

Bleb Revision

A discussion of the indications and surgical approach.

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WITH DAVID S. GREENFIELD, MD

CASE PRESENTATION

An 82-year-old white female with a 35-year history of bilateral open-angle glaucoma presented with a 1-week history of pain and photophobia in her right eye. The patient had undergone bilateral combined trabeculectomy with mitomycin C and cataract extraction in her right eye in 1996 and in her left eye in 1998. She had a visual acuity of 20/30 OD and 20/40 OS. Slit-lamp biomicroscopy revealed a focal, thin, avascular bleb with marked surrounding hyperemia in her right eye. There was no bleb leak or evidence of intraocular inflammation. Her left eye had a quiet, diffuse bleb with microcysts. The patient's IOP measured 16 mm Hg OD and 5 mm Hg OS. Extensive rim loss and a superior arcuate scotoma encroaching on fixation were evident in her right eye (Figure 1).

The attending ophthalmologist diagnosed blebitis in the patient's right eye and started her on hourly topical moxifloxacin 0.5%. The blebitis resolved over the next 7 days, but there was evidence of thinning of the bleb's wall and a breakdown of the avascular conjunctival tissues (Figure 2). Diffuse oozing of aqueous humor through the bleb's wall but no focal leak was observable. In addition, the patient's IOP had risen to 19 mm Hg OD, and she had developed bilateral, chronic blepharitis.

Comments on the Indications for Bleb Revision

DSG: An interesting feature in this case is the lack of a frank leak in the bleb. Published evidence suggests that blebitis is strongly associated with a leaking bleb. In a case-control study, my colleagues and I found that eyes with a bleb-related infection were 26 times more likely to have a late-onset bleb leak than eyes with no infection.¹ Often, the clinician does not see the leak during the patient's initial presentation. As the blebitis resolves, however, the leak becomes manifest. In this case, no leak was present at the initial presentation, but marked thinning of the bleb's wall with diffuse oozing of aqueous through it became apparent once the blebitis had resolved. A second interesting feature is that an infected bleb is less common after combined surgery compared

with trabeculectomy alone, because the bleb's walls tend to be thicker after combined surgery.²

The decision of whether to perform surgery or observe the patient is less straightforward when a frankly leaking bleb is absent. In a retrospective analysis of recurrent blebitis, the major risk factors were bleb leak, which was present in 80% of patients, and blebs sited at the inferior limbus.³ For that reason, I consider a leaking bleb or a bleb located at the inferior limbus to be an indication for revising the bleb.

In this particular case, an argument could be made for any of the following three options: observation only, treatment with topical antibiotics, or bleb revision. The disad-

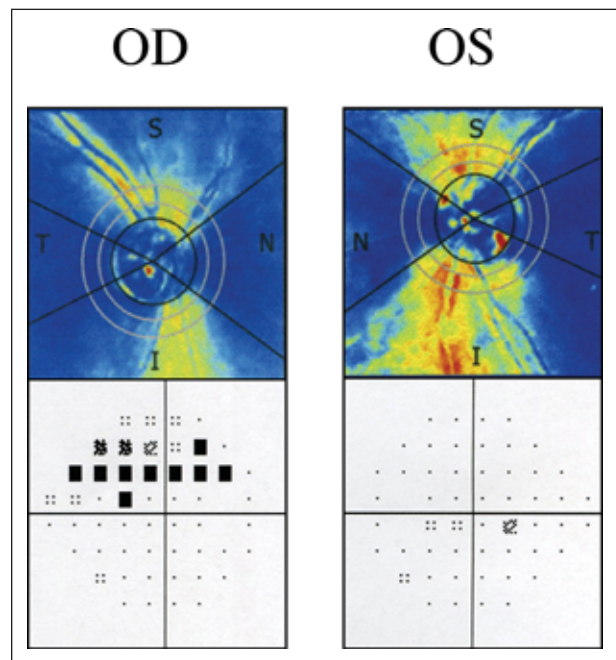


Figure 1. Thickness maps of the retinal nerve fiber layer (GDx-VCC; Carl Zeiss Meditec Inc., Dublin, CA) (top) and the pattern deviation plot (from a 24-2 Humphrey Visual Field using the Swedish Interactive Threshold Algorithm-Standard [Carl Zeiss Meditec Inc.]) (bottom) reveal more advanced glaucoma in the patient's right eye.

vantage of conjunctival advancement surgery here is the probability of elevated IOP postoperatively. The patient has a superior arcuate field defect that is encroaching on fixation, and a rise in IOP could threaten her remaining central vision.

RNW: An alternative surgical approach would be to dissect the fibrous walls of the focal cystic bleb with a microvitreoretinal blade to generate a diffuse bleb. This technique would effectively diffuse the existing bleb and would have the further advantage of reducing the patient's IOP.

After discussing the potential risks and benefits of conservative versus surgical management with the patient, the ophthalmologist decided to intervene surgically. The patient underwent a trabeculectomy revision under retrobulbar anesthesia. Having performed a subconjunctival injection of 5-fluorouracil (7.5 mg) posterior to the bleb, the surgeon made a small conjunctival incision lateral and posterior to the bleb and then extensively dissected the subconjunctival fibrous adhesion. The injection of BSS into the anterior chamber through a paracentesis produced a large diffuse bleb.

