the risk of giant retinal tears and retinal detachment.[3]

TRIAMCINOLONE

Once we have safely removed the nuclear material from within the anterior segment, we turn our focus to removing the vitreous, inserting an IOL, and closing the wounds. To aid in the identification of vitreous in the anterior chamber, we inject 40 mg/mL[4] of preservative-free triamcinolone through a paracentesis. Vitreous will stain white in a sheet-like pattern with the triamcinolone, but balanced salt solution and viscoelastic material will not (Figure 1). Triamcinolone has been shown to cause steroid-response glaucoma; we are therefore careful to remove all of the medication from the eye at the conclusion of the vitrectomy.

INCISION

The removal of vitreous is best accomplished in a closed-eye system. We suture the cataract incision if it is not self-sealing. We recommend using separate anterior chamber irrigation and vitrectomy sites to improve the chamber's stability and ensure adequate irrigation while cutting. The original paracentesis may serve as the site of irrigation, and a new incision just large enough for the vitrector can function as the location of the vitrectomy.

VITRECTOMY

During vitrectomy, we keep the vitrector visible at all times and hold it still in order to decrease traction on the vitreous.

Our settings vary depending on the type of machine, the cutter's gauge, and whether the vitrectomy handpiece is designed for anterior or posterior use. With anterior cutters, a rate of 400 to 800 cuts per minute may be appropriate. We find that posterior cutters work most effectively at higher rates of 1,200 to 2,500 cuts per minute. The rate of aspiration depends on both the degree of irrigation and cutting speed. We believe many anterior segment surgeons are most comfortable performing an anterior vitrectomy through a limbal incision. An argument can be made, however, for performing an anterior vitrectomy via a pars plana incision, located 3.5 mm posterior to the limbus, with the irrigation port in the anterior chamber. In this way, the vitreous is drawn to its correct anatomical position, thereby decreasing traction on the vitreous (Figure 2).

CORTICAL CLEANUP

Once we have removed all of the vitreous from the anterior chamber, we concentrate on cortical cleanup. We remove the cortical material with one of two techniques: dry aspiration using a cannula alone to aspirate the remaining cortex or the irrigation/aspiration/cutting setting on the vitrectomy mode of the phaco machine. We take care not to switch to the irrigation/aspiration/cutting setting before all of the vitreous has been removed, because doing so will aspirate the material and cause unsafe vitreous traction.

WOUND INSPECTION

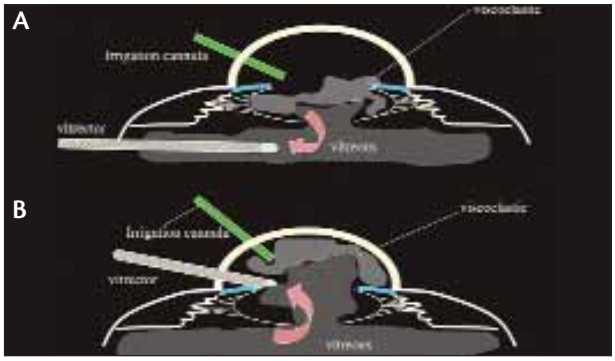
After we complete the vitrectomy and cortical cleanup, we inspect the wound for any remaining vitreous using a Weck-Cel sponge (Medtronic ENT, Jacksonville, FL). We then cut any prolapsing vitreous by holding the vitrector to cut on the surface of the wound.

IMPLANTATION OF THE IOL

Before we implant the IOL, we evaluate the eye. Depending on the amount of residual capsule, options for the lens' placement include in the bag, in the ciliary sulcus with or without optic capture by the capsulorhexis, scleral suture fixation, iris suture fixation, and in the anterior chamber. At the conclusion of the case, we close the wounds using sutures and inspect them to ensure their integrity. Pupillary constriction with intracameral miotics helps us to identify any residual vitreous strands in the anterior chamber.

PROPHYLAXIS

Because vitreous loss is a risk factor for endophthalmitis, proper antibiotic prophylaxis should be considered. In addition to topical antibiotics, subconjunctival, intracameral, or systemic antibiotics may play a role in reducing infectious complications, although there is no consensus on this issue. Whichever route we choose, we monitor the patient with extra care.



(Courtesy of Uday Devgan.)

Figure 2. Many surgeons believe that inserting the vitrector through the pars plana (A), below the escaped vitreous, makes more sense than working from a paracentesis anterior vitrectomy (B). Retinal surgeons are concerned about the possibility that this approach will cause retinal tears, however, and about how anterior segment surgeons would manage them.

Vitreous loss increases the risk of cystoid macular edema, thus possibly limiting visual rehabilitation. Patients therefore may require prolonged treatment with nonsteriodal anti-inflammatory drugs and close follow-up, at times in collaboration with a retina consultant.

CONCLUSION

Although these eyes are at higher risk for other complications as a result of vitreous loss, the vast majority of patients experience a successful outcome. The appropriate management of vitreous loss is critical in helping patients achieve the best visual results. ■

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