

Management of cap striae following challenging small incision lenticule extraction surgery – A case report

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A 24-year-old female underwent small incision lenticule extraction (SMILE) for myopic astigmatism OU. In the left eye, cap-lenticular adhesion along with tearing of the cap occurred, resulting in a gaped incision and transverse striae involving the visual axis on the first post op day. Uncorrected distance visual acuity (UDVA) was 20/32. The case was managed with interface wash and stretching of the cap, in order to iron out the striae. Post intervention, the UDVA improved to 20/20, striae resolved, and interface remained clear through a follow-up of nine months, suggesting that cap striae in SMILE may be similarly managed as the flap striae in laser-assisted *in situ* keratomileusis (LASIK), resulting in satisfactory visual outcomes.

Key words: Cap striae, folds, LASIK, SMILE, visual quality

Intraoperative complications in SMILE have been reported, the incidence being higher during the learning curve of the procedure.^[1,2] Common complications encountered are suction loss, incision/cap tear, cap lenticule adhesion, lenticule tear, and retained lenticule fragments.^[3,4] Cap striae following SMILE may occur rarely;^[3] however, management of the same has not been reported.

We hereby report a case of cap striae following a challenging SMILE surgery, its management, and outcomes.

A 24-year-old female underwent SMILE procedure in both eyes for correction of high myopic astigmatism. Preoperatively, her CDVA was 20/20 in both eyes with a manifest refraction of -6.00 DS/-1.00 Dcyl @ 140 OD and -6.50 DS/-1.00 Dcyl @150 OS. The surgery was performed by a trainee surgeon, under the supervision of an experienced SMILE surgeon (SB).

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Case Report

The VisuMax femtosecond laser (Carl Zeiss Meditec, Jena, Germany) was used for refractive lenticule creation, with a cap thickness of 120 µm, 6.50 mm optical zone, and a 4 mm superior incision in both the eyes. OD surgery was uneventful. The left eye surgery, however, had an eventful course [Supplementary Video 1]. The docking, centration, and laser delivery pattern were normal, with a uniform bubble pattern. The surgeon delineated the planes of the lenticule using the pointed side of the Reinstein lenticule separator (Duckworth & Kent Ltd., England). However, while performing the dissection, he dissected the deeper plane first, which resulted in cap lenticular adhesion.^[5] Repeated entry into the same plane raised the suspicion of the same. The surgeon then used the pointed side of the Chansue ReLEx® dissector to obtain access into the space between the cap and the superficial plane of the lenticule, from the temporal edge of the entrance incision. At this point, a cap tear extending further temporally was noticed, which had probably occurred due to excessive maneuvering during deeper plane dissection. The surgeon, however, was able to carefully separate the edge of the lenticule from the cap and extract it from the pocket. On inspection, the lenticule was found to be complete, without any loss of tissue from the margins.

On post op day one, the patient had a UDVA of 20/20 OD and 20/32 OS, with plano refraction in both eyes. The patient also experienced increased glare in the affected eye. There was no history of eye rubbing or ocular trauma. Dilated clinical photography showed a cap tear beginning from the temporal edge of the access incision extending further for approximately 3 mm [Fig. 1a]. The tear was associated with gaping of the incision and sagging of the cap inferiorly, leading to formation of transverse striae involving the visual axis [Fig. 1a]. The interface, however, was clear without any evidence of debris, foreign bodies, or blood.

In view of the reduced visual acuity and patient's complaints, surgical intervention was contemplated. Under topical anesthesia, the interface was carefully entered, separated, and flushed with balanced salt solution using a 26 G cannula. A scraper was used to debride the epithelium and create an epithelial defect corresponding to the area of striae. The exposed stroma was then irrigated with distilled water, following which, stretching of the folds was performed by application of centrifugal forces using two weck-cel sponges placed perpendicular to the direction of the folds. The maneuver was repeated 2–3 times until reduction in the folds and good apposition of the cap was noted. Finally, a bandage contact lens (BCL) was placed on the eye.

