NEW TECHNIQUES

Refractive procedure may rival excimer laser procedures in the treatment of myopia

by Roibeard O’Eineachain in Istanbul

Two new corneal refractive procedures which involve removal of an intrastromal lenticule with a femtosecond laser can produce predictable refractive results with a better quality of vision than is achieved with LASIK, according to a pair of presentations at the 15th ESCRS Winter meeting.

“What’s nice about these procedures, as we see from the long-term results, is that it has a small learning curve, it involves tissue removal instead of tissue ablation, it has less effect on wound healing and corneal biomechanics than LASIK or PRK,” said Osama Ibrahim MD, Alexandria University, Egypt.

Dr Ibrahim presented the results of a study involving a series of 253 myopic eyes of patients with spherical equivalent values ranging from -1.25 D to 17.0 D. The patients underwent either of two femtosecond laser lenticule extraction techniques, FLEx (femtosecond lenticule extraction) and Smile (small-incision lenticule extraction), with a Visumax femtosecond laser (Carl Zeiss Meditec).

In the eyes undergoing FLEx procedure the surgeon used the Femtosecond laser to create a LASIK-like flap, which is lifted to remove the lenticule by mechanically peeling it from the stroma. In those undergoing the Smile procedure the surgeon removed the lenticule through a small incision created with the femtosecond laser, Dr Ibrahim said.

At one week postoperatively, the mean overall spherical equivalent was -0.28 D, with individual spherical equivalent values ranging from +1.75D to -1.63 D, Dr Ibrahim noted. In addition, the mean sphere was -0.12 D and the mean cylinder was -1.5 D.

In 116 eyes evaluated at three months, the postoperative spherical equivalent had a mean value of -0.12 D and ranged from +1.25 D to -1.88 D. The mean cylinder was -0.3 D and did not exceed -1.7 D. In the 54 patients who had a follow-up of one year, the mean spherical equivalent was -0.45 D.

Dr Ibrahim noted that visual recovery following the procedure was rapid. By one week’s follow-up uncorrected visual acuity was 20/20 in around half of patients and 20/40 or better in 98 per cent. In terms of best corrected visual acuity, throughout the follow-up period around one-third to one-half of eyes had no change, and around one-quarter to one-third of eyes gained one line.

However, there was loss of more than two lines of best-corrected visual acuity in some of the earlier patients when assessed at one week, although their best-corrected acuity appeared to improve over time. Of the 194 patients with a one week assessment, one per cent lost two or more lines, and 15 per cent lost one line. However, among 54 assessed at 12 months none had lost more than two lines.

Predictability improved as the surgeons became more experienced with the technique. That is, at more than three months of follow-up only half of patients were within -0.5 D of attempted correction. That compared to around three-fourths of the 178 patients at three months’ follow-up, a subgroup that included a higher proportion of later patients.

“Refractive lenticule Extraction (ReLEx) with the femtosecond laser is a technology that is as effective, predictable, safe and stable as the excimer laser, if not even better, and it may be that in the next few years we will all be talking about these procedures,” Dr Ibrahim added.

Better quality of vision

Another prospective study, presented at the Istanbul meeting by Jana Gertnere MD, The Dr Solomatin Eye Center, Riga, Latvia, indicated that the FLEx extraction technique induces less in the way of higher order aberrations, and provides better contrast sensitivity than that achieved with wavefront optimised LASIK. The first author of the study was Igor Solomatin, MD.

This consecutive clinical trial involved 82 myopic eyes of 41 patients aged 18 to 40 years, with spherical equivalent values ranging from -2.0 D to -10.0 D and astigmatism from 0 to -3.0 D. In the femtosecond group, the preoperative spherical equivalent had a mean value of -5.57 D and ranged from -3.0 D to -8.13 D, and the cylinder had a mean value of -0.4 D and ranged from 0.0 D to -1.5 D.

Dr Gertnere and her associates performed FLEx with the VisuMax Femtosecond Laser System in 42 eyes of 21 patients and Wavefront Optimised LASIK with MEL 80 excimer laser (Carl Zeiss Meditec) using a Moria II microkeratome for flap creation in the remaining 40 eyes of 20 patients. They performed pre- and postoperative aberrometry with a WASCA aberrometer (Carl Zeiss Meditec) and contrast sensitivity testing with the Vector vision system.

Refractive predictability was good with both procedures, she noted. At six months’ follow-up, 93 per cent of eyes in the FLEx group and 87 per cent of eyes in the LASIK group were within 0.5 D of the attempted correction, she said.

However, the amount of induced spherical aberration and the mean root mean square of total higher order aberrations were significantly greater in the LASIK group than the FLEx group. The mean spherical aberration (Z4;0) values were -0.087 in the FLEx group and -0.087 in the LASIK group, compared to -0.260 in the FLEx group.

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