Optical Coherence Tomography Images of Epithelial Ingrowth and Flap Striae in Traumatic Complication of Laser-Assisted *In Situ* Keratomileusis Cornea

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Laser-assisted *in situ* keratomileusis (LASIK) surgery is one of the most commonly performed operations in the world. However, there are postoperative complications associated with LASIK flaps. Traumatic dislocation of LASIK flaps may occur many years after the refractive surgery. Flap striae and epithelial ingrowth are usually associated with flap dislocation. We described an appearance of epithelium, haze, and striae in the flap interface as visualized by high-resolution anterior segment optical coherence tomography. This experience may provide appropriate knowledge to clinicians for differentiating between inflammation, haze, epithelium, and fluid in the interface, as well as provide aid in the management of post-LASIK complications.

Key words

Epithelial ingrowth; Flap striae; Laser-assisted *in situ* keratomileusis; Optical coherence tomography

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INTRODUCTION

Laser-assisted in situ keratomileusis (LASIK) surgery is among the most common operations in the world. It is estimated that over 15 million patients have undergone LASIK, and approximately 95% of these patients are satisfied after their operation.¹ The LASIK flap allows for rapid visual recovery with minimal pain; however, LASIK flap-associated postoperative complications do occur. Traumatic dislocation of LASIK flaps can occur several years after refractive surgery.² Epithelial ingrowth and flap striae are usually associated with flap dislocation by trauma. We describe cases of epithelial ingrowth and flap striae that is associated with traumatic complications of LASIK flap using optical coherence tomography (OCT) images. The complicated interface pathologies that included epithelium and fluid were delineated with a spectral domain OCT system (Carl Zeiss Inc., Zena, Germany).

CASE REPORT

Case 1. A 41-year-old woman visited with decreased visual acuity of right eye which started 10 months previously when she hit her left eye accidentally with a bough. The patient had undergone microkeratome LASIK surgery in both eyes ten years before. The vision was 20/20 in the right eye and 20/25 in the left eye. On slit lamp examination there was epithelial ingrowth underneath the flap (Fig. 1A; white arrow). Anterior segment (AS) OCT of the patient's cornea showed the epithelial ingrowth underneath the flap (Fig. 1B; red arrow). One week later, the flap was surgically repositioned with removal of the ingrowing epithelium with No. 15 blade and 0.02% mitomycin C. Three months after the procedure, the flap was perfectly attached and positioned and the vision was 20/20 with a mild interface haze.

Case 2. A 57-year-old male, was referred to our hospital with impairment of vision which started two days previously when he had sustained a basketball injury to

Fig. 1. Epithelial ingrowth, slit-lamp photo (A) and anterior segment optical coherence tomography (B) scan of epithelial ingrowth (arrows) after traumatic LASIK flap dislocation.

Fig. 2. Flap striae, slit-lamp photo (A) and anterior segment optical coherence tomography (B) scan of flap striae (arrows) after traumatic LASIK flap dislocation.

the cornea of his left eye. The patient had undergone microkeratome LASIK surgery in both eyes 20 years before. The vision was 20/20 in the right eye and 20/50 in the left eye. On slit lamp examination there was a LASIK flap dislocation with wrinkling (Fig. 2A; white arrow). Anterior segment OCT of the patient's cornea showed the flap striae (Fig. 2B; red arrow). One week later, the flap was lifted and hydrated with distilled water and then stretched it back into position. Three months after the procedure, the flap was perfectly attached and positioned and the vision was 20/20.

DISCUSSION

Although LASIK has become a popular technique for refractive surgery, there are a number of complications that can arise following such procedures, such as interface haze, flap edge scarring, epithelial ingrowth and flap striae or folds.³ One of the most common complications of LASIK is postoperative striae associated with the creation of the corneal flap, which have a variety of appearances.⁴ Epithelial ingrowth is the growth of corneal epithelial cells within the flap interface. Epithelial ingrowth is also a relatively common complication following LASIK, with reported incidence ranging between 0.2% and 12% after primary treatment and up to 32% in cases requiring re-treatment.^{5,6} Clinically significant ingrowth with impaired vision or discomfort is much less common, however, with incidence at most around 3%.⁷

Although often evident on clinical examination, OCT imaging can be useful in visualizing fine details and structural changes associated with flap displacement such as the extent of the epithelial ingrowth, and to confirm proper apposition of the flap edges after repositioning.⁸

In summary, we described the appearance of epithelium, haze, and striae in the flap interface as visualized by both high-resolution anterior segment OCT. This knowledge may help clinicians differentiate between inflammation, haze, epithelium, and fluid in the interface and aid in

the management of post-LASIK complications.

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