

Dry Eyes and Premium IOLs

The health of the ocular surface is important to the success of lens technology.

BY ERIC D. DONNENFELD, MD

An evaluation of the ocular surface is one of the most important aspects of my preoperative routine for any patient who is considering a premium IOL. Dry eye can significantly compromise patients' quality of vision, even after routine cataract surgery. With multifocal IOLs, problems related to dry eyes are magnified by the inherent decrease in contrast sensitivity with this lens type. Although we often talk about dry eye in the context of LASIK, in my experience, cataract surgery is even more commonly associated with the condition. According to a recent report, well over half the patients undergoing cataract surgery experienced significant postoperative dry eye.¹

THE REASONS FOR DRY EYES AFTER CATARACT SURGERY

There are a number of reasons to expect dry eyes after cataract surgery. The cataract surgery patient population is older and has a higher incidence of preoperative dry eye than younger patients. Furthermore, multifocal IOL patients, in my opinion, are generally active and may frequently engage in situations that contribute to ocular dryness (eg, computer use, outdoor activities).

Another reason why a patient may develop dry eye is that their pre- and postoperative topical medications contain preservatives. They may be intrinsically toxic compounds that damage the ocular surface, especially the goblet cells. Also, in addition to the cataract incision, many patients will have limbal relaxing incisions in the periphery of the cornea where the corneal nerves enter the eye. Significant corneal anesthesia and dry eye may ensue. Furthermore, there is a 5% to 10% excimer laser enhancement rate with multifocal IOLs (the risk of dry eye disease increases from multiple surgeries).

PREOPERATIVE EVALUATION

During my preoperative evaluation of patients considering cataract surgery, my first step is to take a thorough ocular history, including contact lens intolerance, foreign body sensation, grittiness, and a record of ocular symptoms that worsen later in the day. The most important indication I look for is fluctuating visual acuity, which almost always suggests ocular surface disease. When I hear a potential patient complain of any of the aforementioned warning signs, I

examine him carefully for dry eye syndrome. I observe the tear meniscus and the corneal and conjunctival epithelium (for hyperemia, redundant conjunctiva, etc.) to assist my diagnosis.

Most important in the evaluation of ocular surface disease is vital dye staining of the conjunctiva and/or cornea. Fluorescein staining of the cornea is typical in mild-to-moderate dry eye disease, because epitheliopathy is not yet apparent at this stage. Lissamine green staining (Accutome Inc., Malvern, PA) is probably the most useful test I perform, because it reveals damage to ocular tissue at its earliest stages and will stain the conjunctival epithelium when there is no fluorescein staining. Typically, there is an interpalpebral staining pattern of the conjunctiva. A reduced tear breakup time (≤ 15 seconds) can indicate a lipid deficiency and a less-than-optimal quality to the tear film. Although Schirmer's testing is the standard method by which to measure tear production, it is generally not considered helpful for diagnosing dry eye syndrome at its early stages, because the results are often in the normal range in these patients. I rely on Schirmer's testing most commonly in patients with collagen vascular disease.

PRETREATMENT OF MULTIFOCAL IOL PATIENTS

I begin by prescribing transiently preserved tears such as Blink Contacts Lubricant Eye Drops (Advanced Medical Optics, Inc., Santa Ana, CA), Optive (Allergan, Inc., Irvine, CA), Genteal (Novartis Ophthalmics, Inc., Duluth, GA), and TheraTears (Advanced Vision Research, Inc., Woburn, MA) four times a day. The ideal artificial tear coats the cornea well and smoothes out the ocular surface, thus regularizing the tear film. The most recent generations of artificial tears offer the advantages of high adherence to the ocular surface without blurring patients' vision. Oral nutritional supplementation with flax seed oil and fish oils also help individuals with dry eye disease, but it is most useful in patients with mixed mechanisms of dry eye and meibomian gland disease. Any patient with even mildly dry eyes who is undergoing cataract surgery, however, deserves immunomodulation.

