

# Bleb Leaks

Experience-based advice on management.

BY DONALD L. BUDENZ, MD, MPH

The bleb can leak after any trabeculectomy, but the problem is more common when surgery involves mitomycin C, which may produce a thin, avascular bleb (Figure 1). Leakage is less common but can also occur with the aggressive use of 5-fluorouracil. The bleb may begin leaking immediately postoperatively or many years after trabeculectomy. Surgeons should suspect a bleb leak in the immediate postoperative period if the IOP is very low, with or without a shallow anterior chamber. They should perform a Seidel test to rule out a leak in any eye with a low IOP and a filtering bleb. After administering topical anesthesia, the surgeon uses a fluorescein strip to paint the surface and edges of the bleb. Viewed with the cobalt blue filter, a rivulet of clear fluid visible in the usually orange surrounding fluid indicates the presence of a leak in that area (Figure 2).

Because bleb leaks can lead to complications of varying severity, their effective management is paramount to the success of filtering surgery as well as to the maintenance of ocular health and vision.

## EARLY POSTOPERATIVE BLEB LEAKS

### Overview

Leakage in the immediate postoperative period may be due to healing wound edges or buttonholes inadvertently made in the bleb at the time of surgery. Early leaks can cause a variety of problems, including choroidal effusion or hypotony maculopathy. In a reanalysis of the 5-Fluorouracil and Filtering Surgery Study, they were a risk factor for late bleb failure.<sup>1</sup> The proposed mechanism is that early leaks are accompanied by low blebs that scar down. A shallow anterior chamber may also be present.

### Management

Small postoperative wound leaks may heal spontaneously. Surgeons tend to taper steroids to encourage healing, but this approach is not ideal, because frequently dosed topical steroids prevent scarring of the rest of the bleb. A contact lens that is large enough to cover the leaking area may be helpful. Performed in an office setting, cautery just adjacent to the leak can heat-shrink the tissue. Direct suturing is an option in eyes with healthy, nonischemic tissue to suture.

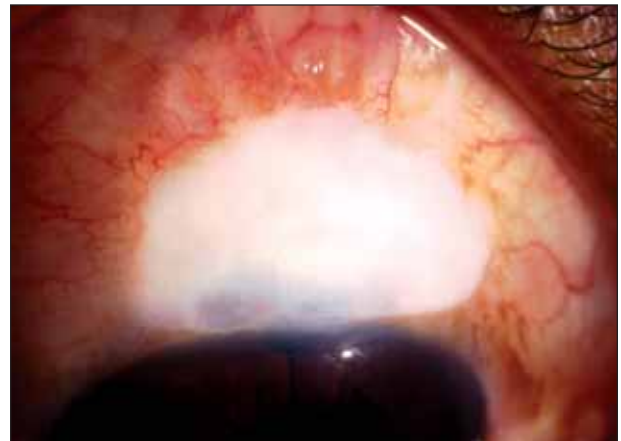


Figure 1. The typical appearance of a thin, ischemic bleb resulting from trabeculectomy with mitomycin C. If accompanied by hypotony, these blebs should be tested for leakage using the Seidel test.

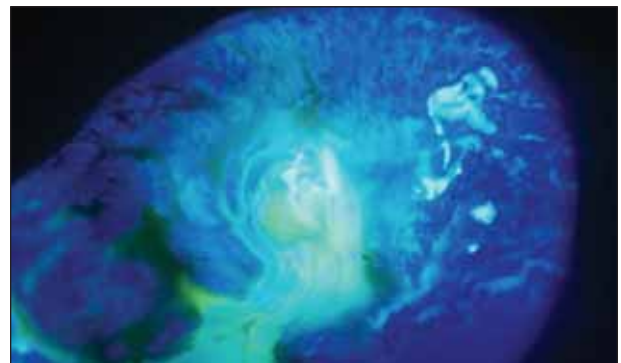
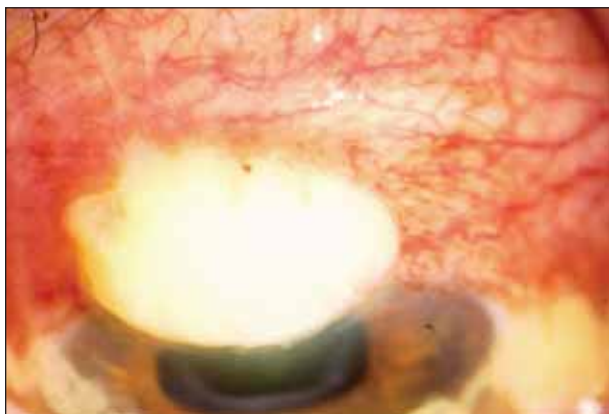


Figure 2. Seidel testing shows a rivulet of clear aqueous within a fluorescein pool.

