

# Ocular Surface and Lid Disorders

Advice on treatment that could improve the success of glaucoma surgery.

BY PATRICK J. RIEDEL, MD

All eye surgeons are familiar with the intraoperative and postoperative complications of incisional glaucoma procedures. Physicians strive to minimize such problems in order to improve the chances of filter survival and controlled IOP. Creating and maintaining a functioning filtering bleb requires avoiding excess inflammation, which can induce episcleral fibrosis and lead to a failed or poorly functioning filter. To that end, many surgeons use intraoperative antimetabolites (eg, 5-fluorouracil, mitomycin C) and postoperative topical steroids, both of which reduce scarring at the filtration site (Figure 1).

Physicians may not fully appreciate how the preoperative condition of the ocular surface affects the success of glaucoma surgery, however. This article focuses on the treatment of ocular surface and lid disorders. Despite a paucity of published data regarding this issue, it seems intuitively obvious that improving a patient's conjunctival and corneal health may improve surgical success.

## DRY EYE

### Tear Deficiency

The most common of ocular surface and tear film conditions, dry eye, can be broadly divided into tear deficiency and evaporative tear film issues. A tear-deficient glaucoma patient (as measured by a Schirmer test and ocular staining with fluorescein, Lissamine Green [Accutome, Inc., Malvern, PA], or rose bengal) should receive treatment similar to that of any other dry eye patient and undergo aggressive ocular rehabil-

itation prior to conjunctival surgery.

Initial therapy consists of frequently instilled artificial tears, ointments, and gels. Lubricant viscosities vary, and clinicians should recommend brands and viscosities based on the patient's symptoms and degree of tear deficiency. I usually recommend starting with one of the following: Refresh brand products (Allergan, Inc., Irvine, CA), Genteal brand products (Novartis Ophthalmics, Inc., Duluth, GA), or Systane (Alcon Laboratories, Inc., Fort Worth, TX). I prefer these products over many other tear formulations because they are readily available and do not contain the preservative benzalkonium chloride. Generally, I do not recommend one of the aforementioned brands over another; I often tell patients to experiment with the different brands to find the one that works

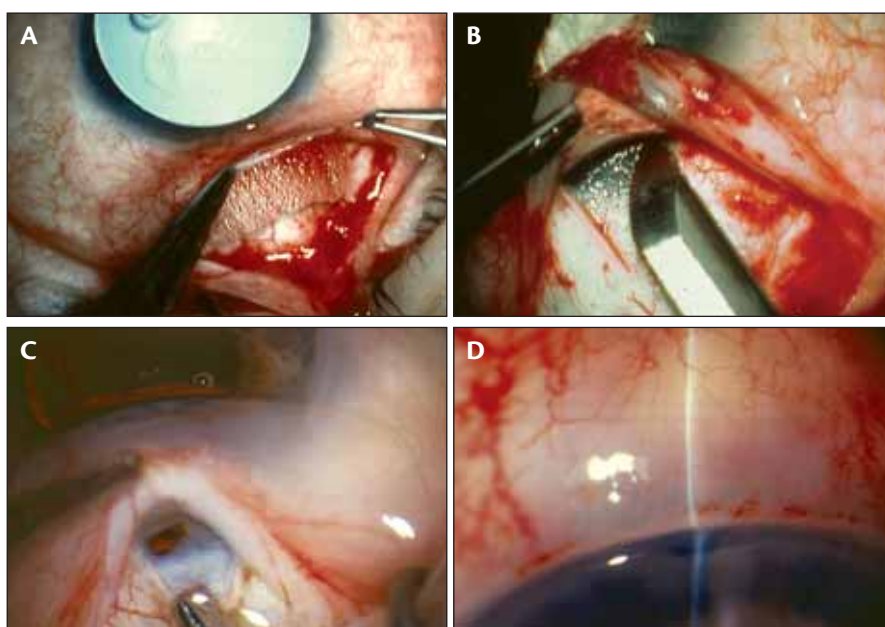


Figure 1. During a trabeculectomy, the surgeon placed a sponge soaked in mitomycin C under the conjunctival/Tenon's flap (A), then created a trabeculectomy flap (B) and an ostomy (C). The bleb functioned well postoperatively (D). By treating ocular surface and lid disorders preoperatively, physicians may improve surgical outcomes.

