

Trabeculectomy in a Young Myope

Surgical considerations with and management of hypotony maculopathy.

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WITH JEFFREY M. LIEBMANN, MD

CASE PRESENTATION

A 34-year-old Asian Indian male with a 6-year history of bilateral open-angle glaucoma presented with moderately elevated IOP in both eyes (21 mm Hg OD, 20 mm Hg OS). He reported good compliance with topical bimatoprost q.h.s. and a fixed-combination dorzolamide-timolol ophthalmic solution b.i.d. He had undergone bilateral argon laser trabeculoplasty during the previous year but had no history of previous ocular surgery. The patient had a positive family history of glaucoma (father) and moderate myopia (-4.75 D OD, -4.50 D OS). His BCVA was 20/25 OD and 20/20 OS.

Slit-lamp biomicroscopy revealed no anterior segment abnormalities, and the anterior chamber angles were open (grade IV) with mild pigmentation. The optic discs were tilted, with bilateral thinning of the rim that was most marked in the superonasal quadrant of the right optic disc (Figure 1). A comparison of the current appearance with previous stereoscopic disc photographs demonstrated progressive, diffuse thinning of the neuroretinal rim in the patient's right eye. Scanning laser polarimetry (GDx VCC; Carl Zeiss Meditec Inc., Dublin, CA) revealed a diffuse loss of the retinal nerve fiber layer in his right eye, with superior, focal, wedge-shaped defects. A superior arcuate visual field defect split fixation in his right eye, and there was evidence of progression upon comparison of the current visual fields with those performed 1 year previously. The left visual field was full. The attending physician recommended trabeculectomy for the patient's right eye.

Comments on the Surgical Approach

JGC: When trabeculectomy is indicated in a young male myopic patient, what considerations are required with respect to planning surgery?

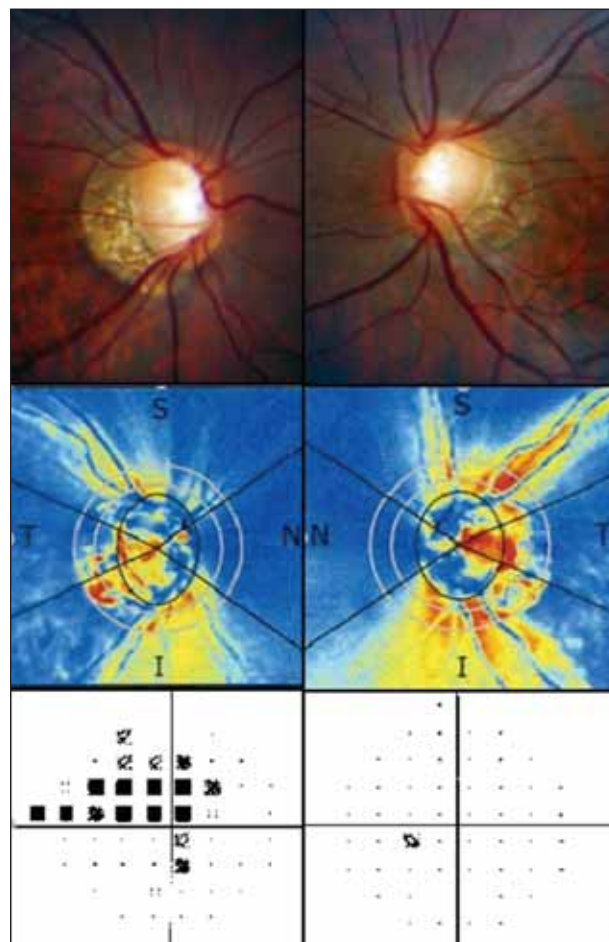


Figure 1. Stereo disc photographs (top), thickness maps of the retinal nerve fiber layer (middle; GDx VCC), and the pattern deviation plot (bottom) from a Humphrey Visual Field using the Swedish Interactive Threshold Algorithm-Standard (Carl Zeiss Meditec Inc.) reveal more advanced glaucoma in the patient's right eye.

