Big Bubble DALK After CXL in Keratoconic Patients

Collagen cross-linking (CXL) is being offered to a growing number of keratoconic patients worldwide for prevention of disease progression, with an overall success rate that exceeds 90% of the treated eyes. However, some patients do continue to progress after CXL and may need to undergo keratoplasty.

Deep anterior lamellar keratoplasty (DALK) has become the preferred technique by an increasing number of surgeons for surgical correction of patients with moderate and severe keratoconus with poor corrected distance visual acuity (CDVA). The “Big Bubble” technique for DALK allows cleavage separation between Descemet’s membrane (DM) and posterior stroma by forceful injection of air into the deep stroma. DALK with baring of DM has been associated with better visual outcomes when compared to DALK by means of deep stromal manual dissection. Overall success in separating DM from the overlying tissue with this technique has been reported to be approximately 70% to 80% worldwide.

CXL produces a compaction of collagen fibers that is confined to the anterior 250 µm of the corneal stroma, as has been shown on electrophoresis ex vivo and confocal scanning laser microscopy in vivo. Nonetheless, compaction of the anterior stroma could theoretically hinder formation of the “Big Bubble” cleavage plane in the posterior stroma and therefore concerns have been raised about the possibility of performing a successful “Big Bubble” technique in corneas previously treated with CXL.

We report a series of patients who had CXL and underwent the “Big Bubble” technique for DALK for keratoconus progression. Data are expressed as mean ± standard deviation. Nine eyes of 9 patients (6 males, 3 females; mean age: 31.3 ± 7.8 years) were included in this series. All patients underwent CXL (6 epithelium-off, 3 transepithelial). Visual and topographic disease progression was detected in all patients at 3 months after CXL. The mean time between CXL and DALK was 11 ± 7.8 months. CDVA before DALK was 20/50. The corneal thinnest point before DALK measured by anterior segment optical coherence tomography (Visante; Carl Zeiss Meditec, Jena, Germany) was 410 ± 22 µm. Preoperative maximum keratometric value (Eye top; CSO, Florence, Italy) was 56.2 ± 2.5 diopters (D) and average keratometric value was 49.1 ± 1.7 D.

Procedures were performed by two surgeons (AC, LF) with the aid of a 27-gauge cannula (Fogla Cannula; Bausch & Lomb/Storz Ophthalmics, Tuttingen, Germany) for intrastromal air injection. Formation of Big Bubble was successful in 8 of 9 eyes. In one eye, DALK was completed by manual dissection without complications. Of interest, this eye had undergone an epithelium-off CXL procedure. After complete removal of corneal sutures (1 year postoperatively), CDVA was 20/25 and maximum and average keratometric values were 44.3 ± 0.7 and 42.6 ± 0.8 D, respectively.

In this small series, the “Big Bubble” technique for DALK after CXL appeared to be at least equally successful compared to the same procedure carried out in corneas without CXL. A history of previous CXL in keratoconic patients should not discourage surgeons from performing this procedure.

REFERENCES


