

# Interface Fluid After LASIK

BY ROBERT K. MALONEY, MD; NOEL ROSADO-ADAMES, MD; TERRY KIM, MD;  
AND KEITH A. WALTER, MD

## CASE PRESENTATION

A 21-year-old white man presents to you for a second opinion. He underwent uncomplicated LASIK using a microkeratome 6 weeks ago. The patient states that the vision in his right eye is “fine” but that the vision in his left eye has been blurry since several days after the procedure. He says that the left corneal flap was lifted 2 weeks after the procedure, after which his vision improved for a few days but then became progressively worse. He has no other medical or surgical history. The patient says he drinks “moderately every day” and is a former smoker. He is currently using the following drugs b.i.d.: brinzolamide (Azopt; Alcon Laboratories, Inc.), a fixed combination of brimonidine tartrate and timolol maleate (Combigan; Allergan, Inc.), and prednisolone acetate (Pred Forte; Allergan, Inc.).

Upon examination, the patient’s UCVA is 20/20 OD and count fingers OS. His IOP measures 12 mm Hg centrally in both eyes by Tono-Pen. The conjunctivae are not inflamed. The right cornea shows a clear, centered LASIK flap. The left cornea shows a LASIK flap with significant edema and a large fluid pocket in the interface, but the flap’s edges are sealed (ie, the flap is not dislocated). Central pachymetry measures 926  $\mu\text{m}$  OS (Figure).

How would you proceed?

—Case prepared by Parag A. Majmudar, MD.

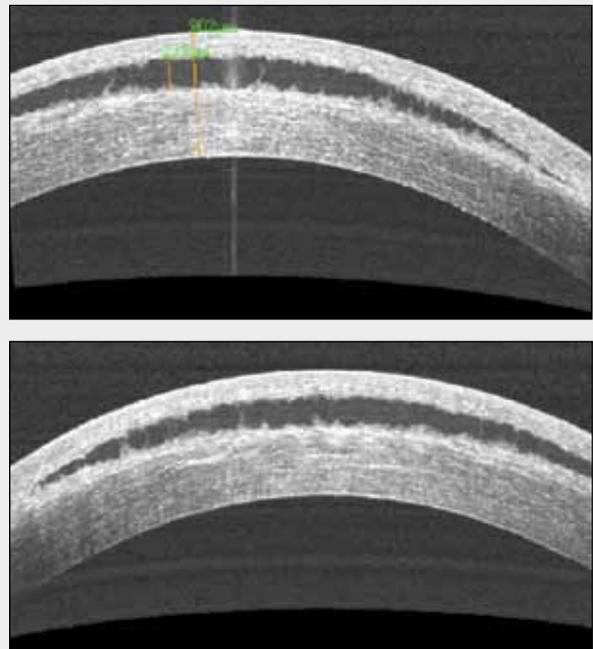


Figure. Corneal optical coherence tomography (OCT) with the RTVue (Optovue, Inc.).

## ROBERT K. MALONEY, MD

My colleagues and I described a syndrome after LASIK of interface fluid associated with high IOP.<sup>1</sup> Specifically, after the procedure, IOP increases due to the prolonged use of topical corticosteroids. The elevation causes the transudation of aqueous across the

endothelium, and the fluid collects in the potential space of the interface. The IOP measured in the central cornea is usually low or normal, because the instruments measure the pressure in the fluid pocket, not in the anterior chamber. For these eyes, it is essential to use a Tono-Pen to measure peripheral IOP, which we

found was usually 40 mm Hg or higher.

This patient is using topical prednisolone acetate, which is likely causing the high IOP. The agent should be discontinued. Usually within a few days, the IOP will start to decline, and the fluid pocket will be reabsorbed.

It is difficult to examine the fundus through an edematous flap. In one of the cases that my colleagues and I reported, the patient had advanced glaucomatous atrophy. He had planned to go to medical school and become a physician, but this complication ended that career possibility. In this case, I hope that the 6 weeks of elevated IOP that the patient has experienced have not induced significant glaucomatous optic atrophy.

### **NOEL ROSADO-ADAMES, MD, AND TERRY KIM, MD**

The presence of edema on a LASIK flap with associated fluid accumulation in the corneal interface, as documented in this case by anterior segment OCT, is most likely secondary to pressure-induced interlamellar stromal keratitis, also known as *interface fluid syndrome*.<sup>1-3</sup> This entity usually presents as diffuse corneal haze confined to the flap interface that affects the visual axis, decreasing visual acuity.<sup>1,2</sup> The use of high-resolution imaging technologies such as OCT is a noninvasive way of evaluating the location of the flap interface pathology.<sup>3</sup>

IOP readings taken in the central cornea can be falsely low secondary to applanation against collected fluid.<sup>1</sup> Measuring the IOP on the corneal periphery, away from the flap, and using a Tono-Pen or applanation tonometer have been recommended. The clinician should carefully evaluate the corneal periphery for the presence of microcystic edema, which can be another sign of elevated IOP.<sup>1</sup>

Because most of these cases result from steroid-induced elevations in IOP, these agents should be tapered and discontinued quickly. The use of topical IOP-lowering agents is recommended, but in some cases, oral carbonic anhydrase inhibitors (acetazolamide) are necessary. In this case, simply stopping the prednisolone acetate and maintaining the glaucoma medications should resolve the interface fluid and improve the patient's visual acuity. Afterwards, a glaucoma workup to assess the status of the visual field and optic nerve should be obtained.<sup>1</sup>

### **KEITH A. WALTER, MD**

Most likely, the IOP in the left eye is elevated. The central corneal pressure measurement will be erroneously low, because it only records the pressure in the small "lake" of fluid that has accumulated underneath

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“[IOP] elevation causes the transudation of aqueous across the endothelium, and the fluid collects in the potential space of the interface.”

—Robert K. Maloney, MD

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the flap. If the IOP were measured outside the flap area, I am sure it would be quite high.

I would stop the steroid and more aggressively manage the patient's IOP, or I would refer him to a glaucoma subspecialist. If the problem did not resolve, another option would be to amputate the flap, assuming it was created as a plano flap with a femtosecond laser. ■

*Section Editor Stephen Coleman, MD, is the director of Coleman Vision in Albuquerque, New Mexico.*

*Section Editor Parag A. Majmudar, MD, is an associate professor, Cornea Service, Rush University Medical Center, Chicago Cornea Consultants, Ltd. Dr. Majmudar may be reached at (847) 882-5900; pamajmudar@chicagocornea.com.*

*Section Editor Karl G. Stonecipher, MD, is the director of refractive surgery at TLC in Greensboro, North Carolina.*

*Terry Kim, MD, is a professor of ophthalmology at Duke University Eye Center in Durham, North Carolina. Dr. Kim may be reached at (919) 681-3568; terry.kim@duke.edu.*

*Robert K. Maloney, MD, is the director of the Maloney Vision Institute in Los Angeles. Dr. Maloney may be reached at (310) 208-3937; info@maloneyvision.com.*

*Noel Rosado-Adames, MD, is a cornea fellow at Duke University Eye Center in Durham, North Carolina. Dr. Rosado-Adames may be reached at noel.rosado@duke.edu.*

*Keith A. Walter, MD, is an associate professor of ophthalmology at the Wake Forest School of Medicine, Winston-Salem, North Carolina. Dr. Walter may be reached at kwalter@wfsbmc.edu.*



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