Promising results for wavefront-guided hyperopic LASIK

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in Paris

TECHNIQUES to help surgeons improve their hyperopic LASIK outcomes and reduce retreatment rates as well as the possible benefits of using wavefront-guided custom treatment to treat hyperopic patients were among the issues discussed by researchers here at the XXII Congress of the ESCRS.

Stephen Slade MD, FACS reported that wavefront-guided CustomCornea LASIK (Alcon) is yielding favourable outcomes with a greater reduction in higher-order aberrations compared to conventional LASIK for the treatment of hyperopia and hyperopic astigmatism.

Presenting early data from the ongoing prospective multicentre FDA clinical trial into CustomCornea treatment for hyperopia and astigmatism, Dr Slade said that the results thus far were very encouraging and underscored the superior clinical outcomes obtained with wavefront-guided custom treatment for hyperopic eyes.

“This is still a work in progress but what is clear after six months follow-up is that the CustomCornea treated eyes had greater reduction of aberrations, less induced higher order aberrations as well as higher patient satisfaction compared to eyes treated with conventional LASIK,” said Dr Slade, Houston, Texas.

Dr Slade presented analyses from data collected at a six-month follow-up visit for 45 eyes with up to +6.0 D sphere and up to +6.0 D cylinder on cyclopegic refraction. After the enhancements, the uncorrected visual acuity was 20/20 or better uncorrected visual acuity, 76% with 20/20 or better, and 98% with 20/40 or better. The accuracy was also good with 80% within 0.5 D and 96% within 1.0 D of the intended correction.

No eyes lost two or more lines of best spectacle-corrected visual acuity and patients typically tended to gain lines of corrected visual acuity. Ninety-eight percent of eyes had reduced total root mean square error compared with preoperatively, and 57% had reduced higher-order aberrations compared with preoperatively, reported Dr Slade.

In the contralateral eye study, the uncorrected visual acuity results and the accuracy results favoured the customised procedure. The eyes that received the customised treatment also fared slightly better regarding BSCVA and safety results.

“The 45 eyes treated with the customised procedure tended to be better in all of the parameters studied at six months. There was a greater mean decrease in total aberrations and less increase in induced aberrations in the customised group,” Dr. Slade concluded.

Benefits of enhancement procedures

In a separate presentation, Ahmed Karimian MD PhD Instituto Oftalmologico de Alicante, Spain, outlined the challenges facing surgeons in deciding whether or not to retreat hyperopic patients.

“We are all aware of the difficulties associated with primary hyperopic LASIK treatments such as regression, loss of visual acuity, problems with ablation profiles and patient complaints. Our aim was to evaluate the visual and refractive outcome of re-enhancement procedures for these patients to determine if such secondary treatments are beneficial overall,” he said.

Dr Galal presented the results of a study carried out at the Instituto Oftalmologico in Alicante, Spain in which 100 eyes that had previously undergone hyperopic LASIK were divided into two groups according to their preoperative spherical equivalent (SE). Group I patients had an SE less than +4.0 D and Group II greater than +4.0 D.

In both groups, the enhancement procedure was performed three months after the primary surgery. Dr Galal reported that elevation of the flap was attempted in all cases and, if there was strong adhesion to the stromal bed, another cut was performed. Patients were followed up to one year following the enhancement procedure. Manifest and cyclopegic refractions, regression, visual outcome, ablation zones, and complications were evaluated.

The mean preoperative SE was +2.8 D in Group I and +5.2 D in Group II. Mean pre-enhancement SE was +1.1 D in Group I and +1.7 D in Group II. Ablation zones ranged between 5mm-7mm in Group I and 5mm-6mm in Group II for first and second surgeries respectively.

One-year after the enhancement surgery, the mean SE in Group I was +0.1 D and +0.3 D for Group II. Uncorrected visual acuity was 20/30 and 20/32 (0.2 and 0.3) for the two groups. Best spectacle corrected visual acuity was 20/25 in both groups (0.1 in Group I and 0.2 in Group II). The gain of uncorrected visual acuity was statistically significant, reported Dr Galal, and there were no vision threatening complications observed in the study.

Dr Galal concluded that enhancement for hyperopic LASIK residual errors are safe for low hyperopia and that visual outcomes improve after secondary treatment with no loss of BSCVA lines for hyperopia up to +7.0 diopters.

Fine-tuning for the far-sighted

The challenge of improving outcomes in hyperopic LASIK treatments was also discussed by Farid Karimian MD Labbafinejad Medical Centre, Tehran, Iran. He suggested that making some basic adjustments to surgical technique such as increasing ablation and transition zones, changing the centre of ablation and focusing area, may yield more consistent results for such procedures.

Dr Karimian presented the results of his study looking at 108 eyes of 54 patients who underwent hyperopic LASIK from January 2001 to August 2003. He noted that the treatment goal was between 20% to 40% over-correction according to cyclopegic refraction. After the creation of a hinged flap with either a Hansatome or Moria-CB microkeratome, the centre for ablation was centred 0.5 mm inferonasal to the centre of entrance pupil. The optical zone was 5.5-6.0 mm with transition zones extending up to 9.0mm. Topical steroids were administered after LASIK and were continued and tapered within two weeks.

The mean preoperative SE was +4.5 D with a range of +1.0 D to +1.5 D, and mean astigmatism of +2.0 D. The average follow-up was 9.4 months and the average preoperative best-corrected acuity was 20/20.

Dr Karimian reported that postoperative uncorrected acuity was 0.12. Mean SE decreased to -0.18 D, mean sphere +0.31 D and mean astigmatism to 0.96 D. In 85 eyes (79.4%) uncorrected acuity was better than or equal to 20/40 while 47.7% saw 20/20 or better.

Nine eyes (8.4%) lost more than two Snellen lines of vision due to decentred ablation, central haziness, punctuate epitheliopathy and dry eyes. All of these complications occurred in eyes with preoperative spherical equivalent over +6.0 D, noted Dr Karimian.

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