Topography-guided transepithelial photoablation for the treatment of interstitial keratitis sequelae

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Topography-guided transepithelial photoablation using the Wavelight Allegretto excimer laser was performed in a patient whose corrected distance visual acuity (CDVA) was severely impaired by superficial fibrosis and major irregular corneal astigmatism. One month postoperatively, the CDVA had improved from 20/400 to 20/50 with spectacle correction and 20/25 with a rigid gas-permeable contact lens. Postoperative corneal topography showed a substantial reduction in the irregular component of the astigmatism. Optical coherence tomography analysis revealed a major decrease in the central fibrotic scarring around the corneal visual axis. No complication occurred, and the patient was very satisfied. Topography-guided custom ablation seems to be a safe and efficient technique for reduction of the irregular component of corneal astigmatism in a scarred cornea.

Financial Disclosure: No author has a financial or proprietary interest in any material or method mentioned.

JCRS Online Case Reports 2015; 3:83–85 © 2015 ASCRS and ESCRS

Phototherapeutic keratectomy (PTK) is commonly performed for surgical correction of corneal scarring. Visual outcomes are usually satisfactory for superficial corneal damage and regular astigmatism. In cases in which corneal scarring is combined with high irregular astigmatism, topography-guided photoablation with an excimer laser could be an appropriate alternative to plano PTK ablation. However, few case reports describe this procedure for post-keratitis irregular astigmatism.1 We report a case of topography-guided transepithelial photoablation for the treatment of interstitial keratitis sequelae.

CASE REPORT

A 26-year-old woman presented to the ophthalmology department for surgical evaluation. She described severe loss of vision in the right eye, persisting since childhood and of undetermined origin. The corrected distance visual acuity (CDVA) was 20/400 in the right eye and 20/20 in the left one. The patient could not tolerate rigid contact lens use. The ocular examination showed a diffuse polycyclic subepithelial fibrosis in the right eye, with no other anomalies (Figure 1). The left-eye examination was normal. High-resolution optical coherence tomography (OCT) (RTVue, Optovue, Inc.) showed an irregular subepithelial hyperreflectivity, which did not exceed 106 μm in the central area. Corneal pachymetry and epithelial mapping revealed a major irregularity in the 6.0 mm central zone (Figure 2). Corneal topography showed irregular corneal astigmatism with major anomalies on the anterior elevation map (Wavelight Oculyzer, Alcon Surgical, Inc.) (Figure 3). Based on these clinical features, undetermined interstitial keratitis sequelae was diagnosed.

Topography-guided transepithelial custom ablation treatment using the Wavelight Allegretto excimer laser (Alcon Surgical, Inc.) was performed. The targeted correction was −3.75 diopters, which corresponds to photoablation of approximately 85 μm (Figure 4). A topical steroid, dexamethasone 0.1%, 6 times a day initially, was tapered over the first 6 weeks.

One month postoperatively, the CDVA was 20/50 with spectacle correction and 20/25 with a rigid gas-permeable contact lens. There was no clinically significant haze or delayed epithelial healing. Postoperative corneal topography showed a substantial reduction in the irregular component of the astigmatism (Figure 5).
The OCT analysis revealed a major decrease in the central fibrotic scarring, particularly around the corneal visual axis (Figure 6). The patient was highly satisfied and did not request further treatment.

DISCUSSION
Interest in topography-guided custom ablation to manage keratoconus has recently increased. Several authors report an improvement in the quality of vision and possibly contact lens fit due to corneal surface regularization.2–4 This technique has also been evaluated for refractive surgery, particularly for complications such as decentration or difficult revision surgery.5 For the management of corneal scarring, topography-guided custom ablation treatment was expected to become a valuable option, combining photoablation of the fibrotic tissue and regularization of the corneal surface. In the case we present, a single PTK treatment would have ablated only the corneal scar, leaving high irregular astigmatism and a poor visual outcome despite a clear cornea.

In our case, the postoperative corneal astigmatism was mostly regular, allowing substantial improvement in distance visual acuity with spectacles. Moreover, gas-permeable contact lenses could be fitted postoperatively, improving the visual acuity to 20/25 from 20/400 preoperatively.
Overall, the procedure was deemed efficient for this particular case. Nevertheless, further studies are needed to confirm these results and evaluate the benefits of the technique compared with standard PTK.

In our case, topography-guided custom ablation treatment seemed to be a safe and efficient technique for reducing the irregular component of corneal astigmatism in a scarred cornea. The technique combines treatment of the lack of corneal transparency with substantial reduction in astigmatism irregularity. Topography-guided custom ablation treatment may provide a valuable option for the management of corneal scars associated with significant corneal irregularity.

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