

# The Literature

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## BLEB REVISION FOR RESOLUTION OF HYPOTONY MACULOPATHY FOLLOWING PRIMARY TRABECULECTOMY

*Bitrian E, Song BJ, Caprioli J<sup>1</sup>*

### ABSTRACT SUMMARY

Bitrian et al described a surgical method of bleb revision for hypotony maculopathy, evaluated its efficacy at 6 and 12 months, and examined the relationship between the duration of hypotony maculopathy and visual acuity outcomes.<sup>1</sup> The study was a noncomparative retrospective case series of patients with hypotony maculopathy who underwent primary bleb revision by a single surgeon.

Hypotony maculopathy was defined clinically as macular striae on fundoscopy, either in the setting of decreased IOP (< 6 mm Hg) or an IOP greater than this amount with typical clinical features of hypotony maculopathy and a decrease of 1 or more lines of Snellen BCVA. Eyes with a history of any surgery other than trabeculectomy or cataract surgery were excluded.

During the surgical procedure, thin or leaky conjunctiva and surrounding Tenon capsule were dissected and excised. The scleral flap was then resutured with a 10–0 nylon suture. A pericardial patch graft or horizontal mattress compression suture was used, if necessary, to provide additional resistance to outflow.

Investigators evaluated 33 patients. The mean time between a diagnosis of hypotony maculopathy and bleb revision was  $4.98 \pm 8.93$  months. Subjects were observed for a total of  $4.68 \pm 3.56$  years postoperatively. Eighty-eight percent of patients experienced an improvement in BCVA. Mean logMAR BCVA was  $0.34 \pm 0.34$  6 months after bleb revision and  $0.45 \pm 0.55$  12 months after revision. The change in BCVA at both the 6- and 12-month interval was statistically significant ( $P < .001$ ). Mean IOP increased from  $3.51 \pm 2.27$  mm Hg preoperatively to  $12.06 \pm 4.06$  mm Hg 12 months postoperatively ( $P < .001$ ). Fifty-two percent of patients were using no antiglaucoma medications at the last follow-up. Fifteen percent (5 eyes) of patients required a second bleb revision. The Spearman rank correlation coefficient between the duration of hypotony maculopathy and logMAR BCVA at 6 and 12 months was 0.43 ( $P = .015$ ) and 0.42 ( $P = .028$ ), respectively.

## DISCUSSION

**What are the nonsurgical options for the treatment of an overfiltering trabeculectomy bleb?**

Treatments are aimed at decreasing aqueous outflow in order to increase IOP. Pressure patching, the application of trichloroacetic acid to the bleb, cryotherapy of the bleb, the placement of an oversized bandage contact lens, and neodymium-yttrium-aluminum-garnet laser ablation are all conservative options for managing an overfiltering bleb that are mentioned in this study.

**What have previous studies shown about the outcomes of surgical bleb revision for hypotony maculopathy, and how do they compare to this study?**

Many studies have examined the outcomes of various methods of bleb revision, but few have specifically assessed the effect of bleb revision on hypotony maculopathy. Bitrian et al identified two other studies that investigated bleb revision for hypotony maculopathy. Cohen et al examined the results of resuturing the scleral flap and reported that six of nine eyes recovered visual acuity to within 1 Snellen line of the initial level.<sup>2</sup> The duration of hypotony maculopathy ranged from 0.5 to 17.5 months. The study found no correlation between the duration of hypotony maculopathy and the final BCVA. Bashford et al studied 14 patients who underwent surgical bleb revision and showed that 12 of 14 eyes regained 3.08 lines of BCVA. The investigators concluded that there was no correlation between the duration of hypotony maculopathy and the final visual outcome.<sup>3</sup>

Bitrian et al noted that their study is the largest reported case series of patients who have undergone bleb revision specifically for the treatment of hypotony maculopathy. Unlike the previous studies, Bitrian et al found that patients who had the greatest improvement in BCVA underwent bleb revision after a shorter duration of hypotony maculopathy.

