

Interface Fluid Syndrome Induced by Scleral Lenses

Flüssigkeitsansammlung im LASIK-Interface induziert durch Sklerallinsen

Background

Laser in situ keratomileusis (LASIK) is a well-known and established procedure for surgical refractive correction, in which a corneal flap is generated and the underlying corneal stroma is reshaped using an excimer laser [1, 2]. There have been several case reports on patients who developed a fluid collection between the LASIK flap and the corneal stroma [3, 4]. This is referred to as interface fluid syndrome (IFS) [5]. IFS has been primarily described in post-LASIK patients with elevated intraocular pressure that was most often induced by topical steroid therapy [6, 7]. However, IFS has also been reported in patients with elevated intraocular pressure due to uveitis or in patients with endothelial decompensation due to Fuchs endothelial dystrophy (FED) [8, 9].

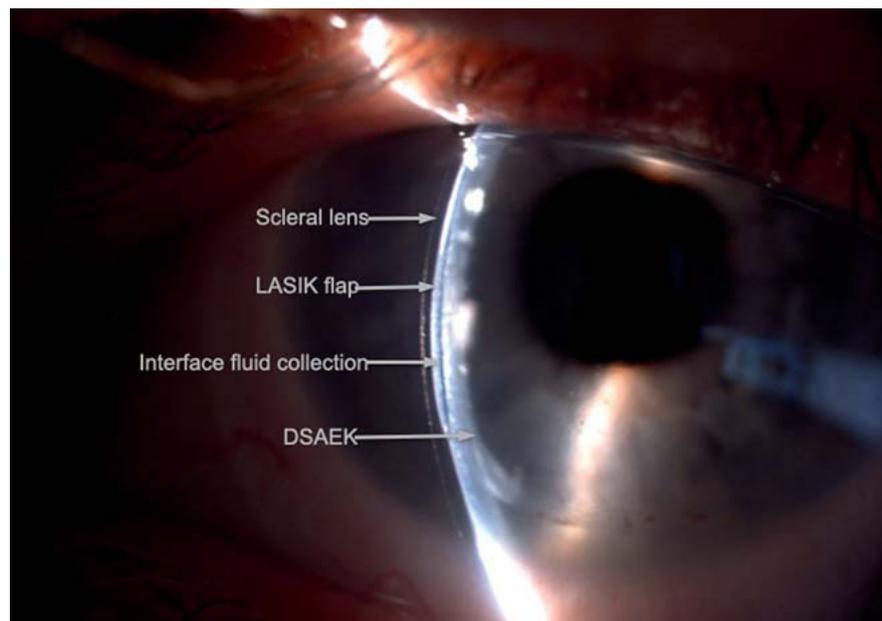
Case Description

A 50-year-old patient underwent bilateral refractive surgery using the LASIK procedure for high myopia in Russia 7 years prior to first examination. As far as is known, the LASIK procedure was without any major complications and had a satisfactory visual outcome. Unfortunately, the visual function deteriorated in the following years due to FED with progressive corneal decompensation. Therefore, Descemet's stripping automated endothelial keratoplasty (DSAEK) was performed on his left eye after previous uncomplicated cataract surgery. The corneal edema cleared up within the first few months postoperatively and the endothelial cell count was 2964 cells/mm² 3 months postoperatively. But best spectacle-corrected visual acuity (BSCVA) was still compromised due to an irregular astigmatism [BSCVA (+6.75/−2.25/160° = 0.5, Snellen chart)]. Therefore, mini-scleral lenses (SL) were fitted 6 months after DSAEK in order to optimize visual correction to a best contact lens-corrected visual acuity of 1.0. When wearing

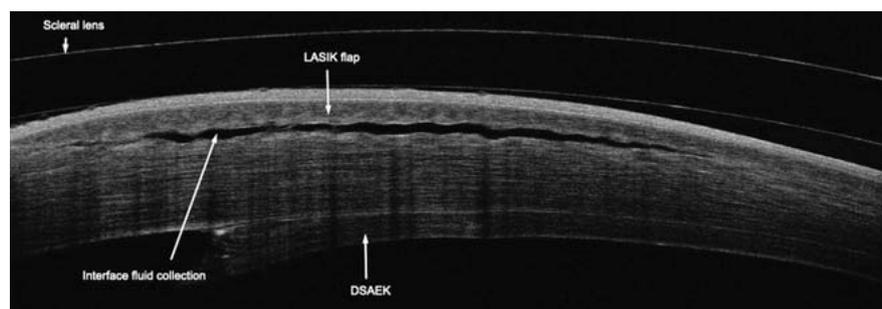
the scleral lenses for more than 8 h, the patient observed halos and blurred vision after SL removal. On examination, there was fluid collection in the interface posterior to the LASIK flap (► Fig. 1), which was also visible on the anterior segment OCT (► Fig. 2). Furthermore, after wearing the scleral lenses for 2 to 4 h, there was corneal edema in the peripheral host cornea. Upon removal of the scleral lenses, the symptoms resolved spontaneously within 2 to 3 h.

Discussion

In this case, the interface fluid may be caused by a diminished oxygen supply induced by the scleral lens, which leads to hypoxia-induced corneal swelling in the peripheral host cornea with subsequent accumulation of fluid in the LASIK interface. We anticipated that a change in oxygen transmissibility of the scleral lens might help to reduce the corneal swelling.



► Fig. 1 Interface fluid collection on slit lamp examination.



► Fig. 2 Interface fluid collection on anterior segment OCT.

However, increasing the oxygen transmissibility (Dk/t) of the scleral lenses from 125 to 200 resulted in only a slight improvement of the symptoms. A large corneo-scleral lens (instead of a mini-scleral lens) could have the advantage of reducing hypoxic stress and therefore might result in a decrease of the corneal edema. Unfortunately, the patient did not feel comfortable wearing the corneo-scleral trial lenses and preferred wearing glasses instead.

Another reason for the IFS in this patient might be an inflammatory process induced by the scleral lens, resulting in fluid accumulation in the interface. Furthermore, an elevated intraocular pressure has to be taken into account as a possible etiology of the IFS. In our case, as the intraocular pressure was within normal limits (9–12 mmHg) at 3, 6, and 12 months postoperatively, we regard a pressure-induced IFS as unlikely.

Conclusion

This is the first report to reveal IFS induced by scleral lens wear after DSAEK due to FED. IFS and its potential clinical effects should be taken into account when adjusting scleral lenses in LASIK patients after DSAEK.

Conflict of Interest

The authors declare that they have no conflict of interest.

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