Silicone-Oil–Related and Neovascular Glaucoma

BY RICHARD A. LEHRER, MD

CASE PRESENTATION

In 2002, a 44-year-old white male was referred to my center. Between 1998 and 2002, he had undergone panretinal photocoagulation, implantation of an Ahmed Glaucoma Valve (New World Medical, Inc., Rancho Cucamonga, CA), multiple vitrectomies with silicone oil for vitreous hemorrhages, cataract surgery, and three revisions of the Ahmed valve with removal of the oil and scar tissue from his bleb. He had proliferative diabetic retinopathy and neovascular glaucoma, with no light perception in his right eye and severe vision loss in his left.

Upon presentation in 2002, the patient was taking Cosopt (Merck & Co., Inc., West Point, PA), Alphagan (Allergan, Inc., Irvine, CA), Lumigan (Allergan, Inc.), and 50 mg of Neptazane (Wyeth Pharmaceuticals, Philadelphia, PA) t.i.d. Vision in his left eye was count fingers at 4 inches, and his IOP was 38 mm Hg OS. Oil was present in the bleb and on the tube. His left eye exhibited epithelial and stromal corneal edema as well as an inferior patellar iridotomy. His cup-to-disc ratio was 0.9 in that eye.

HOW WOULD YOU PROCEED?

1. Would you needle the bleb?
2. Perform a new trabeculectomy or place a new tube implant?
3. Perform a cyclodestructive procedure?
4. Choose another course of treatment?

SURGICAL COURSE

Because of the patient’s limited visual potential, I performed a diode cyclophotocoagulation on his left eye in August 2002. During the first 2 weeks after the procedure, the patient’s IOP dropped to 18 mm Hg. One month later, however, he developed worsening corneal decompensation.

At this point, despite the diode cyclophotocoagulation, the patient required four medications to control his IOP. Based on his high risk of poor postoperative pressure control, I did not deem performing penetrating keratoplasty (PKP) alone to be a good option. I referred the patient to his vitreoretinal specialist for removal of the silicone oil, which I thought might have played a role in his corneal decompensation. The patient’s vision improved only slightly after removal of the silicone oil.

In January 2003, his vision had improved to count fingers at 6 inches, but the eye still had frank bullous keratopathy and an IOP of 19 mm Hg on Cosopt and Lumigan. I felt that he would benefit from a PKP but had to decide whether to perform (1) the procedure alone, (2) a glaucoma procedure followed at a later time by a PKP, or (3) a combined PKP and glaucoma procedure. Performing another diode cyclophotocoagulation was also an option, but phthisis was a concern because the patient was monocular.

I elected to perform a glaucoma procedure first, followed by PKP at a later date. After removing the Ahmed valve, I performed extensive debridement of conjunctival scarring and silicone oil and then inserted a two-plate Ahmed valve through the same paracentesis used for removing the other tube. After 4 months, the patient’s IOP was well controlled in the low-to-midteens on no medications. Three months later, he underwent PKP.

OUTCOME

The patient has done well. In June 2004, his visual acuity was 20/200, and his pressure was 13 mm Hg. His only medication was Pred Forte (Allergan, Inc.) t.i.d., and his graft has remained clear (Figures 1 and 2). The patient reports that he has the best vision of his recent life. His follow-up visits are approximately every 3 months.

Despite his positive outcome, the patient is likely to have problems in the future. His risk of graft rejection is high, and
the chances of his glaucoma surgery’s failing are also fairly high.

**DISCUSSION**

In a unilocular patient, it is difficult to determine which procedure should be performed first to achieve the best possible outcome. A further complicating factor in this case was the issue of performing glaucoma surgery in a patient who was status post silicone-oil infusion.

A study conducted at the Bascom Palmer Eye Institute in Miami found that the surgical management of secondary glaucoma after silicone-oil infusion for complex retinal detachment may achieve good IOP control and stabilize visual function in most patients. Additionally, the researchers reported that patients who underwent silicone-oil removal alone to control IOP were more likely to have persistently elevated IOP and were possibly more likely to undergo reoperation for glaucoma. By contrast, they found that patients who underwent concurrent silicone-oil removal and glaucoma surgery were more likely to have hypotony. These findings suggest that the preferred technique is first to remove the silicone oil, next to allow the inflammation to subside, and then to perform the glaucoma procedure.

Other studies have been conducted to determine the best timing of corneal transplant surgery in relation to glaucoma surgery. In 1996, Figueiredo et al evaluated nine eyes that underwent combined trabeculectomy with mitomycin C (MMC) and PKP. In this study, 67% of patients achieved “good” pressure control (defined in this study as < 21 mm Hg), and there was a 12% transplant failure or rejection rate. The researchers concluded that combined PKP and trabeculectomy with MMC should be considered for select patients with uncontrolled glaucoma and corneal disease who have sufficient conjunctiva for a filtering procedure.

In a similar study, WuDunn et al evaluated combined trabeculectomy with MMC and PKP. They studied 24 eyes in 22 patients for 24 months. The cumulative probability of adequate pressure control was 54% at 24 months. Additionally, there were no graft failures and a 24% rejection rate. This study found that combined PKP and trabeculectomy with MMC was associated with a high rate of corneal graft survival but also a risk of an early failure of IOP control. Concomitant procedures performed during the combined PKP/trabeculectomy may increase the risk of early bleb failure.

Rapuano et al evaluated alloplastic tube shunt surgery before, during, and after PKP. In 46 eyes with 2 years of follow-up. All groups had significantly lower IOPs postoperatively. The most common complication was graft failure, which occurred in 31% of patients who underwent alloplastic tube shunt implantation before PKP, in 29% of patients who underwent combined procedures, and in 44% of patients who underwent shunt implantation after PKP.

Topouzis et al studied the long-term results of the Ahmed Glaucoma Valve implant in patients with complicated glaucoma. The study included 60 eyes with valve implantation. Sixteen of these eyes had prior or concurrent PKP. With a mean follow-up of 30.5 months, the 4-year probability of successful IOP control without devastating complications was 76%. When corneal complications were taken into account, the probability of success declined to 45%. Of the patients with prior PKP, 56% had graft failure, and no graft rejections were specifically reported.

The studies by Rapuano et al and Topouzis et al reported on patients in whom alloplastic shunt procedures were performed before, during, and after PKP. Although the studies had similar failure and rejection rates, Rapuano et al reported much better IOP control, a result that suggests tube implantation should be combined with PKP.

My personal preference is to perform the glaucoma procedure first and the corneal procedure second. I have also experienced corneal surface wetting problems and erosions in patients who have had MMC filters and corneal transplants. Most glaucoma and corneal specialists agree that, in the presence of a corneal transplant, the best option is a shunt with a pars plana tube, whenever appropriate. It is important to keep the shunt as far from the transplant as possible.

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