JML: This patient requires a lower IOP to reduce his risk of progression, but he also has risk factors for developing postoperative hypotony, including male gender, myopia, first trabeculectomy, and young age.¹ Although the evidence is anecdotal, I would make a slightly larger scleral flap (approximately 4 X 4 mm) than my usual and ensure good apposition of the flap's edges during closure to reduce the risk of early postoperative hypotony. I would also apply 5-fluorouracil (5-FU; 50mg/mL) intraoperatively with a sponge for 5 minutes rather than mitomycin C, and I would try where possible to delay suture lysis in the early postoperative period.

The patient underwent uncomplicated trabeculectomy with a fornix-based conjunctival flap. The surgeon intraoperatively applied 5-FU (50mg/mL) with a cellulose sponge for 1.5 minutes. He took care to minimize intraoperative hypotony and closed the trapezoidal partial-thickness scleral flap (3.0-mm base and 1.5-mm sides) with three 10–0 nylon sutures. The surgeon verified adequate closure of the flap's sutures by inflating the anterior chamber with BSS through a paracentesis.

On the first postoperative day, the IOP in the patient's right eye was 30 mm Hg, and his visual acuity was 20/60. Gentle digital pressure lowered the IOP to 12 mm Hg. The IOP remained high over the first 3 postoperative weeks but was easily reduced to the low teens with digital pressure. At 3 weeks, the surgeon lasered the central scleral flap suture, and IOP decreased to 15 mm Hg. The patient's visual acuity was stable at 20/70 (20/30 pinhole) OD. He received a prescription for hourly topical steroids. In total, four subconjunctival injections of 5-FU (total dose of 30 mg) were administered during the first 8 postoperative weeks. At 12 weeks, the filtration bleb was diffuse and quiet with normal conjunctival vascularity (Figure 2).

Comments on the Antimetabolite

JGC: What are your indications for postoperative subconjunctival 5-FU?

RNW: My indications include anterior chamber inflammation or moderate conjunctival hyperemia. One should not delay injections until the IOP increases. Rather, one should administer them proactively in eyes with a fluid-tight closure and intact corneal epithelium. Subconjunctival 5-FU injection should be withheld in eyes with a wound leak or corneal epithelial defect. With longer intraoperative applications of 5-FU, it is possible that fewer postoperative subconjunctival injections will be required. A shorter intraoperative application time, however, may reduce the risk of postoperative hypotony.

In the ninth postoperative week, the patient returned with reduced visual acuity (20/200) and an IOP of 7 mm Hg in his right eye. Disc swelling, increased tortuosity of the vessels, and chorioretinal folds were apparent on dilated funduscopy (Figure 3). There was no evidence of choroidal effusions.

Comments on Decreased IOP

JML: It is vital to identify the cause of low IOP in order to determine the most effective treatment. In this patient, the decreased pressure is likely due to overfiltration following suture lysis. The differential diagnosis also includes bleb leak, cyclodialysis, retinal detachment, and choroidal effusions. The IOP range at which hypotony maculopathy develops appears to be highly individualized. Although many eyes can tolerate IOPs of around 4 mm Hg, others can develop hypotony maculopathy with IOPs as high as 10 mm Hg. I am usually proactive in cases of hypotony maculopathy, because the risk of an incomplete recovery of preoperative visual acuity probably increases with time. Restored vision, however, has been reported after prolonged hypotony.^{2,3}

I adopt a stepwise approach for managing hypotony maculopathy. First, I taper or discontinue topical steroids and add a topical cycloplegic. This approach may be beneficial in a small number of patients. My next step is to use an external tamponade with a tamponade shell or symblepharon ring. The patient



Figure 2. A diffuse, quiet drainage bleb with normal conjunctival vascularity was present in the patient's right eye 3 months after surgery.