## LATE POSTOPERATIVE BLEB LEAKS

### Overview

Thin, ischemic blebs may begin to leak years after trabeculectomy. Surgeons must distinguish frank Seidel-positive leaks from “bleb sweat” (also known as *physiologic Seidel* and *pseudo-Seidel positive*), defined as areas of pinpoint transconjunctival flow. The latter usually does not cause secondary complications. Frank Seidel-positive bleb leaks, however, may lead to hypotony with accompanying



**Figure 3.** This eye with a leaking filtering bleb developed endophthalmitis. Note the thin, ischemic bleb superiorly and pus inferiorly.

corneal folds and/or hypotony maculopathy. The most feared potential consequences of late bleb leaks are blebitis and endophthalmitis (Figure 3). The conjunctiva and sclera are the main barriers to intraocular infection from indigenous bacteria. A hole in the conjunctiva allows these bacteria to travel from the ocular surface into the bleb and ultimately into the anterior chamber and vitreous.

### Management

There is no consensus on whether all late bleb leaks should be aggressively closed. Certainly, closure is advisable if the leak is causing a complication. Surgeons' reluctance to revise leaking blebs relates to the potential for bleb failure after conjunctival advancement and conjunctival autograft. In such cases, the IOP can usually be controlled with medications or additional surgery. Depending on the seriousness of the secondary complication or threat of complication compared with the consequence of bleb failure and resultant increase in IOP, the surgeon may decide to observe bleb leaks. In such situations, the patient should be counseled to come to the office immediately if he or she experiences redness of the eye, sensitivity to light, vision loss, or pain (called *RSVP warnings*).

Small leaks may close with conservative treatment such as observation with or without aqueous suppressants, patching, and an ophthalmic antibiotic ointment. Most of the leaks that heal with conservative treatment, however, ultimately recur. Other nonsurgical approaches include the placement of a bandage contact lens, a symblepharon ring, or a Simmons shell; the administration of trichloroacetic acid; cryotherapy; argon laser therapy with or without dye enhancement; the application of fibrin glue; and the injection of autologous blood. I have not found these office-based procedures to be effective. In my experience, if the hole through which aqueous



**Figure 4.** The appearance of a bleb several years after conjunctival advancement. Note the thick, opaque, vascularized bleb that results in higher IOPs than thin, ischemic blebs but less risk of leaks and infection.



**Figure 5.** Amniotic membrane was used to replace the thin, leaking conjunctiva. This bleb revision has lasted for 12 years with no recurrence of leakage and controlled IOP. In the author's experience, this outcome of replacing leaking conjunctival blebs with amniotic membrane is the exception, rather than the rule.

humor is leaking is visible at the slit lamp, it is unlikely to close without surgical intervention.

The advancement of conjunctival tissue from the adjacent conjunctiva and/or Tenon's layers and free conjunctival autografts are the two surgical techniques most frequently employed today (Figure 4). Amniotic membrane grafts may be used in eyes with inadequate conjunctiva to advance. The reported success rate with amniotic membrane is not very good, however, despite isolated case reports of success<sup>2-5</sup> (Figure 5). In my hands, conjunctival advancement and autograft continue to perform better than amniotic membrane, provided that enough conjunctiva is available to replace the area exposed by excising the ischemic leaking bleb.

Currently, conjunctival advancement is the simplest procedure for reconstructing a filtering bleb. I create a large conjunctival peritomy that extends beyond the pre-

existing filtering bleb by approximately 2 clock hours on either side. Next, I perform extensive blunt dissection of the conjunctiva and Tenon's layers with a blunt Westcott scissors posteriorly and on both sides of the old filtering bleb so that I may pull down or slide these layers over the filtering area. Oftentimes, I encounter a thick ring of scar tissue delineating the old filtering bleb that must be incised. The prior ischemic bleb may be excised at this point. To get the advanced tissue to adhere to the peripheral cornea better, I may use a blade or cautery to denude the peripheral cornea of epithelial cells for 1 mm. Next, I pull conjunctiva and Tenon's layers down past the limbus and close them using Vicryl "wing" sutures (Ethicon Inc., Somerville, NJ) at one end of the wound, pass a horizontal mattress suture of 10-0 nylon just in front of the trabeculectomy site, and then place another Vicryl wing suture at the other end of the incision. I inflate the anterior chamber with balanced salt solution delivered through a paracentesis and check the new bleb for leaks using a Seidel test. I administer a subconjunctival injection of steroids and antibiotics 180° away from the bleb.

Postoperatively, phakic patients use atropine until I am sure their IOP and chamber are stable. I instruct all patients to use topical corticosteroids frequently as well as a prophylactic antibiotic for 1 week.

## CONCLUSION

If a bleb leak has caused a complication or raised concern about the increased risk of bleb-related infections (arguably the case with all bleb leaks), closing the bleb with conjunctival advancement is my preferred intervention, because it is effective and simple. Surgeons may attempt other techniques before or instead of conjunctival advancement or autograft, but these alternatives have not been as successful in my experience. □

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