

Bleb Revision for Late Posttrabeculectomy Visual Loss

BY YARA CATOIRA-BOYLE, MD

CASE PRESENTATION

In November 2006, an 80-year-old white male presented with a complaint of blurred vision in his right eye that dated to and had worsened progressively since a car accident a few months earlier. He also noticed “something” growing on his right eye and the onset of a severe foreign body sensation.

The patient’s past medical history was significant for primary open-angle glaucoma in his right eye, for which he had undergone phacotrabeculectomy in March 1997. His IOP was controlled without topical medications, and he had undergone conjunctival advancement to repair a leaking bleb in May 2003.

The patient’s visual acuity was 20/80 OD (a decrease from a baseline visual acuity of 20/40 in January 2004) and 20/20 OS with his current spectacles (+0.25 +1.25 X 175 OD and -2.50 +1.25 X 40 OS). BSCVA in his right eye was 20/60 (-1.00 + 5.50 X 10). The patient’s IOP measured 9 mm Hg OD and 15 mm Hg OS, and an external examination showed +3 blepharitis and rosacea bilaterally. A slit-lamp examination revealed a moderately elevated avascular bleb that encroached on the cornea almost to the visual axis (Figure 1) and +3 injection of the superior bulbar conjunctiva.

The patient also had a mildly decreased tear breakup time and minimal punctate corneal erosions. The anterior chamber was quiet with an intact posterior-chamber IOL. The fundus examination showed cup-to-disc ratios of 0.9 OD and 0.5 OS as well as normal maculae in both eyes.

My colleagues and I suspected that the severe foreign body sensation in the patient’s right eye was secondary to his overhanging bleb or to blepharitis-induced dry eye. His mild punctate corneal erosions, however, could not explain his blurry vision. We hypothesized that the overhanging bleb was either blocking the patient’s vision directly by encroaching on the visual axis or affecting the



Figure 1. Preoperatively, the patient’s superior bulbar conjunctiva showed injection and a cystic bleb overhanging his cornea.

cornea’s curvature. The latter scenario was consistent with the astigmatism detected on manifest refraction.

HOW WOULD YOU PROCEED?

1. Would you treat the patient’s blepharitis and dry eye conservatively?
2. Would you schedule surgery to revise the patient’s overhanging bleb?
3. How soon after initiating treatment for ocular surface disease would you consider performing surgery?
4. Would you revise the bleb with conjunctival advancement, transplanted conjunctival tissue, or transplanted amniotic membrane?
5. Would you remove the entire bleb?

CLINICAL COURSE

We decided to start the patient on a regimen of lid hygiene, warm compresses, preservative-free artificial tears every 2 hours, erythromycin ointment at bedtime,

and oral doxycycline (100 mg daily) for his blepharitis and dry eye. We did not change the prescription for his eyeglasses. The patient returned 2 months later with the complaint that his vision was worse and that he continued to experience discomfort despite using artificial tears four times daily and erythromycin ointment at bedtime. His visual acuity with his current spectacles was 20/400 OD, and his BSCVA was 20/80 OD ($-1.00 + 6.50 \times 10$). The patient's visual acuity did not improve with a pinhole refraction, and his IOP was stable at 8 mm Hg.

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SURGICAL COURSE

Due to the patient's continued discomfort with conservative treatment, we decided to excise the overhanging portion of the bleb. Our goals were to eliminate the foreign body sensation and improve the patient's vision while maintaining his low IOP.

We used a crescent blade to separate the bleb from the cornea. Next, we incised the superior bulbar conjunctiva (following the contour of the bleb) and undermined the tissue posteriorly to create a flap. Wet-field cautery was used for hemostasis and to remove all of the epithelium from the bleb's surface. Next, we used a crescent blade to create a corneal groove parallel to the limbus from 10 to 2 o'clock. We pulled the posterior conjunctival flap over the preexisting bleb and attached it to the floor of the corneal groove with a running 10-0 nylon suture. An injection of balanced salt solution through a paracentesis elevated the bleb. Testing with fluorescein confirmed that the wound was watertight.