(Courtesy of Thomas Samuelson, MD)

best for them.

If any component of an unstable or irregular corneal epithelium (or early corneal edema) is present, clinicians should consider prescribing hypertonic saline drops, ointment, or a combination of the two (eg, Muro 128 brand [Bausch & Lomb, Rochester, NY]). Although this treatment may not substantially improve conjunctival health, it will allow for a more physiological corneal surface, which will improve ocular comfort and visual acuity.

Punctal plugs can also be effective in tear-deficient patients and should be used liberally by glaucoma surgeons. I usually place Parasol plugs (Odyssey Medical, Inc., Memphis, TN) only in the lower lid to avoid epiphora, but patients with severe dry eye can undergo lower and upper punctal occlusion with either temporary plugs or permanent punctal cautery. I use Parasol plugs because of the ease of their insertion, the stable and comfortable fit, and the presence of an external flange that allows me (and often the patient) to know if the plug is present. Although this is my personal preference, plugs of many different shapes and materials are available.

### Unstable Tear Film

Some patients make a normal quantity of tears, but they have an unstable tear film due to an abnormal or inadequate amount of lipids (produced by the meibomian glands) or mucin (produced by conjunctival goblet cells). The manufacturers of products such as Refresh Endura and Soothe (Alimera Sciences, Atlanta, GA) state that their respective products replenish or stabilize the lipid layer of the tear film, thereby decreasing evaporative problems.<sup>1</sup> If the preoperative evaluation reveals a rapid tear breakup time, then decreasing evaporative tear loss may be more beneficial than simply replacing the liquid component of a patient's tear film.

### Surface Inflammation

It is now fairly well documented that dry eye related to the tear film is caused or continued partly by T-cell-mediated inflammation.<sup>2,3</sup> If a preoperative glaucoma patient displays significant problems with his tear film, then a topical anti-inflammatory agent may be helpful. A short course of a topical corticosteroid may be implemented prior to surgery, but the clinician must remember that glaucoma patients can have a steroid response (ie, significant IOP elevation). Restasis (0.05% cyclosporine A; Allergan, Inc., Irvine, CA) shows promise in alleviating much of the inflammatory component present in tear film conditions.<sup>2,4</sup> Not only can this agent improve tear production and decrease dry eye symptoms, it may also increase the density of goblet cells and thereby improve more than just the liquid component of the tear film.<sup>5</sup>

Because it can take weeks for Restasis to become fully effective, it should be started as soon as possible if it is to be administered preoperatively. Currently, there are no published studies evaluating how preoperative therapy with Restasis affects the success rate of filtering surgery.

Additionally, several available oral supplements are purported to improve the quality of the surface tear film by supplying essential fatty acids that are often missing from patients' diets. Bioteares (Biosyntrx, Inc., Lexington, SC), Hydroeyes (Sciencebased Health, Carson City, NV), and Theratears (Advanced Vision Research, Woburn, MA) are several products occasionally recommended by dry eye specialists.

