

Mixed Surgical Management of Retained Lens Fragments

Careful preoperative planning and choice of intraoperative instrumentation are essential to achieving good outcomes.

BY TAMER H. MAHMOUD, MD, PhD

In this issue of Retina Today, Tamer H. Mahmoud, MD, PhD, discusses surgical pearls for managing retained lens fragments by pars plana vitrectomy and lensectomy with mixed gauges.

We extend an invitation to readers to submit pearls for publication in Retina Today. Please send submissions for consideration to Dean Elliott, MD (deliott@doheny.org); or Ingrid U. Scott, MD, MPH (iscott@psu.edu). We look forward to hearing from you.



—Dean Elliott, MD; and Ingrid U. Scott, MD, MPH

Many vitreoretinal surgeons would agree that in the era of microincision vitrectomy surgery (MIVS) there is little place for 20-gauge pars plana vitrectomy (PPV). However, because small-gauge phacofragmatomes are not commercially available, surgeons may consider creating at least one 20-gauge sclerotomy for retained lens fragments. In this article, I describe my approach to managing retained lens fragments.

TIME TO INTERVENTION

Although in some facilities it may be possible for an available retina surgeon to remove dropped lens material during cataract surgery, this approach is not the standard of care. Studies comparing same-day intervention vs later PPV have demonstrated similar results with both approaches.¹ The determination of timing and the nature of the intervention should be made on a case-by-case basis after discussion with the cataract surgeon. I try to find out if the procedure was performed under topical, retrobulbar block, or general anesthesia; how the patient responded; the stage of the procedure just before the lens material dropped; the status of the capsule; the estimated size of the retained lens material; the steps taken after the fragments dropped; whether an anterior vitrectomy was performed; whether any instruments were used to try to remove the lens material from the vitreous cavity; whether the patient has a history of previous retinal detachment or treatment for any ocular disease, such as macular degeneration or dia-

betic macular edema; and the status of the fellow eye.

I examine patients 1 day after the cataract procedure to assess the clarity of the cornea and the degree of anterior segment inflammation and to measure intraocular pressure (IOP). I discuss the details of the PPV procedure and plan with the patient and family, including when it would be most suitable to operate, which is usually within a few days of the cataract procedure. Before PPV is performed, patients may need to be examined daily to determine if the frequency of eye drop administration should be adjusted to ensure optimal control of IOP and intraocular inflammation and to minimize corneal edema.

INITIAL STEPS

I routinely plan for a 23-gauge PPV and pars plana lensectomy (PPL). A detailed discussion with the cataract surgeon regarding the patient's age and the size and density of the retained lens material should indicate whether a fragmatome will be needed; however, I have it ready in any event. Regardless of whether the fragmatome will be needed, I begin with a three-port 23-gauge PPV. I do not like to use a 23-gauge probe through a 20-gauge incision because, as more vitreous is removed, increased outflow through the 20-gauge sclerotomy may result in a non-closed system. If infusion does not keep up with aspiration, ocular collapse ensues. This would be compounded if there is leakage from the cataract wound, so I always check the wound's integrity at the beginning of the procedure, and I always add a 10-0



Figure 1. A 23-gauge setup with the phacofragmatome introduced through a 20-gauge sclerotomy and the bent 23-gauge butterfly needle attached to a secondary infusion line introduced through a 23-gauge cannula.

nylon suture at the cataract wound for retina procedures that are performed within 2 weeks of cataract surgery, even with a self-sealing wound. PPV manipulations may change wound architecture, and wound leakage may predispose some patients to choroidal detachment and even choroidal hemorrhage.² One can imagine the potential risk of using a 23-gauge vitrectomy probe through a 20-gauge sclerotomy with increased outflow and a leaky cataract wound.

ANTERIOR SEGMENT

To minimize retinal traction, the vitrectomy probe is advanced to the pupillary area to cut any bands of vitreous in the anterior chamber connecting with posterior vitreous. The probe is then rotated into the anterior chamber to remove lens material and vitreous. If a sulcus posterior chamber or anterior chamber IOL has been implanted, the probe is rotated around the lens.

In some instances, the entire lens is subluxed but remains in the pupillary area, so that the infusion cannula cannot be visualized. In these cases, I use a secondary infusion line attached to a 23-gauge butterfly needle that I bend and introduce through one cannula with the vitrectomy probe in the other hand (Figure 1). If I need to use the fragmatome, I remove the 23-gauge cannula and make a conjunctival peritomy and a 20-gauge sclerotomy in that area. Although I always use cannulas for 20-gauge cases, I do not introduce the fragmatome through a metal cannula because doing so may burn the sclera.

