Transitory Haze in Surface Ablation and Epithelial Flap Retention

Determinants of early onset haze were retrospectively explored in patients who had been undergone laser-assisted sub-epithelial keratectomy (LASEK) in a private eye clinic. The technique included creating an epithelial flap following 20 seconds exposure to 20% alcohol. Optimized ablation profile was used by Allegretto laser (Wavelight Technology). Following repositioning of the flap, a single-brand bandage contact lens was used. For eyes with a spherical equivalent of more than 3 diopters, intraoperative mitomycin C (MMC) was used for 20-30 seconds. Patients were visited at day 1, day 4, week 3, month 3, month 6, and year 1 postoperatively. Candidates included 130 patients (260 eyes), of whom 62% were female. Mean age was 29.0±10 years and baseline range of spherical equivalent was -11.50 to +5.75 (absolute mean 3.50) diopters. The epithelial flap was lost in 36 eyes (28%). Transitory haze was observed in 29 cases (21.5%), all of which had retained their epithelial flap; none of the epithelial flap lost eyes showed haze (P<0.004). Gender, age, MMC usage, and pre-existing astigmatism were not associated with transitory haze (P-values: 0.652, 0.575, 0.815, and 0.248 respectively). Haze was resolved in all of the eyes. No case of classic haze was noted.

Contrary to the current concept that the epithelial flap acts as a biologic contact lens and controls wound healing in surface ablation, in the current series, loss of epithelial flap seems to have had a protective effect in (transitory) haze formation.

Wound healing in surface ablation involves epithelial regeneration, anterior stromal response to excimer laser, and its exposure to tear and open sky. This is being modified by topical agents (alcohol for epithelial dehiscence, intraoperative MMC and postoperative steroids, nonsteroidal anti-inflammatory drugs (NSAIDs), and antibiotics, bandage contact lens, ambient ultraviolet radiation, diet, and a retained epithelial flap. Haze is a result of extra activity of keratocytes, abnormal glycosaminoglycans deposition, and collagen disarray. A metaplasia to myofibroblast is also described.

This opacity normally resolves with remodeling in the anterior stroma. It is suggested that preservation of an epithelial flap creates a biologic dressing for the wound and controls stromal response through a barrier function avoiding WBCs and their cytokines to interact with keratocytes.

‘Haze’ is now considered a heterogeneous entity covering first-days postoperation subepithelial granular appearance of anterior stroma and epithelial plaques (specially when topical NSAIDs are applied); early onset/transitory haze within early postoperative weeks; and late onset (classic) haze 3-6 months following the surgery. These involve different pathobiologic processes.

In conclusion the conventional concept of protective effect by the epithelial flap may not be always applicable; it might be hypothesized that dead epithelial cells induce higher inflammatory response. Alcohol exposure time determines the viability ratio in the epithelial flap so higher alcohol exposure time may paradoxically result in higher haze formation in which case, losing the epithelial flap may be more desirable.

References


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