During the postoperative period, a diffuse, shallow bleb was evident. The patient administered topical prednisolone acetate q.h. and gatifloxacin 0.3% q.i.d. to her right eye. She received three subconjunctival injections of 5-fluorouracil (7.5 mg) during the first 3 postoperative weeks. Her visual acuity 1 day after surgery was 20/30 OD. A drop in IOP to between 8 and 12 mm Hg occurred during the first postoperative month. With time, the bleb wall thickened, and the size of the avascular zone decreased (Figure 2).

Comment on the Surgical Approach

JGC: What were the indications for electing to use bleb-decompression surgery versus conjunctival advancement?

RNW: Bleb-decompression surgery is a minimally invasive procedure. It does not induce the corneal astigmatism or ptosis that often accompanies conjunctival advancement surgery. A further advantage is that this approach is less likely to elevate the IOP, as frequently occurs after conjunctival advancement. The patient's visual acuity on postoperative day 1 was 20/30, and her IOP decreased. The oozing cystic bleb—with the potential development of a devastating condition—became a diffuse, nonoozing, partially vascularized bleb that was much less likely to become infected upon the discontinuation of topical antibiotics.

JGC: Another issue is the potential to reduce the avascular zone's size and increase the thickness of a cystic bleb's walls by dissecting the ring of scar tissue. This procedure, of course, now requires systematic evaluation to establish fully its safety and efficacy with respect to altering the bleb's morphology and long-term IOP control.

DSG: An alternative surgical approach is standard conjunctival advancement after dissecting out or de-epithelializing the existing bleb. Autologous conjunctival transplantation from the inferior conjunctiva or from the conjunctiva of the patient's fellow eye may be required if the operative eye has insufficient conjunctiva. Budenz et al⁴ showed that amniotic membrane was not effective in the long term as an alternative to conjunctiva. Other, more conservative approaches for treating a leaking bleb (eg, aqueous suppressants, contact lens tamponade, autologous blood and laser treatments) generally have limited success and are less effective than surgical revision of the bleb.

I remove loose sutures but never close the sclera in order to avoid causing very high pressures. Prior to under-

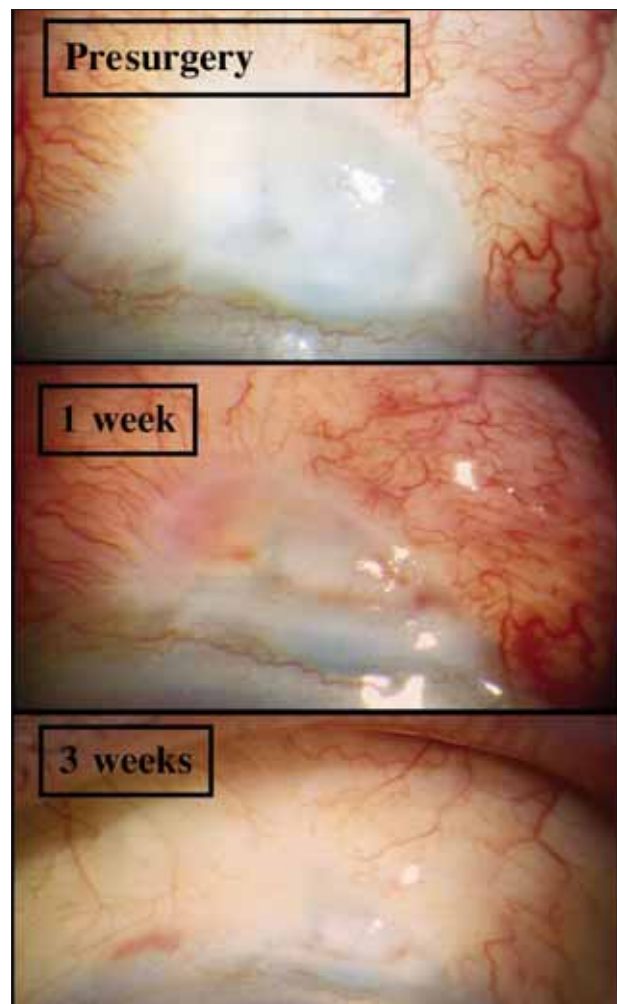


Figure 2. A focal, thin-walled bleb with a large avascular area was observed preoperatively. A moderately brisk oozing of aqueous humor but no focal leak was observable. The postoperative bleb was more diffuse with a thicker bleb wall. The oozing of aqueous humor ceased, and the avascular area shrank.

going conjunctival advancement, patients should be warned that they are likely to develop ptosis and poor vision due to astigmatism from tight limbal sutures. I measure the size of the bleb preoperatively. If it extends more than 10 mm from the limbus, there is a significant risk of a recurrent leak and marked ptosis. In such situations, I consider placing a conjunctival patch graft.

RNW: Our approach is similar. On occasion, if the original scleral flap has melted or there is an obvious aqueous jet-stream leak, I do close that part of the flap, however. In general, I leave the flap alone.

CONCLUSION

Leaking blebs are strongly associated with blebitis, and they are a risk factor for endophthalmitis. Surgical management is indicated for a frank leak and for inferiorly positioned blebs owing to their greater risk of infection. Whether to treat oozing blebs following an episode of blebitis is less clearly defined. Conjunctival advancement with excision of the underlying bleb tissue is our procedure of choice when a leaking bleb is present. Decompressing the bleb by the subconjunctival dissection of scar tissue may provide an alternative approach, particularly if poorly controlled postoperative IOP poses a significant risk to the patient's central vision. In this case, the bleb's decompression was associated with discontinued oozing and a reduced avascular bleb area. □

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