

Tetracaine for Post-PRK Patients

The drug provides pain control after surgery without serious complications.

BY RICHARD MAW, MD

During the last 5 years, PRK has re-emerged as a common procedure among most experienced refractive surgeons. Numerous reasons for this resurgence are that (1) PRK avoids flap-related complications, (2) PRK may be safer in some eyes with regard to preventing ectasia, (3) PRK allows the treatment of some corneas that are too thin for LASIK, and (4) the introduction of mitomycin C to prevent haze has broadened the treatment range of PRK to include high myopes and deep ablations.

The drawbacks to PRK include more pain and a slower visual recovery compared with LASIK. I certainly think that LASIK is more convenient for patients and that it therefore will remain most informed patients' procedure of choice for the near future. However, I believe we are entering an era of much better pain control with PRK patients, and this change will make the procedure better accepted by patients.

For me, the biggest advance in pain control for PRK patients involves the routine use of topical anesthetics such as Tetracaine (Alcon Laboratories, Inc., Fort Worth, TX) during the first 4 days after surgery.

RESULTS

I have used topical Tetracaine to control pain after PRK in all of my patients during the last 2 years. In that time, I have treated 541 eyes of 293 patients without any serious complications. One of my patients experienced delayed epithelialization in both eyes (see sidebar, *Case of Delayed Wound Healing*, on page 86), but he sustained no visual loss and eventually recovered fully. All of the other eyes I have treated have achieved complete epithelialization within 1 week of surgery.

REGIMEN

My postoperative regimen for PRK is as follows. Immediately after surgery, I instill a fluoroquinolone antibiotic in the patient's surgical eye and place a bandage contact lens (Bausch & Lomb, Rochester, NY). Next, I instruct patients

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that they may use Tetracaine q.i.d. for the first 4 days post-operatively to help control their eye pain. Because I supply them with a single, 2-mL bottle, patients who use the medication too often will run out of it before they injure themselves. I also tell patients that they may use a topical NSAID q.i.d. for the first 4 days after surgery to help control their eye pain.

For antibiotics and steroids, patients start the following regimen on the day after surgery. They use Quixin (Johnson & Johnson, New Brunswick, NJ) q.i.d. for 1 week. Starting the day after surgery, patients use Lotemax (Bausch & Lomb) q.i.d. for the first week, t.i.d. for the second week, b.i.d. for the third week, and q.d. for the fourth week. I instruct patients to use artificial tears every 1 to 2 hours for the first 2 weeks after surgery and then as needed for symptoms of dryness.

Finally, I prescribe one or more of the following oral medications as needed: Tylenol No. 3 (Johnson & Johnson); Ambien (Sanofi Aventis, Bridgewater, NJ); and/or Celebrex (Pfizer Inc., New York, NY).

CONCLUSION

Without topical anesthetics, only a minority of PRK patients' pain is well controlled on topical NSAIDs and/or oral pain medication. In contrast, an overwhelming majority of my PRK patients have reported that topical Tetracaine effectively controlled their pain. Many have said to me that, in retrospect, they would be genuinely fearful of undergoing PRK without having Tetracaine as an option to control their pain postoperatively.

I consider the use of topical anesthetics for PRK patients

CASE OF DELAYED WOUND HEALING

One of my patients experienced delayed epithelialization after PRK. He was a 24-year-old white male with a history of hepatitis C. His medical history was otherwise unremarkable, and he was in good health. The patient was using no medications, and he had no history of unusual wound healing. He underwent uncomplicated bilateral PRK and received the usual postoperative medications, including Tetracaine (one drop to both eyes q.i.d. as needed for pain for 4 days postoperatively).

The patient's preoperative prescription was low (-3.00 -1.50 X 095 OD and -3.25 -1.75 X 087 OS). He had thin corneas (460µm OD and 456µm OS). On the first postoperative day, the patient's visual acuity measured 20/25 OD and 20/30 OS. His bandage contact lenses fit well, and he had routine, 5-mm epithelial defects in each eye. On postoperative day 5, it was obvious that his eyes were not healing in a normal manner: both eyes had persistent 3- to 4-mm epithelial defects; the stromal tissue of both corneas had become edematous; and his visual acuity had decreased to 20/60 OD and 20/80 OS.

The patient denied abusing the Tetracaine. Regardless, I instructed him to discontinue the use of all anesthetics (including NSAIDs), and he returned the bottle of Tetracaine to me as proof that he was not overusing the medication.

I followed the patient closely during the next several weeks and varied his treatment regimen. By week 3, both eyes had fully re-epithelialized. Even then, however, he suffered several episodes of bilateral, central epithelial breakdown. After 2 more weeks of failed therapy with bandage contact lenses, his eyes finally responded well to pressure patches. His final visual acuity was 20/15 OU, and he experienced no further episodes of epithelial breakdown after postoperative week 5.

It took 5 weeks to achieve and maintain complete epithelialization in both of the patient's eyes, and he only used the Tetracaine for 4 days postoperatively. For these reasons, it seems unlikely that his extremely delayed wound healing was due to his using Tetracaine during the immediate postoperative period. In 2 years, with more than 500 PRK eyes treated, this is my only patient with delayed wound healing after PRK. Consequently, this patient has not deterred my use of Tetracaine in the first days after surgery.

to be within the standard of care for refractive surgeons today. Again, I would emphasize prescribing no more than 2mL of anesthetic without refills in order to avoid the potential abuse of the medication and subsequent injury. (All of my PRK patients must read and sign an informed consent that discusses the potential for vision loss due to neurotrophic keratitis from the use of topical Tetracaine.) ■

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Three years ago, I became deeply concerned about the lowering of LASIK retail prices, and I wrote an article¹ to try to shed some light on the issue of pricing and how it relates to consumers' adoption of LASIK. The key points of the article could be summarized as follows:

- lower prices were failing to stimulate additional demand for LASIK;
- the decline in LASIK prices, widely promoted by some ophthalmologists and corporate providers, devalued the entire value proposition offered to consumers by refractive surgery;
- a surgeon who cut his price in half had to work 2.5 times harder to achieve similar profitability; and
- with only 5% penetration, LASIK was only reaching the early adopters within the consumer population.

The following spring, I wrote a second article that quantified the impact discounting had had on the refractive surgery category.² By that time, LASIK's dramatic drop in price had caused many surgeons to re-evaluate their desire to perform the procedure. Such a response was not surprising, considering the data from 2000 through 2002. When average LASIK prices declined from their high nationally by 24%, total procedural volume nationwide declined by 18%. I assessed the resulting financial impact on the category as follows:

- discounting cost the industry \$1.67 billion, which amounted to \$335,000 for the average refractive surgeon, and
- because the discounting was funded by a reduction in revenue (with costs remaining the same), every bit of this amount was lost profit. Ouch!

I also suggested that, although it took 5 years to build the value of refractive surgery in the mind of the consumer, it took just a few months in the year 2000 to destroy much of that value. *Value pricing*, as it was called by advocates back then, was a failed experiment. LASIK did not appear to