

Dry Eye: the Impact on Ophthalmic Surgery

Topical cyclosporine A provides adequate relief of symptoms.

BY EDWARD J. HOLLAND, MD

Advances in cataract and refractive surgery have yielded dramatic improvements in surgical safety and quality of vision. Techniques in cataract surgery can now correct astigmatism as well as provide patients with vision at distance and near. Customized ablations in refractive surgery are producing an outstanding quality of vision. These advances are lost, however, with an unhealthy ocular surface. Dry eye is a nearly universal consequence of corneal surgery, and it can severely disrupt the tear film and decrease patients' quality of vision.

CAUSES OF OCULAR SURFACE DISEASE

During the last several years, clinicians have begun paying increasing attention to the diagnosis and treatment of ocular surface disease. A careful patient history is important to help differentiate the various causes of the disease. The symptoms of dry eye include ocular discomfort, burning, foreign-body sensation, photophobia, itching, and redness. More recently, a fluctuation of vision has been recognized as a key symptom of dry eye in patients after cataract and refractive surgery. Ocular pain is less common.

Corneal surgery results in neurotrophic injury from trauma to the corneal nerves, especially with refractive and corneal transplant procedures. Corneal sensation is vital to maintaining the corneal epithelium's integrity. In cataract surgery, the cataract and limbal relaxing incisions transect the nerves responsible for corneal innervation. LASIK patients may experience a significant postoperative decrease in corneal sensation due to the flap's creation and laser ablation.

Other factors that contribute to dry eye after anterior segment surgery include epithelial trauma, exposure to topical medications, a lack of lubrication during surgery, and inflammation.

MINIMIZING OCULAR SURFACE DISEASE

Surgeons can take steps to minimize dry eye in the surgical patient. The first step is to identify which patients are at risk. Preoperative diagnostic steps include a careful examination

and the assessment of lid anatomy and function. In addition, physicians should examine the eyelids for meibomian gland disease (MGD). Patients with MGD are at risk for evaporative dry eye due to an unstable tear film. Other examinations include blink rate, an assessment of the tear film's volume and quality, tear breakup time, ocular surface staining with supravital dyes such as lissamine green or rose bengal, and a Schirmer test. If there are significant findings of dry eye such as conjunctival or especially corneal staining, then it may be advisable to postpone surgery and treat the dry eye disease.

Pre- and postoperative therapy for dry eye disease has changed significantly in the last few years. Artificial tears to support the tear film are the first step. Preservative-free tears are indicated for moderate-to-severe dry eye (ie, tears used four or more times daily). Transiently preserved tears are appropriate for patients with mild dry eye (ie, tears used three times daily). Preserved tears can be used for very mild dry eye (ie, tears used infrequently). Gels and ointments may be suitable for eyes that require overnight lubrication.

TOPICAL CYCLOSPORINE A

The most significant breakthrough in the management of dry eye has been the development of topical therapy directed at the etiology of most dry eye (ie, inflammation). Restasis (topical cyclosporine A; Allergan, Inc., Irvine, CA) has a dramatic effect on the success of dry eye therapy. The drug has been shown to increase the production of tears, reduce corneal staining, and improve visual acuity in a significant number of patients.¹ In addition, a decrease in the use of artificial tears is seen in patients treated with topical cyclosporine A. This drug should now be considered a first-line therapy for dry eye. Any patient using artificial tears on a daily basis may benefit from cyclosporine A. Not only is this treatment more effective than artificial tears, it can prevent the progression of dry eye disease by reducing inflammation in the lacrimal gland and on the ocular surface. In a recent study by Rao,² cyclosporine A limited the progression of dry eye disease and improved dry eye markers, whereas the disease progressed in one-third of the patients treated with an artificial tear.

The combination of corticosteroids with the initiation of cyclosporine A has made anti-inflammatory dry eye therapy even more effective.³ Corticosteroids improve tear production by controlling inflammation, and they decrease the irritation associated with the use of cyclosporine emulsion by as much as 75%. Loteprednol has worked well for this indication due to the drug's efficacy and safety.³

In dry eye patients undergoing anterior segment surgery, treatment with cyclosporine A decreases their postoperative symptoms and improves their rate of visual recovery. Donnenfeld and colleagues reported on the efficacy of cyclosporine versus artificial tears for improving visual outcomes following the implantation of multifocal IOLs.⁴ The investigators found that, 2 months following the second IOL's implantation, the eyes that received cyclosporine A had significantly improved mesopic and photopic contrast sensitivity compared with eyes not treated with the drug. In addition, there was a trend toward improved UCVA and BCVA in the cyclosporine-treated eyes.

Ursea and Schanzlin recently compared the recovery of visual acuity following LASIK in patients treated with topical cyclosporine A versus a standard postoperative regimen.⁵ The investigators found that the cyclosporine-treated eyes achieved better visual outcomes than the control group, and the researchers concluded that the drug may be an effective treatment modality for reducing the time needed

for visual recovery after refractive surgery. The use of cyclosporine A was associated with an overall better and faster recovery of visual acuity.

CONCLUSION

Dry eye can have a significant impact on patients undergoing anterior segment surgery. Surgeons must be aware of the clinical signs and symptoms of this disease. Aggressive dry eye therapy, including anti-inflammatory treatment, will improve surgical outcomes and patients' postoperative quality of vision. ■

Edward J. Holland, MD, is a professor of ophthalmology at the University of Cincinnati and the director of the Cornea Service at the Cincinnati Eye Institute in Ohio. He is a consultant to Allergan, Inc. Dr. Holland may be reached at (859) 331-9000; eholland@fuse.net.



1. Ursea R, Purcell TL, Tan BU, et al. The effect of cyclosporine 0.05% on visual acuity recovery following refractive surgery. *J Refract Surg.* 2008;24:5:473-476.
2. Sanjay N, Rao, SN. Prevention of dry eye disease progression by topical cyclosporine (CsA) 0.05%. Poster presented at: The 2008 AAO Annual Meeting; November 9, 2008; Atlanta, GA.
3. Donnenfeld ED, Sheppard J, Holland E. Prospective, multi-center, randomized controlled study on the effect of loteprednol etabonate on initiating therapy with cyclosporine A. Poster presented at: The 2007 AAO Annual Meeting; November 2007; New Orleans, LA.
4. Donnenfeld ED, Perry HD, Wittpen J Jr, et al. Cyclosporine on quality of vision in patients undergoing IOL implantation. Poster presented at: The ARVO Annual Meeting; May 6, 2007; Fort Lauderdale, FL.
5. Ursea R, Schanzlin DJ. The role of Restasis in faster visual acuity recovery after refractive surgery [ARVO abstract 4381]. *Invest Ophthalmol Vis Sci.* 2005;46.