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Corneal Ectasia After LASIK

Iatrogenic corneal ectasia after laser in situ keratomileusis (LASIK) is an insidious and feared complication. It can be avoided by identifying the associated risk factors.^{1,2} When analyzing the reported cases of corneal ectasia, one should consider the numerous potential sources of error in calculating the theoretical residual bed thickness (RCB) and the difficulties in identifying form fruste keratoconus (FFK).

Of 62 cases of ectasia that we reviewed, 48 (78%) occurred in an eye with FFK or after a high myopic treatment leaving a thin RCB (less than 250 μm) and 14 (22%) occurred in normal corneas after a low-to-moderate myopic treatment leaving a sufficient RCB (greater than 250 μm).¹⁻⁶ Of the latter cases, 7 (50%) had preoperative pachymetry less than 500 μm , suggesting that a thin corneal thickness could represent a risk factor for ectasia and that thin corneas, similar to those with FFK, are more prone than normal corneas to develop ectasia.

The effect of a large-diameter optical zone (OZ) on the occurrence of ectasia is well illustrated by Pallikaris and coauthors.⁵ In a series of 19 ectasia cases, they showed that eyes with an RCB greater than 250 μm had a larger OZ treatment (6.00 mm versus 5.65 mm) than eyes with an RCB less than 250 μm . Argento et al.⁶ report the case of a 27-year-old woman who had bilateral treatment preserving an RCB of 225 μm in the right eye and 238 μm in the left eye. Surprisingly, ectasia occurred only in the left eye, which had less treatment (3.50 diopters [D] versus 7.88 D) but the largest OZ diameter (6.00 mm versus 5.00 mm). Such results could be explained by a large difference in the flap thickness between the 2 eyes. However, we postulate that the OZ diameter might play a role, not only its effect on the ablation depth, which was slightly higher in the right eye (105 μm versus 89 μm), but also its effect on the estimation of the ablated tissue volume. Based on a recent study,⁷ the estimated ablation volume of stromal tissue is twice as important in a 6.0 mm OZ than a 5.0 mm OZ. The volume of tissue ablation could be an important element in the biomechanical structure of the cornea. In the case presented by

Argento et al.,⁶ the ablation volume was similar in both treated eyes.

Based on our review, it appears that FFK corneas commonly develop inferior ectasia more often whereas normal corneas commonly develop central ectasia more often. Thus, the occurrence of an inferior ectasia could retrospectively suggest the existence of FFK preoperatively.

We believe it is mandatory to carefully report and analyze the preoperative and postoperative topographic maps after the occurrence of a case of iatrogenic ectasia and to report the OZ used and the cylindrical correction. It is crucial to report accurate data because such information is necessary to identify preoperative conditions that may lead to corneal ectasia and help uncover unknown risk factors.

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