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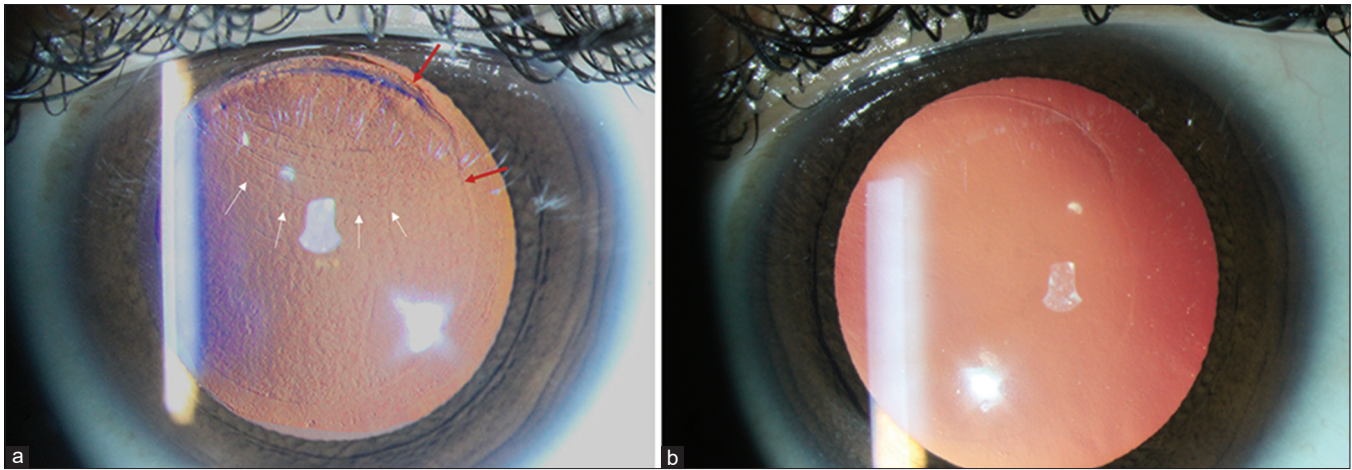


Figure 1: Dilated clinical photographs of the left eye taken in retro illumination mode using the Haag Streit photo slit-lamp camera (model BX 900, Rosengarten, Germany) at 16× magnification. (a) POD-1 clinical picture showing an irregular cap tear beginning from the temporal edge of the access incision and extending further temporally for approximately 3 mm (area between the red arrows shows the extent of the cap tear), associated with transverse striae involving the visual axis (white arrows). (b) Nine-month post intervention clinical picture showing a healed cap tear, clear interface, and resolved cap striae

On fifth day post intervention, the epithelial defect had healed, incision was well apposed, and the striae had resolved. The BCL was removed, and UDVA in the affected eye improved to 20/20 with reduction of glare. Nine months post op, dilated clinical photography showed a well-healed cap tear and a clear interface, without any evidence of striae or epithelial ingrowth [Fig. 1b]. The UDVA maintained at 20/20 and the patient had complete resolution of glare.

Discussion

This case demonstrates a unique postoperative complication of SMILE surgery, wherein multiple striae in the cap affected the visual acuity. This occurred due to a combination of factors (poor surgical technique, deeper plane dissection first, cap lenticule adhesion, cap tear), leading to an unsatisfactory visual outcome on first post op day, which improved with timely and appropriate management.

It is known from the experience of LASIK that any striae involving the visual axis should be washed and ironed at the earliest to prevent them from becoming fixed and permanent. If not managed timely, they may affect the visual quality and potentially lead to symptoms of bothersome glare, especially during the night.^[6]

The case also highlights the management of cap striae, performed in a similar manner as the flap striae in LASIK.^[7] In addition to cap stretching, interface irrigation is particularly important in such cases, as they may be associated with higher risk of epithelium ingrowth in the future. It is also advisable to properly appose the torn cap and secure the wound with a BCL, to prevent sagging of the cap and the resultant striae. In the present case, as no striae were visible on table, and BCL is not routinely applied after SMILE, we did not use the same at the end of surgery. However, on retrospect, we realized that the relatively large cap tear in our case was present superiorly, which was prone to the dragging action of the lids and gravity, unlike LASIK where superiorly a hinge is present which is well covered by the lid.

Conclusion

As SMILE still is a relatively new procedure, and cap tear is a common complication during the learning curve, we believe our case report would especially be relevant to beginners in SMILE, as they would be aware of this possible complication and also know how to manage it, as we also demonstrated successful management of this complication.

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Nil.

Conflicts of interest

Dr Sri Ganesh and Dr Sheetal Brar are consultants to Carl Zeiss Meditec, Germany. Dr Ronald N Gaster and Mr Skanda S Sriganesh have no financial interests to disclose.

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