The secondary infusion hydrates the lens and makes it easier to remove. The needle tip helps bring the lens pieces into the fragmatome and prevents slippage into the posterior segment (Figure 1). The primary infusion is opened as soon as the cannula can be visualized, which keeps adequate balance between inflow and outflow. Most of the lens can be removed in this way, followed by bimanual removal of the



Figure 2. A 29-gauge chandelier is seen inferonasally. This allows a bimanual technique for induction of a posterior vitreous detachment in cases of very adherent hyaloid.

capsule with retinal forceps and a probe. The assistant can help the surgeon by depressing the sclera all the way around to allow visualization of the edges of the capsule to confirm complete removal. If an assistant is not available, one cannula can be plugged and the surgeon can depress with one hand and remove the capsule with the forceps in the other hand.

POSTERIOR SEGMENT

Next, I focus on the posterior segment. Initially, I try to visualize the dropped lens fragments and their relation to the vitreous and determine the status of the posterior hyaloid. A core vitrectomy is performed. The fragmatome should not be used unless almost complete vitrectomy is achieved, to avoid unnecessary traction that can lead to retinal breaks. I begin by inducing a posterior vitreous detachment (PVD). It may deceptively appear that there is a PVD because some floating lens material comes to the probe tip with vitreous and simulates the motion of a detached hyaloid. Triamcinolone may be injected to help visualize the hyaloid. However, I have found that the presence of lens material in these patients provides good delineation of the hyaloid and no additional visualization aid is needed.

A very adherent hyaloid may be managed with a bimanual technique. A 25- or 29-gauge chandelier can be introduced separately (Figure 2). I prefer 29-gauge because it provides adequate illumination and does not leak when removed. In my experience, the wound frequently requires suturing after removal of a 25-gauge chandelier. A pick can then be used in conjunction with the soft tip to detach the hyaloid. Another option when a 20-gauge sclerotomy is needed for the fragmatome is to use a 20-gauge lighted pick with the 23-gauge soft tip.

After detaching the hyaloid, one should focus on completing the PPV and not on the lens material that continues to come to the probe tip. At this stage, most of the lens



Figure 3. Depressed exam allows shaving of the vitreous base with removal of remaining cortical material and detection of retinal breaks.

fragments will be completely free in the vitreous cavity, and the fragmatome may be used to remove them. I like the linear aspect of fragmentation. Initially, I approach the lens piece without suction, and when I am almost touching it I start slow suction until I achieve occlusion. I then increase the suction and move the piece away from the retina and start the fragmentation.

I maintain some suction when I stop the fragmentation to keep the piece at the probe tip and not lose it back on the retinal surface. Because the fragmatome is 20-gauge, it may be necessary to increase the infusion pressure through the 23-gauge infusion line to keep up with the suction. Once most of the large, hard nuclear pieces are removed, I switch back to the vitrectomy probe, keeping it in the center of the vitreous cavity and increasing the suction so that the floating small nuclear and cortical material can come to the tip for removal. At this point, it is safer to switch to a soft-tip active suction cannula to remove the material that is left on the surface of the retina. The infusion pressure should continue to be higher when using 23-gauge instrumentation through a 20-gauge sclerotomy.

One of the most important steps of the procedure is a 360° exam with scleral depression to remove any residual lens material and check for peripheral breaks. I carefully remove almost every small piece in the vitreous base area (Figure 3). If they are not removed, these pieces can lead to residual persistent chronic inflammation with cystoid macular edema (CME). Breaks should be treated carefully with three contiguous rows of endolaser photocoagulation. A retinal detachment related to breaks may prevent good laser uptake, and fluid-air exchange may be required with complete flattening of the retina for good laser treatment. Careful shaving of the vitreous base is required if any break-related retinal detachment is seen, and the patient may require intraocular gas, preferably a short-acting gas such as non-expansile sulfur hexafluoride.

IOL CONSIDERATIONS AND CLOSURE

Most patients seen at our practice have had a sulcus lens implanted at the time of cataract surgery. Care should be taken during PPV not to remove the capsular support.

Patients with good visual potential who were left aphakic at the time of cataract surgery could benefit from IOL implantation at the time of PPV/PPL. This should be part of the preoperative discussion, and measurements for lens implantation should be available. I prefer to place an anterior chamber lens in most of these patients because long-term complications are minimal with the new designs. Secondary IOL implantation is another option, especially with a complex PPV/PPL with retinal detachment and intraocular gas injection.

After careful examination of the periphery with scleral depression, the cannulas are removed and all leaking sclerotomies are sutured. The 20-gauge sclerotomy is sutured with 7-0 vicryl, and the conjunctiva in that area is closed with 6-0 plain gut. I routinely give patients a posterior sub-Tenon triamcinolone injection to help control inflammation and suppress any possible CME. This may also help decrease the burden of frequent drop administration early in the postoperative period.

CONCLUSION

Methods of managing retained lens fragments after cataract surgery are continuously evolving in the era of MIVS. Careful patient history and surgical planning are needed. Comfort with the use of mixed gauges in one procedure, consideration of the proper choice of instruments, and familiarity with bimanual technique and illumination options are all important factors in achieving a good final outcome. ■

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