Newly described syndrome involves corneal opacities after laser refractive surgery

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in San Diego

O PACITIES of the central cornea lasting for months after LASIK surgery have been described in the medical literature as a feature of severe, or stage IV, diffuse lamellar keratitis (DLK). But while this unusual complication of laser refractive surgery is most often seen along with or after DLK symptoms, new research suggests that it is a distinct clinical entity that requires a completely different course of treatment.

Indeed, the topical corticosteroids, and flap lifting and scraping recommended for severe DLK are not only ineffective in treating these slow-clearing corneal opacities, they could lead to serious complications, according to Robert K Maloney MD, of the Maloney Vision Institute, Los Angeles, US, and Baris Sonmez, MD, of Ondokuzmayis University, Samsun, Turkey. To avoid confusion in diagnosis and treatment, they proposed in the March 2007 American Journal of Ophthalmology that the syndrome should be renamed.

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Robert K Maloney MD

“I don’t think [stage IV DLK] is the preferred term because this is a very different entity,” Dr Maloney told the 2007 American Society of Cataract and Refractive Surgery Symposium on Cataract, IO L and Refractive Surgery, where he presented a retrospective study of patients that developed non-inflammatory central corneal opacities shortly after laser refractive surgery. “We wanted to describe the clinical spectrum of the syndrome and suggest that central toxic keratopathy (CTK) is a more appropriate name.”

How CTK differs from DLK

While DLK and CTK both involve opacification of the cornea after laser refractive surgery, the key feature distinguishing CTK is that it is non-inflammatory. In their retrospective study of patients at Dr Maloney’s clinic, Drs Sonmez and Maloney identified 23 eyes in 14 patients that developed non-inflammatory central corneal opacities three to nine days after surgery, and abstracted their records. Their review revealed several characteristics that suggest CTK is a separate condition:

- Occurrence after PRK – unlike DLK, which occurs only along the interface of the flap cut for LASIK surgery, CTK also occurs after PRK. Four of the 23 eyes in this study had undergone PRK.

- Focal presentation – unlike DLK, which presents as a diffuse opacification that extends under all or any part of the LASIK flap, often from the edges inward, CTK presents as focal opacities confined to the central focal region of the cornea.

- Timing of presentation – DLK typically appears within one to two days after surgery; CTK takes longer; in this study between three and nine days after surgery, with most appearing by day six.

- Depth of opacities – unlike DLK, in which opacities are confined to the surfaces of the interface of the LASIK flap, CTK opacities typically extend into the stromal base posterior to the interface, and sometimes into corneal tissues anterior to the interface. CTK opacities may be mild or dense, and may extend to any depth up to the full thickness of the cornea. After LASIK, CTK opacities typically display striae similar to those seen with a wrinkled flap, but striae were also present in one of the four PRK cases reported, suggesting the effect may not be caused by flap placement.

- Lack of white cells – unlike DLK, an inflammatory condition that always occurs with white cells, CTK does not involve white cells.

- Gradual clearing – unlike DLK, which usually resolves within a week, CTK takes months to clear. The 23 cases studied took from two to 18 months to clear, with a mean time of about 11 months. Dr Maloney speculated that severe cases may take even longer, or may never clear completely.

- Non-responsive to steroid treatment – unlike DLK, which typically responds immediately to topical corticosteroids, CTK does not respond to steroids. Due to the long duration of CTK, Dr Maloney believes steroids should not be used after any coincident inflammatory condition recedes because of the risk of inducing glaucoma, cataracts, or flap oedema.

- Re refractive changes – unlike DLK, which can result in hyperopic correction, suggesting the effect may not be caused by flap placement.

- Development of CTK, he added. The fact that CTK lesions occur in the central focal zone, which is the area exposed to the most laser energy, suggests that light energy is a factor. But the fact that none of the eyes in the study suffered a recurrence after a second treatment suggests that an additional factor, perhaps some foreign substance made toxic by laser energy, is also involved.

In addition to avoiding steroids, Dr Maloney also recommends against lifting a LASIK flap and scraping away CTK lesions. “My fear about scraping and irrigating is the tissue is necrotic, and removing the tissue could worsen the hyperopic shift,” he said.

Dr Maloney concluded that with proper treatment, prospects for recovery of vision after CTK clearing are good.

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Prognosis and treatment

While CTK opacities take months to clear, and in many cases patients are left with significant refractive error, the prognosis is generally good, Dr Maloney said. In most cases, patients were successfully retreated with LASIK or PRK to correct residual hyperopia after the opacities cleared. Of the 19 study eyes for which both pre- and postop refractions are available, only one lost two lines of best-corrected visual acuity, and two lost one line.

In no case did the retreatment result in a recurrence of CTK. This leads Dr Maloney to speculate that CTK may result from the photoactivation of some toxic substance in the eye. The fact that CTK lesions occur in the central focal zone, which is the area exposed to the most laser energy, suggests that light energy is a factor. But the fact that none of the eyes in the study suffered a recurrence after a second treatment suggests that an additional factor, perhaps some foreign substance made toxic by laser energy, is also involved.

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