**What are potential causes of incomplete visual recovery after long-standing hypotony maculopathy?**

Visual dysfunction in long-standing hypotony maculopathy is primarily caused by the collapse of the scleral wall, which compresses and distorts retinal photoreceptors.<sup>4</sup> Histopathologic findings in hypotony maculopathy have demonstrated generalized edema of the uvea, retina, and

optic nerve and proteinaceous fluid accumulation in the suprachoroidal space. These changes can lead to retinal hypoxia, endothelial cell damage, and leakage that limit visual recovery.<sup>5-7</sup>

## A PROSPECTIVE STUDY OF CONSECUTIVE PATIENTS UNDERGOING FULL-THICKNESS CONJUNCTIVAL/SCLERAL HYPOTONY SUTURES FOR CLINICAL OCULAR HYPOTONY

Richman J, Moster MR, Myeni T, Trubnik V<sup>8</sup>

### ABSTRACT SUMMARY

Richman et al conducted a prospective case series of patients with hypotony from an overfiltering trabeculectomy who received full-thickness hypotony sutures.<sup>8</sup> Hypotony was defined as vision loss from maculopathy or serous choroidal detachments caused by a low IOP. Eligible patients included those with hypotony after trabeculectomy alone or combined with cataract extraction.

The surgical technique involved placing several radial interrupted 10-0 nylon 7707 sutures (Ethicon), starting from the limbus and passing through full-thickness sclera before exiting the conjunctiva.<sup>8</sup> Patients were assessed 1 day, 1 week, 4 to 6 weeks, 3 months, 6 months, and 1 year postoperatively. Sutures were selectively removed at the surgeon's discretion. Success was defined as resolution of the hypotony, with an IOP lower than 21 mm Hg without glaucoma medications.

Fifteen patients were enrolled in this study. Prior to surgery, mean IOP was 3.3 mm Hg, and mean visual acuity was 20/150. The average number of sutures placed was 9.2. Mean IOP on postoperative day 1 was 23.5 mm Hg. One year after surgery, the mean IOP for all patients was 10.4 mm Hg, and mean visual acuity improved to 20/30. Seventy-three percent of patients had sutures removed postoperatively. Hypotony was reversed in all patients, and 87% achieved success, as defined in this study. Additional surgery was necessary in two patients for elevated IOP approximately 8 weeks after sutures were placed.

### DISCUSSION

**What other studies have evaluated this method of bleb revision?**

Eha et al outlined a technique similar to that explained in this study.<sup>9</sup> They described placing two to five hypotony sutures over the flap, starting from the conjunctiva. Eha et al showed that, at postoperative month 6, mean visual acuity improved from 20/160 to 20/63, and IOP measured  $9.6 \pm 4.2$  mm Hg. Like the research of Richman et al, the study by Eha et al demonstrated an elevated IOP on postoperative day 1 ( $24.9 \pm 11.7$  mm Hg).

Letartre et al studied 35 eyes that underwent transconjunctival suturing of the scleral flap using Eha's technique and showed that hypotony was reversed in 94% of patients.<sup>10</sup> These investigators placed an average of 2.1 sutures, which effectively raised the IOP from a preoperative level of 3 mm Hg to 9 mm Hg 6 months postoperatively.

**What are some notable similarities in the findings of the two studies summarized and discussed in this article for *Glaucoma Today*?**

Both studies reported high success rates in the resolution of hypotony from the surgical techniques described. Although the elevation of IOP to a level higher than optimal is always a concern with bleb revision surgeries, a majority of patients in these studies achieved an acceptable IOP postoperatively. Few patients from either study required repeat surgery within 1 year (15% in Bitrian et al and 13% in Richman et al). Both studies demonstrated that an initial IOP spike can occur on postoperative day 1 but that this elevation is not sustained. The authors of both studies proposed that the surgical approach described may be more efficacious, with less variability, in resolving hypotony after trabeculectomy than nonsurgical techniques.<sup>1,8</sup> ■

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