### ALLERGIC INFLAMMATION

Clinicians should also examine patients for signs of any allergic component of their ocular surface, tear film, or eyelid complaints. Findings include conjunctival chemosis, injection, and follicle formation. An important symptom is ocular itching, which is almost always present when an allergic condition exists. The arsenal of topical allergy medications is large and may be used liberally in these patients. Generally, I recommend a twice-a-day allergy medication that has multiple mechanisms of action (eg, mast-cell stabilization, antihistamine effect) such as Patanol (Alcon Laboratories, Inc.), Optivar (Medpointe Pharmaceuticals, Somerset, NJ), Elestat (Allergan, Inc.), or Zaditor (Novartis Ophthalmics, Inc.). Clinicians should be careful, however, to distinguish environmental allergies from topical changes that occur due to the toxicity of glaucoma drops. The latter should be treated by discontinuing the offending medications rather than prescribing additional medications. Nonsteroidal anti-inflammatories (eg, Acular [Allergan, Inc.], Voltaren [Novartis Ophthalmics, Inc.]) can also be effective in allergically inflamed eyes.

### LID DISEASE

Lid conditions such as blepharitis, meibomitis, and acne rosacea can be present without significant problems in the tear film. Nevertheless, physicians should treat these conditions preoperatively, because they can increase conjunctival inflammation and potentially decrease the success of filtration. Because blepharitis may also heighten the risk of postoperative infection, it should be aggressively treated. The standard approach consists of hot lid soaks and scrubs to remove lid scurf. Patients with blepharitis or meibomitis may also use gentle, or "tearless," shampoos or prepackaged lid scrubs preoperatively. If significant lid inflammation is present, and it does not resolve with lid scrubs and soaks, then a short treatment with an antibiotic (bacitracin, erythromycin) or an antibiotic and ster-

oid combination (eg, Blephamide [Allergan, Inc.]) can dramatically reduce the problem. These medications are preferable to others because of their spectrum of activity and their lack of topical toxicity. Patients taking a product that contains a steroid should be watched closely for any signs of steroid response.

Individuals with significant acne rosacea or meibomitis may benefit from a course of an oral tetracycline (eg, doxycycline 100 mg b.i.d. for 1 month, then 100 mg q.d. for 1 to 4 months) prior to undergoing surgery. Applying metronidazole topical gel, lotion or cream to the periorcular skin can decrease inflammation due to acne rosacea, but ocular contact should be avoided.

### CONJUNCTIVAL IRRITATION

Glaucoma patients often have some degree of conjunctival irritation, inflammation, or both as a result of their chronic use of topical IOP-lowering drugs. Studies<sup>6-9</sup> show that such medications alter the architecture of the conjunctiva (eg, increase subconjunctival fibrosis, squamous metaplasia, and the thickness of the epithelial cell layer) as well as produce an increase in local fibroblasts, lymphocytes, macrophages, and mast cells. These changes, however, may have more to do with preservative toxicity than an effect induced by the actual glaucoma medication.

Noecker et al<sup>9</sup> showed that glaucoma medications without or with only minimal concentrations of benzalkonium chloride (eg, Alphagan-P and Lumigan, respectively [both Allergan, Inc.]) appear to have less effect on the bulbar conjunctival morphology. Pisella et al<sup>10</sup> also showed that benzalkonium chloride increased conjunctival changes when compared to unpreserved timolol. In addition, the longer a patient has been on topical treatment, the more significant the conjunctival changes appear to be. Some researchers have contended that these alterations reduce the success of filtration surgery, and a number of surgeons even recommend performing surgery earlier in the course of glaucoma treatment to avoid operating on a significantly changed and inflamed conjunctiva.<sup>11</sup> A recently published study,<sup>12</sup> however, casts doubt on the strength of the data published to date supporting the idea that trabeculectomy is less successful in patients who were previously taking eye drops.

### SUMMARY

Clinicians should treat glaucoma patients much as they do any others suffering from dry eye, blepharitis, and meibomitis. The difference is that they should exercise caution when prescribing topical steroid treatment due to glaucoma patients' potential for subsequently elevated IOP (steroid response). In addition, physicians should tailor an individual's topical glaucoma therapy to obtain the

treatment goal with the least amount of medication and side effects. They should carefully evaluate the ultimate benefit to the patient of any glaucoma drop that inflames the ocular surface. Discontinuing an offending medication may help maintain a healthier conjunctiva in the short and long term.

