

Provider Case Report

Use of BrightMEM Corneal Allograft in Partial Limbal Stem Cell Deficiency (LSCD)



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Introduction

This case report describes the use of BrightMEM (a modified acellular Descemet's Membrane) for ocular surface rehabilitation in a patient with superior limbal stem cell deficiency (LSCD) secondary to trabeculectomy with mitomycin C (MMC).

This case highlights a novel, innovative, and minimally invasive surgical therapy (BrightMEM) for the management of partial LSCD.

Case Description

An 80-year-old African American male presented with a history of superior, partial LSCD secondary to a prior trabeculectomy with MMC of the right eye. On slit lamp examination, the patient had a superior wedge of conjunctivalization and whirl-like keratopathy (see left panel below) that crossed the visual axis. There was no improvement in the partial LSCD with aggressive lubrication, taper off glaucoma drops, topical steroids, or chronic bandage contact lenses. The patient subsequently underwent superficial keratectomy with amniotic membrane transplantation (SK/AMT); however, the superior conjunctivalization recurred after 5 months. He then underwent SK with autologous simple limbal epithelial transplantation (auto-SLET) using a small limbal stem cell biopsy from his left eye, but superior conjunctivalization again recurred at 5 months. Due to lack of sufficient viable limbus OS for a conjunctival limbal autograft (CLAU), keratolimbal allograft (KLAL) was discussed. However, the patient declined due to the risks associated with immunosuppression that would be required post-operatively.

Over time, the patient developed progressive endothelial failure due to previous glaucoma tube shunts. Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK) was recommended. However, the patient, still interested in rehabilitating his ocular surface, inquired about alternative surgeries to KLAL, given his impending trip to the operating room (OR).

Innovative Surgical Approach

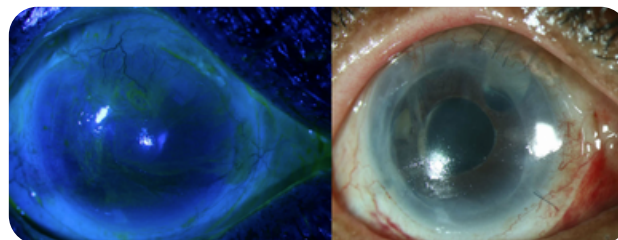
After extensive discussions, a decision was made to perform a BrightMEM Anterior Keratoplasty (BMAK) at the time of DSAEK to address the patient's persistent ocular surface issues. In BMAK, an SK is performed and a BrightMEM allograft is secured onto the central cornea using fibrin glue. Corneal epithelium then re-epithelializes over the BrightMEM allograft post-operatively, integrating the allograft as a long-term scaffold/substrate for the corneal epithelium. This innovative approach is based on evidence that the Descemet's Membrane (DM) strongly supports the proliferation of limbal epithelial stem cells in culture, and is resistant to degradation.

Outcomes

Fourteen months post-operation, although the patient's visual potential was limited by end-stage glaucoma and chronic macular degeneration, he still noted subjective and objective vision improvement from 20/400 to 20/300. This improvement is attributed to the reduction of corneal edema and enhancement of the ocular surface. On slit lamp examination, there was no recurrent conjunctivalization into the central cornea out to 14 months follow-up.

Discussion

LSCD is a challenging disease with limited minimally invasive surgical options. BMAK is a promising, low-risk option in cases of partial LSCD. Although the visual acuity outcome in this case is difficult to interpret due to the patient's co-morbid disease, the notable lack of conjunctivalization out to 14 months following BMAK, suggests that BMAK is a potentially powerful therapy for management of ocular surface disease.



Patient Pre-Op

Patient 3 Months Post-Op