Combination treatment may improve keratoconus/post-LASIK ectasia

Further research of CK as adjunct to corneal implants needed to improve patient selection criteria

By Cheryl Gutman
Reviewed by Jason K. Darlington, MD, and David R. Hardten, MD

Minneapolis, MN—Early results are promising regarding the potential role of conductive keratoplasty (CK, Refractec) as an additional tool to improve vision outcomes in eyes with keratoconus or post-LASIK ectasia treated with corneal implants (Intacs, Addition Technology), said Jason K. Darlington, MD.

Dr. Darlington, fellow, Minnesota Eye Consultants, Minneapolis, presented the results of a retrospective analysis of 25 eyes that underwent CK either simultaneously with the corneal implants or as a sequential procedure. All of the surgeries were performed by David R. Hardten, MD, director of refractive surgery, Minnesota Eye Consultants, and adjunct associate professor of ophthalmology, University of Minnesota, Minneapolis.

Take-Home Message

Results of a retrospective study including 25 eyes with keratoconus or post-LASIK ectasia support consideration of conductive keratoplasty to flatten regional areas of the cornea and improve irregular astigmatism in eyes where corneal implants (Intacs, Addition Technology) alone cannot provide optimum vision. Initial analyses suggest preoperative best-corrected visual acuity (BCVA) and topographic elevation are predictive of the outcome. It is hoped further study will improve patient selection criteria.

At a mean follow-up of 16 months after the last surgery, 20 (80%) eyes were tolerating contact lenses or spectacles and the group overall benefited with significant improvements in uncorrected visual acuity (UCVA) and manifest refraction (MR) cylinder. However, three (12%) eyes lost 2 or more lines of best-corrected visual acuity (BCVA) and two of those eyes plus three others had gone on to penetrating keratoplasty.

“These findings support consideration of CK to flatten regional areas of the cornea and improve irregular astigmatism in eyes where corneal implants alone cannot provide optimum vision,” Dr. Darlington said. “We hope further study will allow us to identify factors that will enable prediction of what patients are most likely to benefit. For the time being, patient selection remains difficult, but penetrating keratoplasty can still be performed if corneal implants plus CK is not successful.”

The series of 25 eyes included 19 (76%) eyes with keratoconus and six (24%) eyes with ectasia after LASIK. The location of CK treatment was determined on a case-by-case basis. See Combination on page 78

Micro-Incision Titanium

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Six-week course

Novel anti-collagenolytic regimen useful for stage IV DLK
Strategy could be considered for other post-LASIK corneal inflammatory conditions

By Cheryl Gutman
Reviewed by Elias F. Jarade, MD

Dubai, United Arab Emirates—A new treatment strategy consisting of oral doxycycline and topical sodium citrate 10% may have a positive role in the treatment of post-LASIK inflammatory conditions characterized by increased collagenolytic activities, said Elias F. Jarade, MD.

Dr. Jarade, a corneal and refractive surgeon at the International Medical Centre, Dubai, United Arab Emirates, reported a case of a referral patient with bilateral stage IV diffuse lamellar keratitis (DLK) and had a successful result when treated using this topical and oral regimen.

"Traditional management for stage IV DLK with flap lifting and irrigation is of little benefit and may result in additional stromal volume loss if aggressive tissue manipulation is performed," Dr. Jarade explained. "Our strategy uses two agents that have anti-collagenolytic activity, and we believe it may have played a favorable role in this case by halting autodigestion of the cornea and preventing the further corneal ectasia and progressive hyperopic shift that is the usual scenario in stage IV DLK.

"Considering its potential mechanism, we propose this therapeutic strategy also might be considered in the treatment of other post-LASIK corneal inflammatory conditions characterized by increased collagenolytic activity, including keratectasia," Dr. Jarade said.

Reasons behind regimen
Dr. Jarade explained that oral doxycycline is known to be a potent collagenase inhibitor, and sodium citrate has inhibitory activity against various matrix metalloproteinases, including collagenase. Their use in treating DLK aims to prevent the adverse consequences of collagenases that are released into the lamellar interface by migrating leukocytes.

"The white blood cells that are abundant in the interface in this sterile corneal inflammatory condition release collagenase that results in fluid collection in the central lamella with stromal volume loss, a hyperopic shift, and the appearance of corrugated mucoid cracks," Dr. Jarade said. He treated a 29-year-old female who he

Take-Home Message
A 6-week course of anti-collagenolytic treatment with oral doxycycline plus topical sodium citrate 10% combined with flap lifting and tapering topical corticosteroid resulted in an excellent anatomic and visual outcome in a patient with bilateral stage IV diffuse lamellar keratitis.

Flap lifting and irrigation [for stage IV DLK] is of little benefit.
Elias F. Jarade, MD

It is important to inform patients whose BCVA is 20/40 or worse that they are less likely to have improvement after the corneal implant and CK.

Jason K. Darlington, MD

Two complications were encountered. Perforation at CK that required gluing occurred in one eye and resulted in a BCVA loss of 3 lines. That eye went on to penetrating keratoplasty. The second complication involved segment migration under the wound. While corneal implant removal was necessary, the patient showed improved BCVA and was able to tolerate contact lens wear.

The investigators also undertook analyses to examine the influence of various preoperative variables on postoperative outcomes. In considering BCVA, patients were arbitrarily divided into two groups using a cutoff of 20/30.

The results showed patients with preoperative BCVA of 20/30 or better achieved a significantly higher mean UCVA outcome than their counterparts with a worse preoperative BCVA. The patients with preoperative BCVA of 20/30 or better achieved 20/25 versus 20/40 mean BCVA in the group with BCVA of worse than 20/30 preoperatively.

"The predictive role of better preoperative BCVA might seem intuitive; however, it is an important consideration with regard to patient education. These individuals often seek visual rehabilitation because of declining BCVA, and it is important to inform patients whose BCVA is 20/40 or worse that they are less likely to have improvement after the corneal implant and CK," Dr. Darlington said.

Preoperative topographic elevation was also analyzed and found to be a significant predictor of postoperative UCVA outcome. In that analysis, patients with a preoperative topographic elevation of 60 μm or less in the region of the cone compared with the best fit sphere had a mean postoperative UCVA of 20/63 compared with a 20/320 outcome for the subgroup having a higher topographic elevation preoperatively. In addition, there was a trend for a better postoperative BCVA outcome with a lower versus higher preoperative topographic elevation (20/25 versus 20/40, respectively).

Preoperative MR and topographic cylinder as well as preoperative steepest K were also analyzed as potential predictive variables, but significant associations with outcome were not found.

Focal Point
Preoperative topographic elevation was a significant predictor of postoperative UCVA outcome.

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