

# Managing Recurrent Corneal Erosions

Francis S. Mah, MD, discusses both surgical and nonsurgical techniques.

BY SARA E. SMITH, MANAGING EDITOR

**R**ecurrent corneal erosions are a common clinical presentation for the corneal specialist, according to Francis S. Mah, MD, at the University of Pittsburgh. For the management of acutely symptomatic anterior basement membrane dystrophy, Dr. Mah recommends frequent lubrication as well as topical antibiotics, if there is an epithelial defect from an erosion. Physicians can also apply cycloplegics or topical nonsteroids adjunctively, depending on a patient's symptoms, he said.

For individuals whose anterior basement membrane dystrophy and recurrent corneal erosions require ongoing management, Dr. Mah recommends that physicians reassure them that treatment may be long term. This support is important because the stress of recurrent ocular pain can take a toll on the patient physically, mentally, and financially with lost work.

## CONSERVATIVE MANAGEMENT

The conservative management of recurrent corneal erosions typically requires patients to use preservative-free lubricants as well as hypertonic agents for 6 to 12 months, even if their eyes begin to feel better, says Dr. Mah. He typically prescribes hypertonic agents, which include 2% or 5% saline solutions such as Muro 128 (Bausch & Lomb, Rochester, NY). Patients should use these agents when they wake in the morning via a regimen of one drop every 5 minutes for the first 15 minutes, recommends Dr. Mah. During the day, the use of the osmotic agents is not as critical, because the cornea has been allowed to deterges so that the epithelium will lie against Bowman's membrane and be more adherent. At nighttime, it is critical for these patients to use an ocular osmotic ointment, such as Muro 128 5% or 2%, stresses Dr. Mah, because it will prevent the cornea from absorbing too much fluid.

Dr. Mah presumes that the mechanism of corneal erosions in anterior basement membrane dystrophy involves a lack of adherence between the epithelium and the

underlying Bowman's layer. According to Dr. Mah, when patients sleep and normal basal evaporation of the tear film does not occur, the excess fluid enters the cornea via an osmotic gradient. Because the epithelium is not adherent, it will loosen while the patient sleeps, he said. When the patient wakes and blinks, the loose epithelium may tear, causing the erosion and pain. Topical osmotics help to keep the fluid from entering the cornea. Dr. Mah states that he has had success when using dextran 10% as an osmotic, and it does not burn as much as the saline solutions. He said that it also has the advantage of being preservative free and may be used up to six times per day.

## ADDITIONAL THERAPIES

According to Dr. Mah, other adjunctive therapies for conservatively managing corneal erosions include oral tetracycline for mitigating meibomian gland dysfunction (which has been associated with recurrent corneal erosions), steroids to decrease matrix metalloproteinases (one of the theories regarding the pathogenesis of recurrent corneal erosions involves an increase in matrix metalloproteinases), NSAIDs to reduce pain and cause epithelial hypertrophy, and possibly Restasis (cyclosporine A; Allergan, Inc., Irvine, CA) to improve the tear film as well as improve meibomian gland dysfunction.

Finally, the physician may judiciously use a bandage contact lens with these patients if he monitors their eyes closely. Dr. Mah will use these lenses in eyes with corneal erosions that are extremely uncomfortable. He tends to use bandage contact lenses with a flat base curve so that the epithelium does not float. He also prescribes a concurrent prophylactic topical antibiotic to be used q.i.d. Depending on the patient's signs and symptoms, Dr. Mah may also prescribe a topical nonsteroidal, cycloplegic, and/or corticosteroidal agent.

If a bandage contact lens does not help, Dr. Mah may employ an anterior stromal micropuncture technique, depending on the frequency, severity, and location of

the erosion on the cornea. He typically uses a 25-, 27-, or 30-gauge short needle in the area of the erosion and tries to avoid treating over the visual axis. Histologically, subepithelial scarring occurs between the epithelial basement membrane and Bowman's layer following anterior stromal micropuncture.

