

Predictors for failure of intracorneal ring segments in keratoconic eyes

KERATOCONIC eyes with a preoperative keratometry reading greater than 55 D or pachymetry less than 480 microns may not benefit visually from implantation of intracorneal ring segments (INTACS®, Addition Technologies), said Joseph Colin MD at the XXIII Congress of the European Society of Cataract and Refractive Surgeons.

“Best-corrected acuity improved in 68 eyes (81%) and worsened in 14 (19%). Subjectively, 70% of patients reported vision improvement, and the results have been stable between years one and two.”

Dr Colin, professor of ophthalmology, University of Bordeaux, France, reported the results of a study conducted to determine why some intracorneal ring segment procedures for keratoconus fail. An analysis of 82 eyes followed prospectively for two years showed that the group overall benefited with flattening of central corneal curvature as measured by keratometry, improvement in corneal ectasia seen on topographic mapping, and improvement in visual acuity.

Mean MRSE improved from -6.9 D to -3.8 D, mean K was reduced from 50 D to 46 D, and mean uncorrected visual acuity improved in 80 eyes (95%) and worsened in 4 (5%). Best-corrected acuity improved in 68 eyes (81%) and worsened in 14 (19%). Subjectively, 70% of patients reported vision improvement, and the results have been stable between years one and two, Dr Colin said.

Keratometry a prognostic factor

A comparison of baseline features in eyes with worsened versus improved best-corrected acuity showed the former eyes had more cylinder (-5.35 D vs. -4.18 D) and a higher MRSE (-8.64 D vs. -6.09 D). However, the preoperative difference between groups was not statistically

significant for either parameter.

In contrast, analysis of the preoperative keratometry readings showed that eyes that experienced loss of best-corrected acuity had central corneas that were both significantly steeper and thinner than the eyes that improved. For the eyes with worsened BCVA, mean K1, K2, and pachymetry values were 56.0 D, 49.5 D, and 446 microns, respectively. Corresponding values for the eyes with improved BCVA were 53.5 D, 46.5 D, and 480 microns, respectively.

“We and others have shown that implantation of INTACS or other types of intracorneal rings can be a very useful procedure to improve the shape of the cornea and visual acuity in eyes with keratoconus that are contact-lens intolerant and have a central clear cornea. However, the procedure fails to provide functional benefit in a minority of eyes. The findings from our study

may help surgeons to better select patients who are most likely to achieve good results. Nevertheless, it is reassuring to know that if BCVA worsens because of some problem or cone progression, the segments can be easily explanted and, after waiting three to six months, penetrating keratoplasty can still be performed,” Dr Colin said.

The 82 eyes included in the study were from an original series of 100 eyes. Fourteen of the other 18 eyes were either lost to follow-up (five during the first year and nine during the second year) while four underwent segment explantation. The INTACS were removed from two eyes, because of extrusion after five and eight months,

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respectively. The other two removals were performed more than 12 months after implantation because the patients

were dissatisfied. The latter two cases went on to penetrating keratoplasty.

Shallow implantation can cause extrusion

Dr Colin noted that in most cases where extrusion occurs, it is because the ring is not implanted deep enough. Patients must also be cautioned to avoid eye rubbing as it can cause the segments to rotate and produce complications, including corneal melting.

In all cases, the INTACS were implanted using a temporal radial 1.0-mm incision with manual dissection of two channels. Thickness of the segments was chosen according to the



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consistently predict the visual acuity results.

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preoperative MRSE with 0.45 mm segments used in eyes with an MRSE more than 3.0 D and 0.40-mm segments implanted in eyes with less refractive error.

“The keratoconic cornea tolerates the PMMA segments very well when they are placed to at least two-thirds depth. However, a temporal incision is preferred over one that is superior as the former seems useful for minimising the development of neovascularisation to the wound site,” Dr Colin said.

He also noted that change in corneal topography after INTACS implantation did not

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