Contralateral Eye Long-Term Follow-Up of Prophylactic High-Fluence Collagen Crosslinking Combined with LASIK for High Myopia

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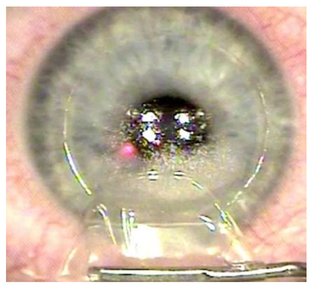
Introduction

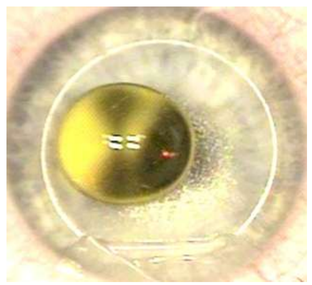
Corneal collagen cross-linking (CXL) is proposed to stabilize progression and improve visual acuity in patients with keratoconus and other corneal ectasias. Ultraviolet-A (UVA) light is administered to a cornea saturated with riboflavin, creating reactive oxygen species that lead to formation of covalent bonds between collagen molecules.

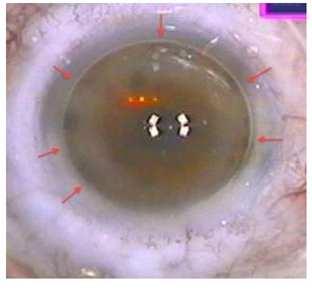
Iatrogenic keratectasia is a feared complication of laser in situ keratomileusis (LASIK). Prophylactic CXL performed at the time of LASIK has been proposed as a technique to prevent post-LASIK ectasia in eyes that may be at increased risk by strengthening the residual corneal stroma. This case series aims to evaluate the safety and efficacy of UVA CXL combined at the completion of LASIK in patients with high myopia.

Methods

A prospective contralateral-eye study was performed in 48 patients with high myopia who underwent bilateral LASIK. No patients had evidence of frank or forme fruste keratoconus. Parameters evaluated peri-operatively included uncorrected and best spectacle-corrected visual acuity, refraction, keratometry, topography, total and flap pachymetry, and endothelial cell count. At the completion of LASIK, a single instillation of 0.1% riboflavin sodium phosphate was administered in the flap interface prior to flap repositioning in both eyes. In a randomly-selected eye of each patient (intervention, group A eyes), high-fluence UVA CXL was performed (10mW/cm2 for 5 minutes). No CXL was applied in the contralateral eye (control, group B eyes).







LASIK was performed per usual protocol after creation of a femtosecond laser flap. Riboflavin was applied to the stromal bed of all eyes. The flap was replaced. UVA was then applied in group A eyes only.

Results

The mean follow up was 2.5 years (1 to 3.5). Regression of greater than 0.5 D requiring re-treatment was seen in 1 eye from group A and 5 eyes from group B ($p < 0.01$). No evidence of keratectasia was seen in either group during the follow-up period.

Mean values	Group A	Group B
Uncorrected VA, day 1	20/25	20/20
Uncorrected VA, month 6	20/22	20/25
Best-corrected VA, month 6	20/12	20/12
Preop spherical equivalent	-7.5 D	-7.4 D
Postop spherical equivalent	-0.2 D	-0.4 D
Preoperative keratometry	44.5 D	44.6 D
Postoperative keratometry	38.0 D	38.5 D

Conclusions

Prophylactic UVA CXL at the completion of LASIK appears to be a safe and effective adjunct treatment against potential ectasia for high myopes during the follow-up period of this study. Performing CXL in this manner does not appear to affect the refractive outcome of the LASIK ablation. It appears to delay UDVA by 1-2 days, but may confer higher stability than standard LASIK and may prevent ectasia.

Selected References

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