

Hypotony due to an Overactive Bleb

How to proceed when filtering surgery is too effective.



By Amy Badger, MD,
and Todd Perkins, MD

A 46-year-old myopic white male developed severe hypotony maculopathy with a visual acuity of 8/200 and an IOP of 3 mm Hg 2 weeks after combined phacoemulsification and trabeculectomy with mitomycin C for juvenile glaucoma. Despite success with surgical revision of the bleb in cases of post-trabeculectomy hypotony maculopathy,¹⁻³ we were aware that reopening the conjunctival flap still posed a risk that the bleb might fail.⁴

Shirato et al⁵ described a simpler technique involving tightly resuturing the scleral flap directly through the conjunctiva with one or two sutures of 10-0 nylon on a round, tapered needle at the slit lamp or under an operating microscope. Some leakage occurred postoperatively at the sutured points, but it resolved spontaneously a few hours or days later. The suture was spontaneously buried in the conjunctiva in 1 week. The lack of a persistent bleb leak was attributed to closure of the scleral flap and a reduction in outflow. In a case series of 56 eyes

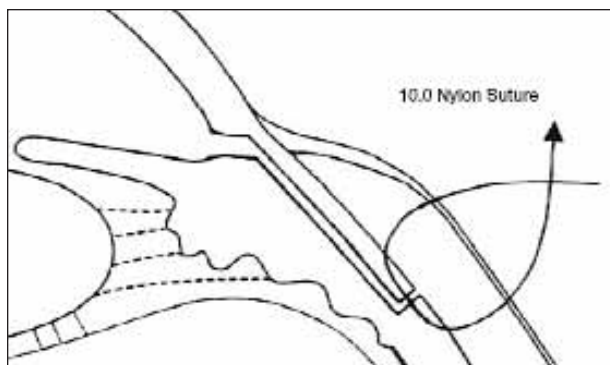


Figure 1. The path of the transconjunctival scleral flap sutures. (Reprinted with permission from Springer Science+Business Media: Eha J, Hoffmann EM, Wahl J. Flap suture—a simple technique for the revision of hypotony maculopathy following trabeculectomy with mitomycin C. *Graefes Arch Clin Exp Ophthalmol.* 2008;246:869-874.)



Figure 2. The bleb 6 weeks after trabeculectomy with mitomycin C prior to transconjunctival scleral flap resuturing (A) and 1 day (B) and 1 week (C) after transconjunctival scleral flap resuturing.

treated by this method, 92% experienced a resolution of hypotony maculopathy.⁶

Eha et al⁴ described a similar approach (Figure 1) in which they used two to five 10–0 nylon sutures on a CU-8 needle. The IOP rose from an average preoperative level of 2.8 mm Hg to 15.7 mm Hg 1 week postoperatively.

Our patient underwent transconjunctival scleral flap resuturing with two sutures using the CU-8 needle (Figure 2). On postoperative day 1, his IOP rose to 35 mm Hg, and his bleb was weakly Seidel positive but was negative thereafter. He was treated with antibiotic, steroid, and nonsteroidal eye drops four times daily. His pressure gradually decreased to the high teens, and his visual acuity improved to 20/20 by 2.5 months postoperatively.

Transconjunctival scleral flap resuturing is an effective way to treat hypotony maculopathy with less risk than traditional surgical revision of the bleb. In addition, the former method may prevent a return trip to the OR. The compression of the conjunctival and scleral tissues seems to prevent bleb leaks at the suture site.

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By Geoffrey T. Emerick, MD

I perform bleb revision for symptomatic hypotony maculopathy due to persistent overfiltration. At least in my hands, no other method is reliably effective. Shortly after the use of mitomycin C became common in the 1990s, Gail Schwartz, MD, and others separately published the results of scleral resuturing for hypotony.¹ I generally follow the technique of Paul Palmberg, MD,² also published in the mid-1990s, of placing two sets of scleral flap sutures—one to get a relatively high

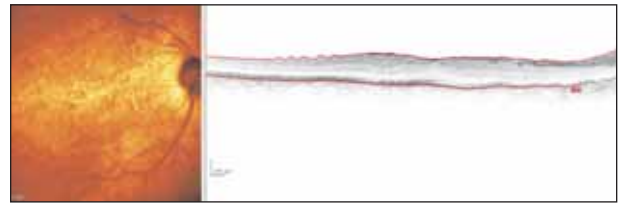


Figure 1. Spectral domain optical coherence tomography of resolving retinal folds after the treatment of hypotony maculopathy.