### AGGRESSIVE TREATMENTS

#### Epithelial Debridement

Dr. Mah finds epithelial debridement especially useful for recurrent erosions associated with dystrophic, degenerative, or severe basement membrane disorders. This technique may be performed at the slit lamp, under an excimer laser microscope, or under an operating microscope in a minor room.

#### Phototherapeutic Keratectomy

According to Dr. Mah, phototherapeutic keratectomy (PTK) for anterior basement dystrophy has also been shown to have excellent results, with up to 90% resolution of symptoms and recurrences. Essentially, the excimer laser causes a controlled fibrotic response that theoretically produces a strongly adherent bond between the epithelium and Bowman's layer. For this approach, the surgeon generally uses topical anesthesia, a dry Merocel sponge (Medtronic Xomed, Inc., Jacksonville, FL), and spatula or blunt approach with a surgical blade to remove the epithelium. He must be careful not to injure or scar the underlying Bowman's membrane, especially in the visual axis.

Excimer laser PTK is FDA approved for anterior stromal corneal dystrophies, such as granular and lattice, and for basement membrane dystrophies, including Reis-Buckler's and Meesman's dystrophy. PTK is also FDA approved for epithelial basement membrane dystrophy and irregular corneal surfaces as well as anterior corneal scars and opacities due to trauma, surgery, infection, and pathology. Although not included in its FDA labeling, according to Dr. Mah, there has been interest in applying PTK to treat recurrent corneal erosions in patients who have not responded to the aforementioned conservative therapies. If the previously described treatments fail, Dr. Mah uses excimer laser PTK.

#### DR. MAH'S METHOD

##### Pre- and Intraoperative Management

Dr. Mah first examines eyes with a corneal erosion at the slit lamp to identify the area of pathology. He doses the patient with a preoperative antibiotic and anesthetic, and he performs an eyelid skin preparation with 5% povidone-iodine solution. Next, he drapes the lashes and uses

a lid speculum. First, he touches the epithelium with a dry Merocel sponge to identify all loose epithelium. He removes the epithelium with a blunt spatula and non-toothed forceps instead of a sharp blade, because he believes it is more difficult to injure the underlying Bowman's membrane with a blunt spatula. Dr. Mah warns that surgeons need to remain conscious of the length of the procedure to avoid differential drying or folds in the stroma. He removes the epithelium peripherally and then sweeps it centrally. It is crucial for the underlying surface to be smooth, Dr. Mah says. He advises removing scar tissue manually, such as with a forceps. If the underlying surface is rough, and depending on to what degree, Dr. Mah recommends using methylcellulose or balanced salt solution as a masking agent for the laser ablation. He uses a 6-mm ablation diameter with a 2-mm transition zone and averages between five and 10 pulses centrally with a similar number of peripheral pulses so that the refractive changes can be kept to a minimum.

##### Postoperative Routine

Dr. Mah uses an antibiotic, an NSAID, and fluoromethalone q.i.d. in addition to a bandage contact lens. He also incorporates oral NSAIDs into the patient's postoperative regimen for the first 24 to 48 hours. After 2 days, he has the patient decrease his use of the topical NSAID to b.i.d. or as needed and replaces it with preservative-free artificial tears.

#### FINAL CONSIDERATIONS

Surgeons may want to consider the use of topical mitomycin C for Salzman's nodular degeneration and Reis-Buckler's dystrophies, says Dr. Mah, although he has had excellent success treating these conditions without the use of adjunctive mitomycin C. Another consideration include the fact that scar tissue may ablate at different rates and lead to an unpredictable refractive outcome or irregular surface. He says to expect a hyperopic shift to occur, especially if a deep ablation is planned, and notes that the refractive change could lead to significant anisometropia postoperatively. Other risk factors for excimer PTK include corneal scarring, haze, symptoms of glare, and the risk of corneal infection. ■

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1. Mah F. Treatment of corneal epithelial disease. Paper presented at: The ASCRS/ASOA 2006 Symposium & Congress; March 18, 2006; San Francisco, CA.