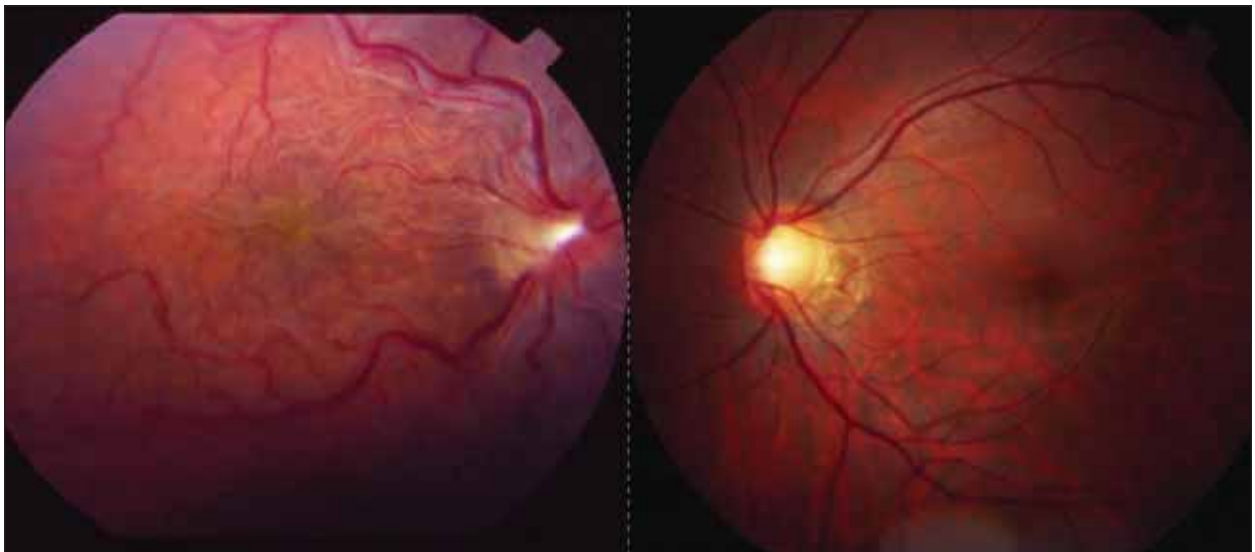


Figure 3. Fundus photographs taken 3 months after surgery demonstrate a reversal of disc cupping, increased tortuosity of the vessels, and macular chorioretinal folds in the patient's right eye.

may better tolerate a symblepharon ring if the ophthalmologist inserts a bandage contact lens under it. Intracameral viscoelastics or air injection may also help to elevate IOP temporarily. One may use these measures to temporize while waiting to return to the OR. In my experience, a significant rise in IOP is often necessary in order to reverse the chorioretinal folds. In young patients, such as this one, I have a low threshold for returning to the OR to resuture the scleral flap. Nevertheless, one needs to be mindful of the risk of elevated IOP in a patient who has advanced field loss that is encroaching on fixation.

RNW: This patient has so far declined further surgical intervention. In the fourth postoperative month, his visual acuity is 20/200 OD, and his IOP has remained at 7 mm Hg.

CONCLUSION

Young male myopic patients who require trabeculectomy are at risk of postoperative hypotony maculopathy. Intraoperative measures aimed at reducing the risk of hypotony include reduced intraoperative hypotony, tighter scleral sutures, and meticulous closure of the sclera and conjunctiva. Using 5-FU intraoperatively or no adjunctive antifibrotic may be preferable to mitomycin C. The evidence supporting any of these measures is limited,⁴ and hypotony maculopathy may occur despite these precautions.

The conservative management of hypotony maculopathy includes the use of external tamponade with shells or symblepharon rings. Internal tamponade at

the scleral ostium may be induced temporarily with viscoelastics or air, which can be injected into the anterior chamber. Surgical intervention to resuture the scleral flap is frequently required to elevate the IOP and restore macular anatomy and function. □

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