Iatrogenic Keratectasia After A Deep Primary Keratotomy During Laser in Situ Keratomileusis

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PURPOSE: To describe a case of keratectasia after a deep primary keratotomy during an aborted laser in situ keratomileusis procedure.

METHODS: Retrospective, observational case report.

RESULTS: In a 47-year-old woman, progressive keratectasia developed after a 90% depth keratotomy during an aborted laser in situ keratomileusis procedure. This case was managed with a rigid gas permeable contact lens and consideration for penetrating keratoplasty.

CONCLUSION: Keratectasia is a reported microkeratome-related complication after laser in situ keratomileusis. Appropriate microkeratome assembly and surgeon awareness are necessary to avoid this complication.

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IATROGENIC KERATECTASIA IS A KNOWN COMPLICATION after laser in situ keratomileusis. This entity may occur after laser in situ keratomileusis for high myopia in which the integrity of the posterior stromal bed is excessively compromised by the microkeratome pass and excimer laser photoablation.1 In this case report, we report keratectasia after a deep primary keratotomy flap without photoablation during an aborted laser in situ keratomileusis procedure.

• CASE: A 47-year-old otherwise healthy woman underwent laser in situ keratomileusis for compound myopic astigmatism, RE. Preoperative best spectacle-corrected visual acuity was 20/20 with a manifest refraction of −5.0 + 1.0 × 76 degrees. After the primary keratotomy with the Nidek MK-2000 Keratome System (Nidek, Fremont, California), the primary surgeon noted an “irregular, jagged flap.” The laser in situ keratomileusis procedure was aborted, and the primary keratotomy flap was immediately repositioned without performing the photoablation. The patient was begun on topical antibiotics, prednisolone acetate 1% (Allergan, Irvine, California), and Muro 128 (Bausch and Lomb, Rochester, New York). The patient was referred to the Stanford Eye Laser Center for consultation on postoperative day 11.

On our initial examination, the uncorrected visual acuity was counting fingers in the operated eye. Best spectacle-corrected visual acuity was 20/100 with −20.0 + 5.50 × 120. Slit-lamp examination demonstrated a nasal hinged primary keratotomy flap at 90% depth through the corneal stroma with evidence of central corneal ectasia. Bowing of the posterior stromal bed and associated deep striae were also present (Figure 1). The nontreated left eye was normal without evidence of keratoconus. The ectasia was confirmed on the anterior and posterior elevation maps on the Orbscan topography system (Orbtek Inc., Salt Lake City, Utah) (Figure 2). At 1 month, progression of the ectasia occurred. Her best spectacle-corrected visual acuity was 20/100 with a manifest refraction of −30.0 + 8.50 × 100. The patient is currently undergoing fitting for a rigid gas permeable contact lens and consideration for possible penetrating keratoplasty.

Circumferential disruption of the corneal lamellae that occurs with the microkeratome pass during laser in situ keratomileusis may result in biomechanical forces that result in lateral pulling of the peripheral cornea and central corneal flattening.2 This process may be distinct from the mechanism of corneal ectasia that may occur after laser in situ keratomileusis for high myopia or automated lamellar keratoplasty for hyperopia.2 In hyperopic automated lamellar keratoplasty, intentional posterior corneal ectasia is performed in a controlled fashion by creating a 53% to 74% depth lamellar dissection with an automated microkeratome.3 However, as many as 26% of eyes may develop iatrogenic keratoconus after hyperopic automated lamellar keratoplasty.4 A minimum of 250 μm in the posterior stromal bed (after the creation of the lamellar flap and the photoablation) has been suggested to avoid this visually threatening complication.5

In the patient referred to us, the 90% depth of the primary keratotomy flap functioned as a hyperopic auto-
mated lamellar keratoplasty procedure. Although some variability in the depth of the dissection is to be expected with older generation microkeratomes, unintentional 90% depth lamellar dissection has not been reported with the more modern microkeratomes. Poor quality and variable depth lamellar dissections may also occur secondary to defects in blade quality and inadequate assembly of the microkeratome. Meticulous attention to detail, such as preoperative examination of the blade quality under the microscope and appropriate assembly of the microkeratome according to manufacturer specifications, may limit avoidable complications.

REFERENCES


FIGURE 1. Photograph demonstrates central ectasia 11 days after the 90% depth primary keratotomy.

FIGURE 2. Orbscan topography confirms the ectasia on the anterior and posterior float maps 11 days after the aborted laser in situ keratomileusis procedure.