Massive epithelial sloughing during LASIK raises red flag for epithelial basement membrane dystrophy

SILENT epithelial basement membrane dystrophy (EBMD) appears to be a common cause of massive corneal epithelial sloughing during LASIK, according to the findings of a new Spanish study. Speaking at the X X III Congress of the European Society of Refractive and Cataract Surgeons, Ahmed Galal, MD PhD reported that among 5,670 eyes with normal appearing corneas that underwent LASIK over a 10-year period, 18 (0.32%) developed severe epithelial defects intraoperatively. A defect was defined as an epithelial irregularity measuring more than 9.0 mm² or involving at least 20% of the flap surface.

The epithelial defects were microkeratome-related in one-third of the eyes. They resulted from poor irrigation during flap creation in another five percent of cases. However, the remaining 61% of eyes all developed signs of EBMD (i.e. intraepithelial microfolds or “dots”) during post-LASIK follow-up, said Dr Galal, Vissum Institute of Ophthalmology, Alicante, Spain. The 11 eyes with delayed EBMD had a mean preoperative uncorrected visual acuity of 20/400. At one month postoperatively, mean uncorrected visual acuity was about 20/35. It was slightly improved at three months and reached 20/30 at one year. The efficacy index (post-op UCVA/preop BSCVA) was 0.82.

Mean best-corrected acuity was 20/25 preoperatively, that dropped slightly at one month postoperatively, but improved thereafter and had returned to just slightly above the preoperative level by one year. The refractive results were favourable for the majority of the eyes. For the 11 eyes, mean UCVA was -0.66 D preoperatively, decreased to -0.66 D at one month, and reached -0.51 D at one year. At one month, 82% of the eyes were within 1.0 D of emmetropia and 55% were within 0.5 D. Those percentages improved at one year to 91% and 64%, respectively. Those 11 eyes represented 0.2% of the entire cohort. None had any preoperative history of recurrent corneal erosions or any other signs of EBMD detected in a thorough preoperative examination.

Slower visual rehabilitation, flap complications
At one year after surgery the safety index for the group was 1.04, and the refractive results were acceptable overall. None of the 11 eyes had lost two or more lines of best-corrected acuity. However, the eyes with silent EBMD had a delayed visual recovery and developed multiple complications. These complications included DLK and microfolds within the first month after surgery and, later, epithelial ingrowth and flap melting that persisted to one year.

While there are multiple causes for severe epithelial sloughing during LASIK, our study indicates this intraoperative complication is often a sign of EBMD. LASIK surgeons need to be aware of this hidden cause of severe sloughing. They should anticipate similar behaviour in the fellow eye, and postpone LASIK while evaluating the aetiology. In eyes with EBMD, PKR is the refractive and therapeutic procedure of choice,” said Dr Galal.

All of the ablative procedures were performed with the Technolas C-217 excimer laser (Bausch & Lomb). Three different microkeratomes were used during the 10-year study period, the ALK-E (Chiron Vision), the BD K-3000 (Becton Dickinson), and the M2 (Moria). Five of the 11 cases of EBMD-associated severe epithelial sloughing occurred with use of the ALK-E microkeratome, while the M2 was used in four eyes, and the BD K-3000 in one eye.

“The type of microkeratome has been identified in the past as an important cause of epithelial sloughing during LASIK, but in eyes without silent EBMD, those problems have been minimised with the improved safety of newer generation microkeratomers,” Dr Galal said.

Three of the six patients with silent EBMD underwent bilateral simultaneous LASIK and developed severe epithelial sloughing in both eyes. Two patients had a bilateral procedure with a one-week waiting period between eyes. The sixth patient underwent LASIK in the first eye and PKR in the fellow eye.

“When sloughing occurred during the procedure in the first eye of the first five patients, we thought it might be a microkeratome-related problem or related to flap irrigation. Therefore, we went on to operate on the other eye with greater caution. By the sixth patient, we recognised the potential for the same complication to occur in the second eye,” said Dr Galal.

Both investigators concluded that visual rehabilitation is slower after Epi-LASIK compared with LASIK. However, in contrast to PKR, discomfort was minimal following Epi-LASIK, there were no problems with significant haze, and the refractive and visual results were excellent overall and generally stable beginning at three months.

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