

Triamcinolone-Assisted Anterior Vitreotomy

The art of visualizing the vitreous.

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Vitreous gel, transparent by design, is virtually invisible under the operating microscope. Furthermore, it is particularly unwelcome in anterior segment surgery, because it makes surgery more difficult and is associated with a variety of serious intraoperative and postoperative complications such as a dropped lens fragment, corneal edema, cystoid macular edema, retinal detachment, and endophthalmitis.¹⁻¹⁴ Fortunately, meticulous vitreous clean-up can reduce the incidence of many vision-threatening complications associated with vitreous loss.⁹ Until recently, however, surgeons had only indirect intraoperative clues to determine if vitreous gel were present in the anterior chamber and, if so, to what extent.

Triamcinolone acetonide (Kenalog; Bristol-Myers Squibb Company, New York, NY) has proven quite useful for visualizing vitreous in the anterior chamber¹⁵ and has become a routine part of our practice for complicated cataracts with large zonular dialyses. To date, we have performed more than 200 cases of triamcinolone-assisted anterior vitrectomy and have not seen a complication attributable to

the agent. On the contrary, eyes receiving intracameral triamcinolone have a quieter postoperative course versus those in which the agent is not used.

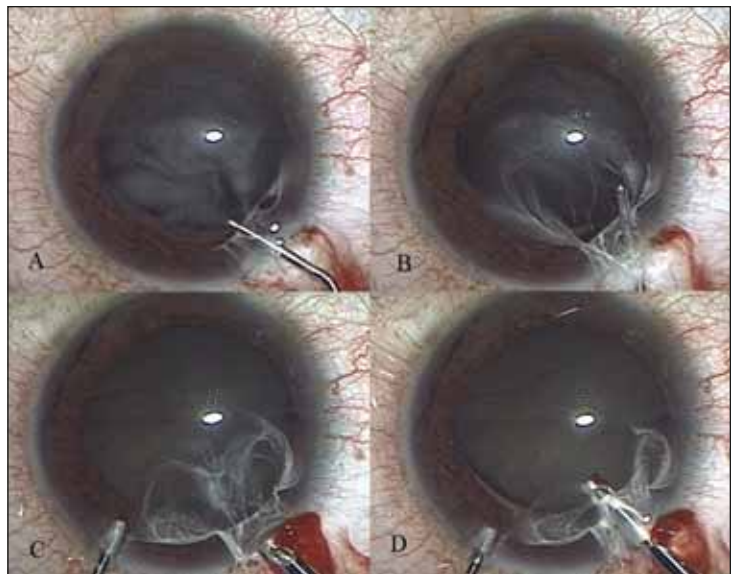


Figure 1. The surgeon injects triamcinolone acetonide into the prolapsed vitreous (A and B) and then performs an anterior vitrectomy (C and D). Note the vitreous present in the wound at the time of injection.

PREPARATION

We continue to prepare triamcinolone as originally described¹⁵ and remove the preservative by a sterile capture-and-wash technique. Our decision is based on a lack of data regarding the intracameral effects of benzyl alcohol, the preservative in Kenalog. Clearly, however, our original washing technique is a bit tedious, particularly when the encounter with vitreous is unexpected or the OR staff is unfamiliar with the technique.

It is therefore not surprising that one of the most common questions regarding intracameral triamcinolone is, "Can the preparation be simplified?" There are actually several options (and wide variation among surgeons) that range from using the agent directly out of the bottle to simple dilution. Others fill a syringe with triamcinolone, stand it inverted until the particles settle, express the vehicle, and resuspend the triamcinolone particles in the desired volume of BSS. In addition, compounding pharmacies sell preservative-free triamcinolone, but it has a limited shelf life.

TECHNIQUE

When asked the best way to use triamcinolone, the answer is not to lose vitreous in the first place. The next best answer is to get lots of practice. Neither reply is practical for most surgeons, who instead must gain insight from the experience of others. Here at the Cincinnati Eye Institute, we typically withdraw 0.2mL of 40mg/mL triamcinolone acetonide, then wash and resuspend the agent in 2.0mL of BSS (10X dilution). Much higher concentrations tend to leave too much unbound triamcinolone in the anterior chamber, whereas a larger volume of a lower concentration of triamcinolone tends to distribute the particles more evenly.

