LETTER TO THE EDITOR

Reversibility of topographic changes and visual symptoms induced by epithelial ingrowth post-LASIK: A case report

Réversibilité des signes topographiques et des symptômes visuels secondaires à une invasion épithéliale post-LASIK : à propos d’un cas

Introduction

In recent years, laser vision correction has become a popular treatment for patients who wish for spectacle independence. Epithelial ingrowth under the corneal flap is a common complication following laser-assisted in situ keratomileusis (LASIK) [1,2]. Although infrequent, its incidence in the literature varies from 0% to 20% [3–6]. Recent post-mortem histopathologic studies document an incidence as high as 50% [1,6–8]. However, Wang and Maloney documented that out of a cohort of 3786 cases, clinically significant ingrowth necessitating surgical removal occurred in approximately 0.92% following primary treatment, and 1.7% following enhancement procedures with recurrence rate of 44% in treated patients following initial epithelial removal, 78% at 1 month postoperatively, and 11% at 2 months postoperative visit [1].

Although ingrowths are usually not clinically significant and may not have visible consequences or even require surgical intervention, island nests of stratified squamous epithelial cells can migrate centrally invading the intrastromal interface promoted by poor flap adhesion. The invading epithelial ingrowth become clinically significant by causing scarring, astigmatism, fibrosis, and keratolysis of surrounding tissues leading to flap melting [9]. While rare, these complications can be devastating, necessitating prompt diagnosis and immediate surgical intervention for best clinical outcome.

We report a case of clinically significant epithelial ingrowth following LASIK that was treated surgically with documented complete recovery, restoration of visual acuity and no evidence of recurrence.

Case report

A 23-year-old female patient presented to our attention for evaluation 3 months after she had undergone LASIK to both eyes at another institution. Approximately 1 month after the procedure, she started complaining of decreased visual acuity in her right eye (OD) with halos, and severe glare at night.

On initial presentation, the patient had a best-uncorrected distance visual acuity (BUDVA) of 0.5 (20/40) OD and 1 (20/20) in her left eye (OS). Her best-corrected distance visual acuity (BCDA) was 0.7 (20/30) OD (+0.25 + 2.75 × 80) with an intraocular pressure (IOP) of 12 mmHg bilaterally. The addition of pinhole did not improve her visual acuity beyond the BCDVA. Slit lamp examination of OD revealed dense epithelial cyst under the LASIK flap, located nasally at 9 O’clock (Fig. 1A). No flap necrosis was evident. She had a normal ophthalmologic examination except for low Breakup Time (BUT) of her tear film. Corneal topography was performed using the Sirius (Costruzione Strumenti Oftalmici, Florence, Italy), which combines rotating Scheimpflug camera and Placido disk system. The combined system gives anterior and posterior corneal topography using sagittal and tangential, curvature maps which showed a steep island (Fig. 2A). Rigid contact lens add on improved her visual acuity to 0.7 (20/30) in her right eye.

Four months after initial presentation, she had deterioration of her BCDVA OD and worsening of her visual symptoms. Accordingly the decision was taken to debride the epithelial cyst.

The edge of the flap was marked on the slit lamp microscope and a scratch incision was done at the edge of the flap proximal to the epithelial ingrowth. The interface was dissected using the Miniature Edged LASIK blade (Eagle Laboratories®; EL-6400 Round Tip). The flap was lifted using the Guell LASIK Forceps (ASICO®). The epithelial ingrowth was scraped off the stromal bed as well as the posterior surface of the flap. The bed was copiously irrigated with a sterile irrigating solution (BSS®). A cellulose eye sponge imbied with 20% alcohol was applied at the area of the ingrowth for 20 seconds and the area was flushed again with BSS®. The flap was repositioned and a bandage soft contact lens (CooperFlex®—8.8, diameter 14.2) was applied (Fig. 1B).

The patient was seen on day one postoperatively; the bandage soft contact lens was left in place; patient was treated olofoxacin 0.3% ophthalmic solution (Oflox®) and Prednisolone Acetate (Pred Forte®) OD every 2 hours. During her next follow-up visit 4 days post-surgery, the bandage contact lens was removed and Oflox® was discontinued while
Figure 1.  A. Dense epithelial ingrowth presenting as translucent cyst underlying at initial presentation. A demarcation line is seen at the edge of the epithelial ingrowth (arrow). B. Day 1 post-flap lift and debridement of epithelial ingrowth. C. Same eye after flap lift and debridement of epithelial ingrowth at 3 and half months postoperative.

Figure 2.  A. Topography demonstrating irregular astigmatism induced by epithelial ingrowth at initial presentation. B. Topography demonstrating reduced astigmatism postoperatively day 1. C. Topography demonstrating normalization of steepening with reversal of the induced astigmatism 3 and half months after surgery.
Pred Forte® was continued at a dose of three times per day for an additional 7 days. The patient was started on artificial tears every 2 hours for 2 weeks. Corneal topography was taken on her follow-up (Fig. 2B). The patient BUVA had improved to 1 (20/20) OD; her manifest refraction was plano + 0.5 × 80 and the halos and glare had resolved.

On her final visit 3 and half months from time of surgery, the patient had a UCVA of 1 (20/20) OD and her manifest refraction was −0.5 + 0.75 × 80. Corneal topography showed reversal of the steepening noticed on presentation with minimal residual scarring (Figs. 1C and 2C).

During the course of the patient treatment and follow-up, spherical equivalent values (SE) decreased from 1.625 with an average keratometry (K) reading of 39.49 diopters (D) and visual acuity (VA) of 20/40 preoperatively to SE values 0.25 with average K reading 39.62 D with a VA 20/20 2 weeks postoperatively. On her final visit 3 and half months from time of surgery her SE was measured at −0.125 with average K value Of 40.48 D and her final VA was 20/20.

Discussion

Epithelial ingrowth following LASIK procedures can be one of the visually disturbing complications that may affect the BCVA if not attended to adequately.

The visual symptoms of epithelial ingrowth are mostly related to induced astigmatism, topographic changes aberrations, and anatomic changes of the overlapping flap. These symptoms are further exacerbated if the ingrowth is in close proximity to the visual axis.

In our reported case, the visual symptoms of the patient were causally linked to the findings on her evaluation namely, the induced astigmatism and the island of steepening at the anatomical location of the ingrowth. This topographic irregularity is secondary to the elevation caused by the space occupying growth underneath the flap. These documented changes confirm the inability of the flap to neutralize the topographic changes and visual manifestations of the epithelial ingrowth.

In view of the above discussion, it is of utmost importance to examine the edge of the microkeratome blade in order to confirm the absence of possible manufacturing defects that can bring on the risk of dragging the overlying epithelium as demonstrated by Helena et al. [10]. This is one of the main advantages of the femto-second laser in creating LASIK flaps, where the incidence of epithelial ingrowth is significantly lower as compared to using mechanical microkeratome [1,5,7].

In conclusion, reversal of the epithelial ingrowth by scarring off the epithelial sheet from the interface as well as from the posterior surface of the flap can reverse topographic changes, secondary astigmatism, the glare and halo symptoms in addition to restoring the visual acuity of the patient.

Disclosure of interest

The authors declare that they have no conflict of interest concerning this article.

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H.M. El Ballouz , T.A. Baban , E.L. Warrak * ,
FASCRS
Department of Ophthalmology, Saint George Hospital - University Medical Center, Sodeco Square, Block C, 13th floor, Beirut, Lebanon

* Corresponding author at: FASCRS, Sodeco Square, Block C, 13th floor, Beirut, Lebanon.
E-mail address: advancedeyecare.ew@gmail.com

(E.L. Warrak)

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