

Bovine Amniotic Membrane Transplantation for the Treatment of Descemetocele in a Dog

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Abstract : An 1.6-year-old female Shih Tzu was presented with corneal perforation, descemetocele, and deep corneal ulcer in the left eye. A bovine amniotic membrane graft which preserved in lyophilized dry form and a third eyelid flap were applied. After 14 days, the cornea was fluorescein-negative. At day 42 postoperatively, only a moderate scar at the corneal center was showed. At the 10-month follow-up, there was clear cornea with a mild scar.

Key words : bovine amniotic membrane transplantation, descemetocele, corneal perforation, corneal melting ulcer, dog.

Introduction

Several methods of surgical management of descemetocele and corneal perforation in dogs, including conjunctival pedicle graft, tissue adhesive, autogenous corneal graft, homologous corneal graft, and synthetic materials, have been attempted that the prognosis has improved (2,8). Amniotic membrane transplantation has been used successfully in humans to repair corneal ulcers of various types (3-5,7,9) and, in dogs, equine amniotic membrane also experimentally in treatment of perforating corneal lesions with loss of corneal tissue (1,6). The amniotic membrane not only physically fills in a corneal wound, but speeds the corneal healing as it contains several proteinase inhibitors that reduce corneal vascularization and scarring (7,10).

This paper describes the use of bovine amniotic membrane in the surgical repair of descemetocele in a dog.

Case

An 1.6-year-old female Shih Tzu was presented with severe corneal damage by trauma in the left eye. At the initial presentation, the cornea (OS) was severely contaminated, vascularized, perforated with deep and diffuse corneal ulcer (10 × 10 mm), and descemetocele could be seen (Fig 1).

The opening of perforated area was occluded by fibrin clot. The cornea was washed carefully and disinfected with warm sterile saline solution and eye betadine solution. Atropine 1% ophthalmic solution, ophthalmic artificial tear, ofloxacin eye drops, autologous serum 50% (serum diluted with saline solution) eye drops each two hours, and an injection of enro-

floxacin subcutaneously were prescribed. Therapeutic antibiotic that was applied was selected empirically. After corneal debridement under general anesthesia with isoflurane, a bovine amniotic membrane (Bioland, Korea) transplantation was performed, suturing over the cornea a patch of the membrane using a 8-0 daxon in a simple interrupted pattern (Fig 2). Seven days later, a third eyelid flap was performed. Treatment with ofloxacin eye drops four times a day, atropine 1% ophthalmic solution two times a day, autologous serum each two hours, and enrofloxacin per os, BID for 7 days were continued. After 8 days ofloxacin eye drops was changed to a BID regimen and atropine 1% ophthalmic solution to a SID regimen. The flap was removed 14 days later and the fluorescein dye test was negative. At day 21 postoperatively, diffuse corneal opaque was seen (Fig 3). At day 42 postoperatively, a scar was seen in the central cornea (Fig 4). Ten months later, the



Fig 1. The left eye has a descemetocele in a deep ulcer. A perforated corneal area was occluded by fibrin clot.

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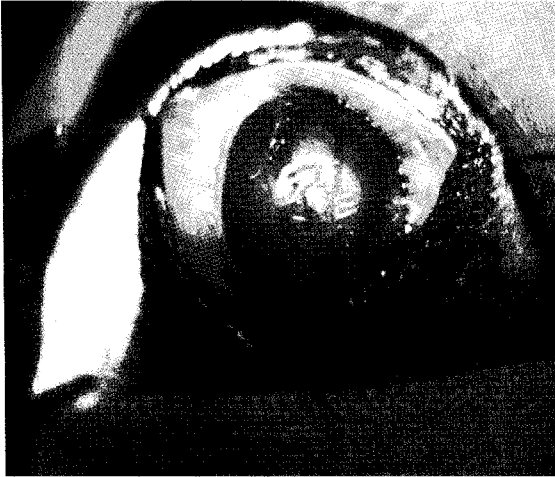


Fig 2. Bovine amniotic membrane suturing over the cornea using a 8-0 dexton in a simple interrupted pattern.



Fig 3. Diffuse corneal opaque at day 21 postoperatively.



Fig 4. Scar formation at the central cornea at day 42 postoperatively.



Fig 5. Cornea was transparent with a mild scar at month 10 postoperatively.

cornea was transparent with normal vision and a mild scar (Fig 5).

Discussion

Corneal defects and perforation are common ocular problems in dogs. Those should be treated immediately in order to maintain vision.

Biological membranes such as pericardium, peritoneum, and amniotic membrane, have been used as an alternative surgical treatment including temporary tarsorrhaphy, third eyelid flap, conjunctival flap, and corneal graft to repair corneal defects (8).

In amniotic membrane transplantation, in order to stick to the cornea, third eyelid flap was performed. Compared to a conjunctival flap, amniotic membrane could be applied promptly to the corneal lesion that could maintain corneal shape, then prevent from loss of vision. In a tarsorrhaphy, it is impossible to see the status of healing process of corneal lesion, while in amniotic membrane transplantation could be seen the healing process.

The amniotic membrane consists of an epithelium, basement membrane, and stroma that facilitate the migration of epithelial cells. Additionally, the amniotic membrane reinforces adhesion of basal epithelial cells, promotes epithelial differentiation, and reduces epithelial cell apoptosis, diminishes anti-protease activity, and minimizes corneal scarring (7,9,10).

The amniotic membrane has stromal matrix components that suppress transforming growth factor beta signaling, and proliferation, and myofibroblast (10). This reduced the corneal scarring in this case. Resolution of corneal melting condition was noted in this case because the matrix has protease inhibitors that enhance an efficient epithelial healing and reduce the stromal inflammation (7). The equine amniotic membrane in dogs has been effective in covering and repairing corneal perforation experimentally created by penetrating keratectomy that sealed the cornea perfectly with no visible leakage of aqueous humor, and clinically extensive corneal defects after a scleral and corneal mass excision (1,2). The same occurred

with this case which had a good reconstruction of the deep and extensive corneal lesion.

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개에서 데스메막류 치료를 위한 양막이식의 적용

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요 약 : 1.6년령 암컷 시쥬가 좌안에 각막천공, 데스메막류 및 심한 melting ulcer를 나타냈다. 손상된 각막에 소에서 유래한 양막을 이식하고 동시에 제3안검판을 실시하였다. 14일후에 제 3안검판을 제거하고 각막은 형광염색 음성을 보였다. 수술 후 42일째 각막 중앙에 중등도의 반흔이 존재하였고 10개월 후 각막은 거의 투명하였으며 가벼운 반흔만이 나타났다.

주요어 : 데스메막류, 각막천공, melting ulcer, 양막이식, 개.