IMPROVEMENT OF POSTOPERATIVE RESULTS

Cyclosporine has been shown to improve corneal staining at all follow-up visits ($P < .001$). At month 4, the improvement in staining with the help of cyclosporine was significantly

greater than with the vehicle ($P \leq .05$). Patients treated with cyclosporine A 0.05% emulsion experienced statistically significant reductions in corneal staining by month 8 ($P = .008$), and they exhibited statistically and clinically significant reductions in blurred vision versus the vehicle at all time points ($P \leq .05$), as measured by the Snellen chart. The mean visual improvement was approximately 24%.²

The therapeutic efficacy of cyclosporine is important for patients receiving multifocal IOLs. A recent prospective, randomized, masked, bilateral, multicenter study evaluated 28 eyes of 14 patients without a history of dry eye who were scheduled to undergo bilateral phacoemulsification with the implantation of a multifocal IOL.³ One eye received topical cyclosporine b.i.d. whereas the other received artificial tears b.i.d. for 1 month prior to and 2 months following cataract surgery. After 3 months of treatment, fluorescein corneal staining was significantly less in the cyclosporine group ($P = .034$). Two months postoperatively, the mean UCVA was significantly better in the eyes treated with cyclosporine as opposed to artificial tears (logMar of 0.11 vs 0.19, $P = .045$). Similarly, BCVA 2 months postoperatively was zero with cyclosporine and 0.1 with tears ($P = .005$). Contrast sensitivity under mesopic and photopic conditions improved with and without glare. The patients who expressed a preference were significantly more likely to favor the cyclosporine-treated eye ($P = .007$).

Cyclosporine can take several weeks or months to have an effect, and 17% of patients who use Restasis (Allergan,

Inc.) experience burning upon instillation.³ The irritation improves over 6 months, but the burning and stinging may cause patients to discontinue using the drug before its therapeutic impact is realized.

Although cyclosporine inhibits inflammatory mediators that are produced by activated T lymphocytes, corticosteroids block several pathways associated with dry eye, including the production of cytokines, chemokines, and metalloproteinases. To control the entire inflammatory process and break the cycle at an earlier stage, clinicians should consider agents such as corticosteroids in combination with cyclosporine therapy. Studies have shown that the concomitant use of loteprednol with cyclosporine rapidly treats dry eye disease and reduces the burning and stinging associated with cyclosporine and the pathology.⁴

CONCLUSION

Although the measures I have outlined may sound like a lot of work, they are a worthwhile investment in the postoperative outcome. A healthy ocular surface gives whatever lens technology we use the best chance of success. By addressing dry eye proactively, we help our cataract/IOL patients see better faster with less discomfort after surgery. I have also found it helpful to discuss with patients what I am doing with respect to their dry eyes. This conversation lets patients know that they can help to ensure the best possible surgical outcome. The resulting "wow effect" and patients' high level of satisfaction build referrals for the practice.

Improving visual acuity and quality of vision starts with optimizing the tear film. Because advances in refractive and cataract surgery have raised patients' expectations, it is important to address their ocular surface disease preoperatively in order to improve their visual outcomes after IOL surgery. ■

Section Editor Eric D. Donnenfeld, MD, is a partner in Ophthalmic Consultants of Long Island and is a trustee of Dartmouth Medical School in Hanover, New Hampshire. He is a consultant to and performs research for Alcon Laboratories, Inc.; Allergan, Inc.; Advanced Medical Optics, Inc.; and Bausch & Lomb, but he acknowledged no financial interest in the products mentioned herein. Dr. Donnenfeld may be reached at (516) 766-2519; eddoph@aol.com.



1. Li XM, Hu L, Hu J, Wang W. Investigation of dry eye disease and analysis of the pathogenic factors in patients after cataract surgery. *Cornea*. 2007;26:S16-S20.
2. Sall K, Stevenson OD, Mundorf TK, Reis BL. Two multicenter, randomized studies of the efficacy and safety of cyclosporine ophthalmic emulsion in moderate to severe dry eye disease. CsA Phase 3 Study Group. *Ophthalmology*. 2000;107:631-639.
3. Donnenfeld E, Roberts C, Perry H, et al. Efficacy of topical cyclosporine versus tears for improving visual outcomes following multifocal IOL implantation. Paper presented at: The ASCRS/ASOA Symposium on Cataract, IOL and Refractive Surgery; April 2006; San Diego, CA.
4. Donnenfeld, E, Sheppard, J, Holland E. Prospective, multi-center, randomized controlled study on the effect of loteprednol emulsion on initiating therapy with cyclosporin A. Poster presented at: The 2007 AAO Annual Meeting; November 2007; New Orleans, LA.

DuoVISC

DUO VISC® is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease. DUO VISC is a combination of cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

DUO VISC is a prescription eye drop that contains a combination of two active ingredients: cyclosporine and polyvinyl alcohol. It is used to treat dry eye disease.

