Case Series

Multilayered Amniotic Membrane Transplantation for Mooren's Ulcer – A Case Series of Ten Patients

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Abstract

Purpose: To examine the efficacy of amniotic membrane transplantation as a primary procedure in the treatment of Mooren’s ulcer. Method: A total of 10 patients with primary Mooren’s ulcer were treated by this method: none of the patients had undergone any previous treatment for their ulcer. The ulcer in each of the 10 patients (10eyes) was treated with amniotic membrane transplantation. Separate amniotic membranes were transplanted (in lay) as material to fill the gap in the stromal layer (amniotic membrane filling), as a basement membrane (amniotic membrane graft), and as a wound cover (amniotic membrane patch). In the postoperative period all the patients were treated with topical antibiotics, topical steroids and artificial tear drops. Result: 7 eyes (70%) healed with epithelialization in (range, 7 to 18 days) with 4 eyes showing corneal epithelialization and 3 eyes showing conjunctival epithelialization. 3 eyes showed persistent defect with no epithelialization and showed recurrence of ulcer on follow up. Conclusion: Multilayered amniotic membrane transplantation is effective for treatment of deep ulceration of the cornea as occurs in Mooren’s ulcer.

Key words: Mooren’s ulcer, amniotic membrane, cyclosporine, keratoplasty

Mooren’s ulcer is a chronic, painful, peripheral ulcerative keratitis that was described as a clinical entity by Mooren in 1867. It is characterised by progressive, crescentic, peripheral corneal ulceration that is slightly central to the corneoscleral limbus¹. It is associated with a characteristic extensive, undermined overhanging edge. It typically progresses with an anterior stromal yellowish infiltrate at the advancing margin. An overlying epithelial defect then develops followed by progressive stromal melting. The ulcer progresses circumferentially and centrally. The pathogenesis remains unknown but appears to involve an autoimmune reaction against a specific target molecule in the corneal stroma which may occur in genetically susceptible individuals. It is usually treated as a stepladder approach by local, systemic and surgical therapy. Local treatment includes topical steroids or topical cyclosporin. Subconjunctival heparin injections and topical collagenase inhibitors have also been used²,³. Systemic immunosuppressives are initiated if treatment with topical therapy and conjunctival resection fails.

Surgical therapy include lamellar keratoplasty, epikeratoplasty, delimiting keratotomy, patch grafts of periosteum, fascia lata and amniotic membrane. Surgical management for visual rehabilitation is a challenge; penetrating keratoplasty is usually associated with disease recurrence, graft rejection and melting⁴,⁵,⁶. In the present series we have used amniotic membrane transplantation as primary modality of treatment in all the 10 cases.

Amniotic membrane has long been used as a surgical material in this surgery. Amniotic membrane has a number of indications, both as a graft to replace damaged ocular surface stromal matrix and as a patch to decrease inflammation.

Methods:

10 Patients (7 males and 3 females) with severe ulceration of the cornea from Mooren’s ulcer were treated with amniotic membrane transplantation. All the operations were performed by a single surgeon after obtaining informed consent from the patient.

Amniotic membrane was obtained during caeserian section in donors who were sero-negative for hepatitis B, hepatitis C, syphilis and HIV. The amniotic membrane with underlying chorion was washed in phosphate buffered saline containing 1mg/ml of dibekacin sulphate and bluntly
separated from placenta. The membrane was then cut into 3×3 cm pieces and rinsed in 0.5mol/l dimethyl sulfoxide dissolved in phosphate buffered saline and preserved in -80 degree centigrade. All procedures were performed under sterile conditions. Preoperatively the container with amniotic membrane was thawed at room temperature and the membrane was rinsed three times in saline and then once in saline containing 1mg/ml of dibekacin sulphate. The amniotic membrane was separated bluntly from the underlying choroin with forceps during surgery.

Surgery was performed under subconjunctival anaesthesia with 2% lidocaine and 1:8×10 noradrenaline. First the bottom of the ulcer was debrided and poorly attached epithelium at the edge of the ulcer was removed as bluntly as possible. After the ulcer surface was treated and healthy corneal stroma exposed, the first segment of amniotic membrane was transplanted as filling material (in lay) in the stromal layer. The amniotic membrane was cut into small pieces and stuffed into the ulcer. The second amniotic membrane was transplanted as a basement membrane (amniotic membrane graft). Amniotic membrane was placed on the ulcer with epithelial side up and secured with 10-0 nylon sutures. The third amniotic membrane was given as a cover (amniotic membrane patch) with 10-0 nylon. The amniotic membrane patch was placed on the entire wound and corneal limbus with epithelial side up to protect the area of re-epithelialization. Post-operatively antibiotic and corticosteroid drops were instilled.

Results:

7 eyes (70%) healed with epithelialization (range, 7 to 18 days) with 4 eyes showing corneal epithelialization and 3 eyes showing conjunctival epithelialization (Fig 1a & 1b). 3 eyes showed persistent defect with no epithelialization and showed recurrence of ulcer on follow up of 6 months. Improvement in visual acuity was recorded in 5 eyes. In other 2 cases the visual acuity remained unchanged in the post-operative period.

Discussion:

Several studies have demonstrated that the amniotic membrane has unique properties including antibacterial, wound protecting, pain reducing, epithelialization promoting and fibrosis suppressing effects. These properties are considered suitable for treatment of impaired epithelialization of ocular surface. Improvement in epithelialization may be attributed to inhibition of collagenase by amniotic membrane and supplementation of the basement membrane and growth factors. The present study utilized these properties. A combination of collagen layer supplementation, basement membrane reconstruction and promotion of epithelialization and wound healing is required to treat severe ulceration. We used multilayered amniotic membrane to achieve these goals. Amniotic membrane filling provides a substitute for collagens, the amniotic membrane graft provides a basement membrane for proper epithelialization and the amniotic membrane patch protects the wound. In summary, we found that multilayered amniotic membrane transplantation is highly effective for treatment of Mooren's ulcer of cornea. The unique properties of amniotic membrane appear to offer a better surgical outcome for the treatment of this disease. The exact mechanism of the healing effect of amniotic membrane is still unknown. One
shortcoming of the present series is the lesser number of patients. Further studies with a larger number of patients are needed to fully understand the mechanism of beneficial effects of amniotic membrane in the treatment of Mooren's ulcer.

**Reference:**