

Kiewiet de Jonge Award study sheds light on clinical course of epithelial defects

**Dermot McGrath
in Lisbon**

Alireza Mirshahi MD received the Kiewiet de Jonge Award at the XXIII Congress of the ESCRS. The award is given in recognition of the best European paper published in the Journal of Cataract and Refractive Surgery in the previous year.

His paper, entitled "Clinical course of severe central epithelial defects in laser in situ keratomileusis", focused on the outcome of LASIK cases complicated by severe defects caused by the microkeratome cut. Dr Mirshahi, now at Recklinghausen Eye Centre, Recklinghausen, Germany, carried out the study when based at Johann Wolfgang Goethe-University, Frankfurt, Germany. It appeared in the August 2004 issue of the journal.

Large central epithelial defects are a relatively rare but severe intraoperative complication of LASIK that are typically accompanied by diffuse lamellar keratitis and epithelial ingrowth and result in prolonged visual restoration for patients, said Dr Mirshahi, who presented his study at the Lisbon congress.

"The introduction of the zero compression microkeratome head has fortunately reduced the incidence of central epithelial defects, but I think the lesson to be learned from this study is that when we are cutting through the cornea we are not changing only the corneal biomechanics but also the physiology, and this may result in an altered condition of wound healing after LASIK," said Dr Mirshahi.

Intraoperative epithelial defects are a common complication that may be associated with epithelial ingrowth, flap oedema, diffuse lamellar keratitis, overcorrection or undercorrection, flap melting and

haze. However, such secondary complications are relatively rare and result primarily from larger, central defects.

"Large, particularly central, epithelial defects are rare but of potential risk to vision since the optical axis and not the flap periphery is affected. Several risk factors such as age, corneal thickness and skin type are associated with an increased incidence of epithelial defects," he said.

In a retrospective study of 1,650 LASIK cases at one centre, researchers reviewed the preoperative data, surgical procedures and postoperative course in 22 eyes of 14 patients who experienced severe central epithelial defects during the LASIK procedure (1.3%).

Surgery was performed using a Technolas C-LASIK 217 excimer laser (Bausch and Lomb) and a Hansatome microkeratome. Average follow-up was 13.5 months. Only epithelial defects larger than 1.5mm² that affected the visual axis were included in the study.

Age may be a factor

Looking at the affected patients in more detail, Dr Mirshahi noted that eight of them were affected bilaterally and 15 eyes (68%) had moderate to severe dry-eye symptoms preoperatively. The mean age of the patients with large central epithelial defects was 42 years, with a range from 27 to 61 years.

"This is slightly higher than the typical LASIK patient, so it is possible that the increased age of a patient may be a risk factor for development of large central epithelial defects," he said.

Dr Mirshahi noted that although almost all eyes lost some lines of best-corrected visual acuity (BCVA) in the immediate postoperative period, visual acuity improved slowly and by the last

follow-up visit no eye had lost more than one line of BCVA.

"The loss of BCVA seems to peak around one week after surgery with the occurrence of severe central epithelial defects. The good news is that it will come back with routine treatment, but it will take a long time. At one month, the BCVA is already much better and it steadily improves until the final 12-month follow-up point," he said.

Temporary reduction of BCVA

Dr Mirshahi said that careful analysis of the patients affected by loss of BCVA revealed that induced corneal irregularities were the root cause of their temporary loss of visual acuity.

"When we look at the data, it is clear that we are inducing corneal irregularity in the form of irregular astigmatism or higher order aberrations during LASIK. This irregularity decreases over time parallel to the increase in BCVA, so we can be sure that this is the induced irregularity causing the loss of visual acuity for these patients," he said.

Other complications noted in the study included six eyes (27.3%) that developed paracentral epithelial islands in the interface during the follow-up, and peripheral epithelial ingrowth was also observed in an additional five eyes (22.7%). In one eye, surgery to remove the epithelial growth from the interface was necessary. LASIK retreatment was necessary in five eyes to correct residual refractive errors.

At the final follow-up point, the slit lamp examination revealed interface haze/snowflakes in two eyes (9.1%), microfolds in 12 (54.5%), map-dot-fingerprint dystrophy signs in six (27.3%; observed preoperatively in two eyes), epithelial irregularity in two (9.1%), mud cracks and iron deposit in one eye each (4.5%), and



ESCRS President M.J. Tassignon presenting the Kiewiet de Jonge Award to Alireza Mirshahi

mild subepithelial opacification or cornea guttata in both eyes of two patients (observed preoperatively).

One patient developed recurrent paracentral epithelial defects (corneal erosions) with concomitant DLK in both eyes during the 15-month follow-up. No corneal abnormality except mild dry-eye syndrome was noticed in this case preoperatively.

Diffuse lamellar keratitis (DLK) was observed in 20 eyes (91%), irregular astigmatism in 17 (77%) and microfolds in 12 eyes (55%). In unilaterally affected patients, the refractive outcome was better in the non-affected eye.

Higher retreatment rates

Interestingly, Dr Mirshahi remarked that intraindividual comparison of the unilaterally affected patients and the relatively high number of retreatments (six cases, 27%) underscored the fact that the refractive outcomes seem to be negatively influenced by central epithelial defects.

While noting that the number of unilateral events in the study was too small to be conclusive, Dr Mirshahi said that his research

agreed with other studies in the published literature that indicate that eyes affected by interface keratitis and epithelial defects have a larger deviation from emmetropia than eyes with interface keratitis alone.

The appearance of DLK in the early postoperative course in more than 90% of cases highlighted another significant outcome of the study, clearly demonstrating the association between epithelial defects and abnormal wound healing, said Dr Mirshahi.

"If you have a central epithelial defect, there is a strong likelihood that the patient will develop DLK, so it is important to follow that patient very meticulously and use steroids where necessary."

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