OUTCOME

One day postoperatively, the patient's UCVA was 20/60, and his IOP measured 11 mm Hg. Slit-lamp examination revealed a pinpoint leak at the limbal wound. The patient began a postoperative regimen of prednisolone, anti-infective eye drops, and bacitracin ointment four times a day for 2 months. By that time, the patient's UCVA was 20/40, his BSCVA was $+1.50 \times 155 = 20/25$, and his IOP measured 8 mm Hg. The diffuse, +1 vascular, microcystic bleb was mildly elevated



Figure 2. The bleb in the patient's right eye was vascularized, diffuse, and mildly elevated 2 months after we removed overhanging tissue to resolve his postoperative astigmatism. The sutures were still present at this time.



Figure 3. The patient's visual acuity was 20/20 OU, and he had well-controlled IOPs 19 months after the excision of an overhanging bleb from his right eye.

with no leakage. A running 10-0 nylon suture was in place (Figure 2).

In March 2007, we removed a loose 10-0 nylon suture from the limbus. At that time, the patient's BSCVA was 20/20 OU, and his IOP measured 9 mm Hg OD. Follow-up in July 2007 showed that his vision and IOP were stable (Figure 3).

DISCUSSION

Studies have shown that conjunctival advancement with or without bleb resection can successfully repair leaking blebs, resolve bleb-related dysesthesia, and prevent hypotony due to overfiltration. Most patients who undergo this procedure maintain or report improvement in their preoperative visual acuity.¹⁻³ Other techniques used to revise dysfunctional blebs include the transplantation of amniotic membrane and the placement of incisions at the superior fornix to release excessive tension at the limbus.

“Early visual loss after trabeculectomy has been attributed to astigmatic changes in the cornea’s topography, keratometry, and refractive function.”

Early visual loss after trabeculectomy has been attributed to astigmatic changes that alter the cornea’s topography, keratometry, and refractive function.⁴ Patients typically develop with-the-rule astigmatism in the first 3 months after surgery that seems to revert to against-the-rule astigmatism between 6 and 12 months postoperatively. The literature does not describe clinically significant changes associated with patients’ late conversion to against-the-rule astigmatism.⁵⁻⁷

Astigmatism after filtration surgery is less common with microtrabeculectomy through a 2-mm X 2-mm flap and a 0.75-mm sclerostomy, nonpenetrating filtering surgery without the implantation of a drainage device, and the intraoperative use of mitomycin C (MMC) than with trabeculectomy with flaps larger than 4 mm or without MMC.

Factors that may contribute to early postoperative astigmatism after trabeculectomy include the shrinking of tissue in the flap’s episcleral area with cautery, tight suturing of the scleral flap, and horizontal misalignment of the flap. The cornea’s vertical radius might also be decreased when the corneal edge of the internal sclerostomy is sunk during the scleral flap’s approximation and suturing.

Because MMC delays the wound’s healing, it may reduce the degree to which episcleral tissues contract and deform the cornea.^{8,9} In some cases, laser suture lysis can correct severe astigmatism during the early postoperative period.¹⁰ The longest follow-up in these studies,⁹ however, was 12 months. Moreover, although it is well known that blebs change over time, the oph-

thalmic literature does not document a relationship between alterations in their morphology (ie, overhanging blebs) and the development of astigmatism after trabeculectomy.

The patient described herein developed severe, late, against-the-rule astigmatism of at least 6.00 D. After the bleb was revised, his vision improved to 20/20, and his astigmatic correction returned to preoperative levels. The postoperative change also included a shift in astigmatic axis, a result that is atypical of the with-the-rule astigmatism that develops between 1 and 6 months after trabeculectomy. The most likely cause of our patient’s astigmatism was compression and flattening of his cornea by the overhanging bleb at the 90° meridian versus a steepening of the 180° meridian. We cannot verify this etiology, however, because we did not perform preoperative corneal topography or videokeratography.

My colleagues and I have adopted a standard surgical revision technique that preserves a preexisting bleb while improving its function. This technique successfully resolves symptoms related to leaking, disesthetic, or overfiltering blebs and maintains IOPs of between 5 and 21 mm Hg with no medications in approximately 60% of patients. The addition of topical therapy to the patients’ postoperative regimen increased the surgery’s success rate to 80% at a mean follow-up of 18.9 months.³ □

Steve Petkovich, OD, and Sean Stotts from the Roudebush VA Medical Center in Indianapolis, Indiana, assisted the author with the photographs in this article.

Yara Catoira-Boyle, MD, is Assistant Clinical Professor of Ophthalmology at the Indiana University School of Medicine in Indianapolis. She may be reached at (317) 278-2661; ycatoira@iupui.edu.



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