Wound Dehiscence in a Patient With Keratoconus After Penetrating Keratoplasty and LASIK

Residual refractive error often complicates penetrating keratoplasty (PKP) and can be treated surgically in patients who are contact lens intolerant. Both photorefractive keratectomy and laser in situ keratomileusis (LASIK) have been used to reduce postoperative myopia and astigmatism following PKP. Reported complications of LASIK following PKP include irregular astigmatism, photoablation decentration, stromal bed hemorrhage, obstruction of the microkeratome path by graft sutures, corneal perforation, flap dislocation, melts, slippage, paracentral perforation, or buttonhole. Keratoconus has been described as a contraindication to LASIK due to corneal instability attributed to the excessively thin residual stromal bed produced by the lamellar dissection, but several studies have documented successful LASIK following PKP in patients with keratoconus. We report herein a case of wound dehiscence following LASIK in a patient with post-PKP keratoconus, the first such report to our knowledge.

Report of a Case. A 59-year-old man with a history of keratoconus, PKP, and LASIK in his right eye was seen in our service with wound dehiscence following LASIK. The patient first underwent PKP in both eyes 30 years earlier for keratoconus, followed by photorefractive keratectomy in both eyes for postoperative astigmatism 6 years ago. However, the postoperative course in the right eye was complicated by the development of corneal haze, topographic irregularity, and an early cataract that reduced the best rigid lens–corrected visual acuity to 20/50 OD and produced disabling symptoms of glare and light scatter. Three years ago the patient underwent repeated PKP, cataract extraction, and intraocular lens placement in his right eye. Visual acuity improved postoperatively to 20/25 OD with a rigid contact lens. However, because of contact lens intolerance, the patient elected to undergo LASIK. A microkeratome (Hansatome; Bausch & Lomb, Rochester, NY) was used to create the LASIK flap, with the goal of creating a flap that was only slightly larger than the 8.0-mm-diameter corneal graft (Figure 1). The operating surgeon reported that the flap appeared to be thin centrally but that a full-thickness buttonhole was not evident. The stromal bed was inspected and noted to be smooth and regular, so the ablation was completed as planned, and the stromal flap was repositioned without difficulty.

On the first postoperative day, the inferior aspect of the flap was noted to be unusually edematous and there was relative thinning of the flap at the corneal apex, but no other abnormalities including a shallow chamber, interface fluid, or dehiscence were identified. Two weeks after the LASIK procedure, the patient reported irritation of the right eye that compelled him to rub the eye with moderate vigor. He noted excessive tearing, and soon, thereafter, experienced a progressive decrease in visual acuity and pain. He was seen by a local ophthalmologist who identified wound dehiscence and a flat anterior chamber and referred the patient to our service. On our examination, the visual acuity was 20/400 OD, and the eye was hypotonous with an intraocular pressure of 0 mm Hg. Slitlamp biomicroscopic examination revealed a flat anterior chamber and a positive Seidel test at the 6-o’clock position. Fluorescein was noted to stream out from beneath the flap edge, but the overlying flap was edematous, and a dehiscence in the underlying and more centrally located graft-host junction could not be clearly identified. Inspection of the central cornea revealed a relatively lucent zone indicative of relative flap thinning consistent with a partial-thickness buttonhole (Figure 2).

Four interrupted 10.0 nylon sutures were placed inferiorly, traversing the graft-host junction and LASIK flap edge. The next day, visual acuity remained 20/400 OD, but the anterior chamber appeared deep and formed, the Seidel test result was negative, and the intraocular pressure was 13.5 mm Hg. An area of uplift, edema, and necrosis of the LASIK flap appeared along the nasal edge of the graft and LASIK flap (Figure 3), and further sutures were placed to correct the uplift. Two weeks following placement of these sutures, visual acuity remained at 20/400 OD owing to high irregular suture-induced astigmatism, but the flap edema had resolved, the flap edge necrosis and thinning appeared to have been arrested, there was good flap edge surface contour, there was no evidence of epithelial ingrowth, and the anterior chamber was deep and formed.

Comment. Although successful LASIK procedures have been re-
ported in patients with keratoconus following PKP, it would seem obvious that the reduced stromal bed thickness of the keratoconic host would pose a risk for wound dehiscence. However, based on a search of the PubMed database, our description appears to represent the first reported case of wound dehiscence in this patient group. In patients with keratoconus who have undergone full-thickness grafting, the graft-host junction consists of thinned host stroma fused to a normal-thickness graft. This junction is particularly thin inferiorly because of the inferior displacement of the cone in patients with keratoconus. A LASIK flap created larger than the graft requires the flap to cross the graft-host junction into the thinned keratoconic host. As a result, the already limited adherence between host and graft is reduced by the thickness of the flap (Figure 4), thereby increasing the risk of dehiscence either at the time of surgery, or as appears to be the case described herein, following minor trauma. Surgeons and patients who consider a LASIK procedure in this setting should note this increased risk. Adequate time following PKP should be allowed to maximize healing of the graft-host junction, and the wound should be carefully evaluated preoperatively to identify particularly thin regions that are at increased risk for dehiscence. If LASIK is performed, the risk of graft dehiscence is likely to be reduced by limiting the diameter of the flap to within the graft-host junction, or creating a thinner flap that leaves a greater area of posterior graft-host adherence. However, as demonstrated in our case, the risk of buttonhole formation appears to be elevated when LASIK is performed following PKP; therefore, we would recommend that if appropriate, surgeons consider photorefractive keratectomy correction, thereby avoiding the risk of dehiscence or buttonhole formation.

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