IOP and one at target. The goal of revision is to restore the patient's visual acuity by flattening chorioretinal folds.

In the OR, after reopening the limbal incision and dissecting posteriorly to free up any adherent Tenon's capsule, I expose the scleral flap. I place 10–0 nylon sutures in the flap and adjust their number and tension to achieve the target IOP. I then place additional sutures to obtain a pressure in the 20s. This procedure usually flattens the folds over a period of 2 to 4 weeks (Figure 1), at which time I can perform suture lysis.

It is important to note in the chart the location of each set of sutures at the time of surgery to make certain the correct ones are cut later. Also, the flap sutures should not be so tight as to cause "cheese wiring." A horizontal mattress stitch over the flap can be helpful in some situations. If the tissue is inadequate to reduce flow sufficiently, a pericardial patch graft is very effective but with less predictable results.

I find Dr. Palmberg's technique to be highly effective and have achieved postoperative visual acuities of 20/30 or better in around 90% of the eyes in which I have used it. In general, it is best to intervene within the first 6 months of hypotony maculopathy, although some improvement in acuity can be achieved even after later revision.

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By Michael C. Stiles, MD

If hypotony develops within the first several weeks of surgery, the conjunctiva is typically easily mobile, and I consider one of the two following approaches to correct the prob-

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lem. The less invasive technique is to anchor the scleral flap to the scleral bed transconjunctivally with 10–0 nylon (CU-8 needle) or 9–0 nylon (VAS needle), as first described by Eha and colleagues.¹ One or more sutures can be added between existing scleral flap sutures. This procedure can be performed in the OR, minor room, or clinic with the patient under topical anesthesia. The revision typically increases both the IOP and visual acuity if maculopathy exists. Usually, none of the sutures requires removal, and they are incorporated into the conjunctival bleb as epithelialization occurs over them.

A more invasive approach is a technique described by Paul Palmberg, MD, and colleagues.² After reopening the original conjunctival incision and inspecting the trabeculectomy site, the surgeon tightly secures the flap with multiple 10–0 sutures in order to drive the pressure higher than desired in the hope that changes in the posterior segment completely resolve and the patient's vision returns to normal. The surgeon then selectively lyses the sutures with a laser or releases them if he or she placed releasable sutures. The pressure is titrated down slowly to avoid repeat hypotony yet reproduce a lower pressure.

If the surgeon is correcting hypotony several weeks after trabeculectomy, a transconjunctival approach may not be feasible due to conjunctival ischemia, thinning, or underlying encapsulation. In these cases, suturing the flap through a conjunctival opening is safer. Whether the reoperation is performed through a fornix-based or a limbus-based flap is determined by whether or not the bleb has developed clear cystic architecture anteriorly, in which case a limbus-based approach is desired.

Late hypotony secondary to bleb leaks is typically due to weak anterior conjunctiva from a high-flow subconjunctival opening in the scleral flap. In these cases, direct suturing of the scleral flap is usually impossible. One option is to create a fornix-based conjunctival peritomy around the clear cystic portion of the bleb. The bleb itself is de-epithelialized with a combination of cautery and mechanical debridement. The surgeon advances the conjunctival flap over the bleb and secures the flap to the de-epithelialized peripheral clear cornea with 9–0 nylon sutures.

In my experience, most of these cases of hypotony are due to severe maceration of the underlying sclera. My preference, therefore, is to tamponade the high flow of aqueous by securing a patch graft over the weakened sclera with 10–0 nylon sutures. In an attempt to produce diffuse posterior aqueous flow, I secure the flap more tightly anteriorly than posteriorly. My goal is to prevent recurrent anterior bleb leaks long term.

The surgeon then completes conjunctival advancement as desired. □

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