

Cataract Surgery in the Presence of a Functioning Bleb

Strategies for lowering the risk of bleb failure.

BY VALERIE TRUBNIK, MD

Patients who undergo trabeculectomy are at increased risk of cataract formation and progression; more than 50% of patients will require cataract surgery within the first 5 years of trabeculectomy surgery.^{1,2} In the Advanced Glaucoma Intervention Study (AGIS), the Collaborative Normal Tension Glaucoma Study (CNTGS), and the Collaborative Initial Glaucoma Treatment Study (CIGTS), patients who underwent a trabeculectomy had a significantly higher risk of subsequent cataract extraction during the follow-up period compared with the nonsurgical treatment group.³⁻⁵ The pathogenesis of cataract formation in these patients was multifactorial, and the risk of cataractogenesis was highly dependent on whether the patient developed complications after the trabeculectomy. According to the AGIS, complicated trabeculectomy (ie, a flat anterior chamber) was associated with a 104% increase in the risk of cataract formation, but an uncomplicated procedure still carried a risk as high as 47%.^{2,3}

Phacoemulsification after trabeculectomy has been associated with bleb failure and a loss of IOP control. Managing visually significant cataracts in glaucoma patients with filtering blebs is thus a common clinical challenge.

HOW DOES CATARACT EXTRACTION AFFECT THE BLEB?

Although the exact mechanism of bleb failure after phacoemulsification is poorly understood, the formation of scar tissue at the conjunctival-scleral or scleral flap interface probably presents the greatest barrier to effective filtration. Additionally, cataract surgery is thought to cause prolonged low-grade inflammation secondary to lens crystallins, the effect of ultrasound energy, and the

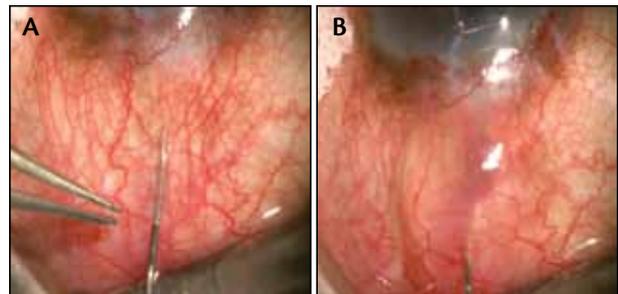


Figure. The bleb is flat prior to the initiation of a needling procedure (A). Bleb needling with mitomycin C after phacoemulsification (B).

high volume of fluid passing through the eye, all of which likely increase the production of fibrogenic cytokines in the aqueous humor, leading to further scarring.⁶

Despite numerous studies concerning the effect of phacoemulsification on the function of the filtering bleb, opinions on the subject vary. In 2002, Friedman et al conducted an extensive review of the literature and concluded that the data were inconclusive as to whether cataract extraction negatively affects preexisting blebs.⁷ Chen et al, however, found that patients under the age of 50 who had a preoperative IOP above 10 mm Hg, intraoperative iris manipulation, an early postoperative IOP over 25 mm Hg, and cataract surgery less than 6 months after trabeculectomy were all at risk for reduced bleb function after cataract extraction.⁸

Several other studies have demonstrated that postponing cataract surgery by more than 6 months reduces the risk of bleb failure. This period permits the bleb to stabilize and allows low-grade subclinical inflammation to resolve. A nascent bleb may be unable to withstand the stress of phacoemulsification.^{9,10}

INTRAOPERATIVE PEARLS FOR MINIMIZING THE RISK OF FAILURE

You can use the following intraoperative techniques to minimize the risk of scarring and loss of IOP control:

- Avoid manipulating the bleb and conjunctiva.
- Use a temporal clear corneal approach, 90° away from the bleb.
- Perform phacoemulsification in the capsular bag and in the plane of the iris. Doing so will minimize trauma to the ostium.
- Use low flow and low vacuum settings, which will reduce the amount of fluid directed through the bleb.
- Perform meticulous cortical cleanup to lessen inflammation.
- Place a suture at the corneal wound after the surgery. Closing the incision will minimize the chance of anterior chamber collapse or wound gape.¹⁻⁴

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STRATEGIES TO IMPROVE THE BLEB'S LONGEVITY

In addition to the timing of cataract surgery relative to trabeculectomy, ophthalmologists can employ certain techniques intraoperatively to minimize the risk of scarring and loss of IOP control (see *Intraoperative Pearls for Minimizing the Risk of Failure*). One goal of the cataract procedure in these patients is decreasing their IOP and their dependence on glaucoma medication. Although the revision of functioning blebs is not routinely recommended during phacoemulsification, it is indicated for patients with high preoperative IOPs and failing blebs. In such cases, I generally use 0.1 mL of a 50%-50% mixture of preservative-free 1% lidocaine and 0.4 mg/mL mitomycin C on a 27-gauge needle to revise the bleb after completing phacoemulsification (Figure). I cautiously enter the anterior chamber in order to minimize damage to the corneal endothelium. Kasahara et al described a similar procedure for simultaneous phacoemulsification and internal revision of the bleb to reduce scarring, with resultant preservation of the bleb in 89% of the 19 patients evaluated.¹¹

The use of 5-fluorouracil for peri- and postopera-

tive needling and for injections is another means of reducing fibrosis of the bleb. Despite the lack of large prospective studies to determine the role of repeated postoperative subconjunctival injections of this antimetabolite, the intervention has demonstrated some clinical significance^{2,12} and should be considered in patients with early postoperative IOP elevations.

Aggressive postoperative treatment with topical steroids and nonsteroidal antiinflammatory drugs for 1 month also helps to reduce the risk of bleb failure.

Surgeons may wish to consider maintenance therapy with a topical, brand-name nonsteroidal antiinflammatory drug dosed once daily for 1 year after cataract surgery, although this practice has yet to be evaluated in the literature.

CONCLUSION

Cataract formation is a well-known complication of trabeculectomy. The anterior segment surgeon's knowledge of intra- and postoperative measures that can minimize the risk of bleb failure is therefore crucial. Ophthalmologists can significantly lower this risk through proper precautions and techniques for phacoemulsification as well as the aggressive use of prophylactic antiinflammatory treatments postoperatively and timely injections of these agents if scarring or IOP elevation occurs. ■

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