Although some data suggest that certain glaucoma medications may produce less conjunctival inflammation than others,<sup>9,10</sup> all glaucoma drops likely alter the normal conjunctival architecture to some degree. As mentioned earlier, whether these changes ultimately affect the outcome of trabeculectomy is still open for debate and further study. Research in the area of conjunctival health and surgical outcomes is emerging, but it is currently sparse and often inconclusive. Nonetheless, a focused diagnosis and the treatment of lid and tear film conditions in the glaucoma patient will almost certainly reduce unwanted symptoms and improve surgical success. □

*Patrick J. Riedel, MD, is in private practice at Minnesota Eye Consultants, PA; Adjunct Assistant Professor of Ophthalmology at the University of Minnesota; Attending Surgeon at Phillips Eye Institute; and Glaucoma Consultant at Minneapolis VA Medical Center, all in Minneapolis. He is also Glaucoma Consultant at Regions Hospital in St. Paul, Minnesota. He stated that he holds no financial interest in the products or companies mentioned herein. Dr. Riedel may be reached at (763) 553-1142; pjriedel@mneye.com.*



1. Di Pascuale MA, Goto E, Tseng SC. Sequential changes of lipid tear film after the instillation of a single drop of a new emulsion eye drop in dry eye patients. *Ophthalmology*. 2004;111:783-791.
2. Perry HD, Donnenfeld ED. Topical 0.05% cyclosporine in the treatment of dry eye. *Expert Opin Pharmacother*. 2004;5:2099-2107.
3. Brignole F, Pisella PJ, Goldschild M, et al. Flow cytometric analysis of inflammatory markers in conjunctival epithelial cells of patients with dry eyes. *Invest Ophthalmol Vis Sci*. 2000;41:1356-1363.
4. Stevenson D, Tauber J, Reis BL. Efficacy and safety of cyclosporine A ophthalmic emulsion in the treatment of moderate-to-severe dry eye disease: a dose-ranging randomized trial. The Cyclosporine A Phase-2 Study Group. *Ophthalmology*. 2000;107:967-974.
5. Kunert KS, Tisdale AS, Gipson IK. Goblet cell numbers and epithelial proliferation in the conjunctiva of patients with dry eye syndrome treated with cyclosporine. *Arch Ophthalmol*. 2002;120:330-337.
6. Sherwood MB, Grierson I, Millar L, Hitchings RA. Long-term morphologic effects of antiglaucoma drugs on the conjunctiva and Tenon's capsule in glaucomatous patients. *Ophthalmology*. 1989;96:327-335.
7. Pozarowska D, Toczolowski J, Wozniak F. The evaluation of morphologic status of bulbar conjunctiva after long-term antiglaucoma drug therapy [in Polish]. *Klin Oczna*. 1999;101:455-458.
8. Nuzzi R, Vercelli A, Finazzo C, Cracco C. Conjunctival and subconjunctival tissue in primary open-angle glaucoma after long-term topical treatment: an immunohistochemical and ultrastructural study. *Graefes Arch Clin Exp Ophthalmol*. 1995;233:154-162.
9. Noecker RJ, Herrygers LA, Anwaruddin R. Corneal and conjunctival changes caused by commonly used glaucoma medications. *Cornea*. 2004;23:490-496.
10. Pisella PJ, Debbasch C, Hamard P, et al. Conjunctival proinflammatory and proapoptotic effects of latanoprost and preserved and unpreserved timolol: ex vivo and in vivo study. *Invest Ophthalmol Vis Sci*. 2004;45:1360-1368.
11. Broadway DC, Grierson I, O'Brien C, Hitchings RA. Adverse effects of topical antiglaucoma medication II. The outcome of filtration surgery. *Arch Ophthalmol*. 1994;112:1446-1454.
12. Flach AJ. Does medical treatment influence the success of trabeculectomy? *Trans Am Ophthalmol Soc*. 2004;102:219-223.