Ideally, one injects the agent directly within the substance of the vitreous to obtain maximum visualization. Dusting the surface of the gel works, but only until one has removed the surface, at which point reinjection is necessary. Dr. Burk likes to swirl a little triamcinolone around the anterior chamber to get an overview of the situation. He then buries the cannula's tip within the gel and makes a very controlled injection. It is important to remember that, if the vitreous is near the wound and fluid comes out upon the injection, so will vitreous. Inserting the cannula through the paracentesis often avoids such reflux. Vitrectomy should be performed with a high cutting rate, a low aspiration rate, and separate irrigation. Although not always needed, a pars plana approach can be quite helpful, particularly for vitreous at the site of the corneal incision (Figure 1).

ALTERNATIVES

Realizing that the vitreous gel will capture and hold nearly any particulate matter, some groups are evaluating alternative techniques of vitreous identification. The most notable is 11-deoxycortisol, a steroid precursor without glucocorticoid effects.¹⁶

Nonetheless, we prefer triamcinolone acetonide because it is readily available, is nontoxic,¹⁷⁻¹⁹ and has a 25-year track record for intraocular use since it was first described in 1980 by Tano et al.²⁰ In addition, one should not underestimate the role of intracameral triamcinolone in stabilizing the blood-aqueous barrier and minimizing inflammation on postoperative day one in complicated anterior segment cases.

QUESTIONS

To date, two questions about triamcinolone-assisted vitrectomy are unresolved. As mentioned earlier, the first regards the method of preparation and the effects of the benzyl alcohol preservative. The use of preservative-free or washed triamcinolone makes intuitive sense, but we are unaware of any evidence suggesting that the removal of the benzyl alcohol preservative is helpful or necessary.

The second question relates to the probability of steroid-induced glaucoma. It is well known that our vitreoretinal colleagues observe increased IOP after the depot injection of an intraocular steroid. Indeed, the amount of steroid deposited correlates with the percentage of patients experiencing elevated IOPs and with the severity of the rise in pressure.

Although it is certainly possible that an eye will develop glaucoma after undergoing triamcinolone-assisted anterior vitrectomy, we have not observed this complication. Furthermore, the risk of steroid-induced glaucoma seems to be minimal when the surgeon uses a small amount of triamcinolone and then removes most of it along with the vitreous gel that was identified. In summary, we have found triamcinolone acetonide to be safe and quite useful for identifying and removing vitreous. ■

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Vision of a perfect flap may overlook safety advantages of microkeratomes over the IntraLase FS device

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Although there is more than one way to create a flap, some surgeons may be swayed by the perceived advantages of using the IntraLase femtosecond device instead of the microkeratome to solve a problem that, in essence, has no perfect solution. In choosing between the two technologies, physicians should be aware of some important safety concerns associated with the IntraLase device.

Though rare, flap complications can occur with both methods. It really comes down to the type of problem a surgeon would prefer to deal with. My practice receives a lot of referrals for complications, so I have the opportunity to see many of the problems associated with both microkeratomes and the IntraLase device. In my experience, microkeratomes are more likely to cause buttonholes, whereas the IntraLase device appears to be more frequently associated with flap tears. Referring surgeons have also mentioned loss of suction with the IntraLase device – a complication caused by the time required to make the flap. Some surgeons – I being one of them – find it easier to manage buttonhole flaps, and are therefore better off using the microkeratome. For doctors who are more comfortable coping with flap tears, the IntraLase device may be a more appealing option.

While the IntraLase is widely marketed as a better way to create flaps, there is data that suggests that its complication rates are similar to the microkeratome, and that in fact, it can present additional, unique problems. Visual recovery with IntraLase appears to take longer, with referring IntraLase surgeons telling me of 20/20 to 20/30 acuities day one post op versus the 20/15, 20/20 I typically see in my keratome patients. Currently, there is no substantive scientific or clinical proof that IntraLase offers advantages over the microkeratome, and it will take time to confirm longer-term visual results.

A new area of concern involves track-related iridocyclitis and scleritis (TRISC), a condition that can surface with the IntraLase device. This syndrome can be extremely debilitating – forcing patients to wear sunglasses indoors for months and endure aggressive steroid therapy. Topical corticosteroids can elevate IOP and induce fluid accumulation in the interface. This may lead to falsely low IOP readings, which could potentially result in end-stage glaucoma.

When considering a flap-creation method, physicians should take into account all of these factors.