Annular Amniotic Membrane Transplantation as a Host Incorporated Graft in the Management of Brown–McLean Syndrome

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Purpose: To report the use of annular amniotic membrane transplantation as a host incorporated graft in the management of Brown–McLean syndrome.

Methods: Case report.

Results: An 87-year-old man underwent annular amniotic membrane transplantation with ethylenediaminetetraacetic acid chelation resulting in resolution of pain, irritation, and foreign body sensation, and resolution of recurrent peripheral epithelial defects.

Conclusions: Annular amniotic membrane transplantation is a safe and effective treatment strategy for the management of Brown–McLean syndrome.

Key Words: Brown–McLean syndrome, amniotic membrane transplant, recurrent epithelial erosions

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Peripheral corneal edema occurring as a late complication of cataract surgery was first described by Brown and McLean[1] in 1969 and is now known as Brown–McLean syndrome (BMS). Because the condition is limited to the corneal periphery,[2] a customized annulus of amniotic tissue can be used. In this case, the amniotic membrane transplant (AMT) was placed as basement membrane side up in an attempt to permanently incorporate the tissue into the host cornea. When used in this manner, AMT can serve as a long-term solution for the management of the symptoms of BMS.

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CASE REPORT

An 87-year-old man presented to the Jules Stein Eye Institute with redness, pain of 8 to 9 on a 10 scale, tearing, and decreased acuity in his left eye. His history included epiretinal membrane surgeries (1994, 1998) and cataract surgery (1998) in the left eye. Best-corrected visual acuity was 20/70.

On examination, peripheral corneal edema with epithelial defects was present at 360 degrees OS with band keratopathy at 3- and 9-o'clock position on the cornea. No corneal infiltrates were present. A posterior chamber intraocular lens was noted to be in good position without phacodonesis. Specular microscopy of the corneal endothelium revealed a cell density of 1905 cells per square millimeter with pleomorphism and polymegethism OS compared with a cell density of 2532 cells per square millimeter with a normal mosaic OD. The patient was diagnosed with BMS and treated with bandage contact lens placement OS.

The epithelial defect healed after the bandage contact lens placement. The patient returned several months later, however, with ocular pain and recurrent epithelial defects OS. The patient was consented for ethylenediaminetetraacetic acid chelation and amniotic membrane transplantation OS.

SURGICAL PROCEDURE

A 57 scleral blade was used to remove the peripheral disadherent corneal epithelium. Ethylenediaminetetraacetic acid 1% was applied to the 3- and 9-o'clock locations of band keratopathy (see Video, Supplemental Digital Content 1, http://links.lww.com/ICO/A95). A 57 scleral blade was then used to remove the calcium carbonate deposits. Measurements of the limbus-to-limbus diameter and the diameter of the remaining healthy central corneal epithelium were taken using calipers to size the graft. The annular amniotic membrane graft (Amniograft 2015-F; Bio-Tissue, Inc., Miami, FL) was formed using 2 trephines, one 12 mm in diameter and one 7 mm in diameter. The tissue was placed on the cornea, basement membrane side up. A fibrin-based adhesive (Tisseel; Baxter, Deerfield, IL) was used to secure the amniotic membrane tissue to the cornea. A bandage contact lens was placed. The lid speculum was removed, and 1 drop each of moxifloxacin (Vigamox; Alcon Laboratories, Fort Worth, TX) and difluprednate (Durezol; Alcon Laboratories) was administered. The patient was instructed to take moxifloxacin and difluprednate twice a day for 1 week. The bandage contact lens was exchanged 2 weeks after surgery and removed 1 month after the surgery.

One day after the procedure, examination revealed no corneal infiltrate with the annular AMT graft in good position.

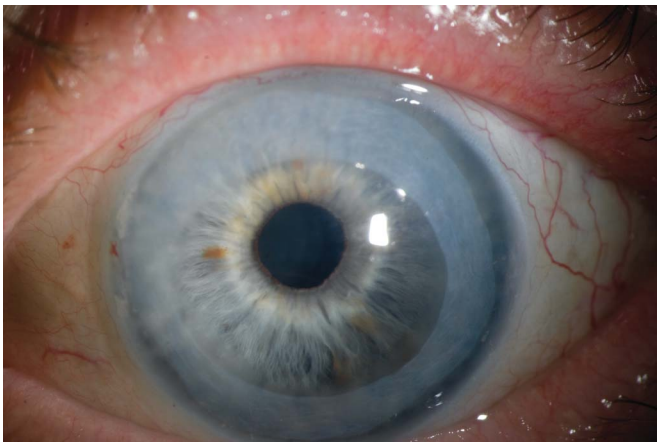

FIGURE 1. Slit-lamp photograph taken 2 weeks after the surgery showing AMT intact 360 degrees with epithelialization of peripheral cornea over the AMT graft.

At 2 weeks, slit-lamp examination revealed complete epithelialization of the peripheral cornea on top of the AMT graft (Fig. 1). Visual acuity had returned to preoperative levels. At 1-month follow-up, the patient reported no episodes of pain or discomfort since the surgery. Examination showed the AMT to be fully intact. The patient did not present for his scheduled 3-month follow-up visit but reported through telephone that he had been asymptomatic since the surgery. He also noted that there had been no changes in vision and that he was content and comfortable. The patient died of unrelated causes 1 month later.

DISCUSSION

BMS typically manifests as corneal edema in a radial distribution limited to the peripheral 2 to 3 mm inside the limbus, sparing the central visual axis.[1] It is also associated with decreased endothelial cell density and polymegethism, both of which were seen in our patient.[2]

Although its clinical course is often benign, symptoms manifest as foreign body sensation and recurrent peripheral epithelial defects. The application of a bandage contact lens has been reported as a useful treatment option[2] and led to transient improvement in our patient's condition. However, the recurrent corneal erosions in BMS would require extended contact lens wear, a suboptimal therapy given the high incidence of microbial keratitis associated with extended contact lens use.[3]

Amniotic membrane has been used to facilitate ocular surface reconstruction in conditions such as pseudophakic bullous keratopathy, pterygium, conjunctivochalasis, and corneal defects.[4] In these applications, by placing the AMT basement membrane side up (stromal side down), active components in the membrane such as nerve growth factor are thought to help reduce pain while the basement membrane component supports epithelialization over the membrane[4] reducing desiccation of the AMT tissue and maintaining a smooth substrate for the epithelium to tightly adhere to. The use of AMT in pseudophakic bullous keratopathy is limited to cases where the visual potential is low because of the need to place the AMT across the visual axis. The use of AMT in BMS spares the visual axis and, therefore, should not adversely affect the visual acuity, rendering the technique useful in a wider range of patients.

Amniotic membrane tissue is similar in composition to the conjunctiva,[5] suggesting that the tissue may support the growth of epithelial progenitor cells by prolonging their lifespan and maintaining their clonogenicity.[4] Therefore, amniotic membrane tissue may be used to promote activity of limbal stem cells and facilitate the re-epithelialization of the peripheral cornea.[4]

Annular amniotic membrane transplant represents a viable long-term treatment for symptomatic BMS patients. The proposed ability of the amniotic membrane to support limbal stem cell growth and healthy epithelialization, together with its sparing of the visual axis, make the technique particularly attractive in patients with excellent visual potential.

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