

Evaluation of Outcome of Amniotic Membrane Transplantation with Conjunctival Limbal Autograft for Pterygium

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Aim: To determine the outcome of amniotic membrane transplant with conjunctival limbal autografts for primary and recurrent pterygium.

Patients and Methods: Ninety one eyes of 86 patients were reviewed in this retrospective non-comparative interventional case series. Fifty four eyes (59.3%) had primary pterygium and 37 eyes (40.7%) had recurrent pterygium. Of these, 11 eyes (12.1%) had symblepharon and 8 eyes (8.8%) had ocular motility restriction. There was a male preponderance with 74.4% men and 25.6% women. The majority of patients (76.7%) worked indoors. All eyes were treated with amniotic membrane transplant along with conjunctival limbal autografts, and intraoperative mitomycin C was added for 7 eyes (7.7%) with recurrent pterygium. All surgeries were done by the same surgeon. The main outcome measures were recurrence of pterygium, improvement in ocular movement, and symblepharon formation.

Results: No recurrence was seen in 74 eyes (81.3%), 17 eyes (18.7%) had developed recurrence at the last follow up. None of the 7 patients with recurrent pterygium treated with adjunctive mitomycin C showed recurrence after the procedure. Recurrence of pterygium was seen in 9 eyes (16.6%) with primary pterygium and 8 eyes (21.6%) eyes with recurrent pterygium. All 8 eyes with restricted ocular motility showed improvement. There was no recurrence of symblepharon after surgery.

Conclusion: Amniotic membrane transplantation along with conjunctival limbal autograft is a safe procedure for ocular surface reconstruction after pterygium excision in patients with restricted ocular motility and symblepharon formation.

Key Words: Amnion, Conjunctiva, Pterygium, Reconstructive surgical procedures, Transplantation, autologous, Transplants

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Introduction

Several surgical modalities have been devised for pterygium surgery with varying success rates. Surgical techniques include simple excision; bare scleral excision with adjunctive therapy such as β -irradiation, thiotepa drops, intra- and postoperative use of mitomycin C; and various techniques of

conjunctival grafting.¹⁻⁶

Antimetabolites such as 5-fluorouracil and mitomycin C have powerful antifibrotic effects. Both intra- and postoperative application of these drugs has been shown to be useful for the treatment of pterygium.^{1,7-10} Conjunctival autograft is associated with a low recurrence rate of

approximately 5% and fewer complications than other treatments. Nevertheless, it is a technically demanding procedure. It is also not feasible to cover large defects created after primary excision, for example, double-headed primary or large recurrent pterygium. The procedure is also contraindicated for patients who may require future glaucoma filtration surgery.¹¹

Amniotic membrane (AM) has a thick collagen layer and an overlying basement membrane with single-layered epithelium. The use of AM for the treatment of primary pterygium has been reported and, used alone, it has been shown to have an unacceptably high recurrence rate.¹¹ The objective of this study was to assess the results of pterygium excision with AM transplant combined with conjunctival limbal autografts for the management of primary and recurrent pterygium in India.

Patients and Methods

Patients

Case records of 91 eyes of 86 consecutive patients with primary and recurrent pterygium were included. This retrospective analysis included patients who underwent pterygium excision with AM transplant combined with conjunctival limbal autografts between January 1998 and December 2004. A single surgeon performed all the surgeries. Patient data included age, sex, occupation, and history of ocular surgery. The characteristics of the pterygium, including location, size, extent over the cornea, and laterality, were noted. Any complications such as graft oedema, graft retraction, infection, cyst formation, and recurrence were recorded. Pterygium recurrence was defined as fibrovascular re-encroachment extending beyond the surgical limbus at any time during the study.¹² Patients who gave a history of pterygium formation after injury were not included in the study. The study population comprised 63 men and 23 women.

Human Amniotic Membrane Preparation

The standard protocol proposed by Kim and Tseng was used.¹³ In brief, the placenta, which has 2 layers of amnion and chorion, obtained from caesarean section deliveries was used to obtain the AM. After screening the donor for human immunodeficiency virus, hepatitis B surface antigen, and Venereal Disease Research Laboratories, the placenta was placed in a sterile pan and washed repeatedly with antibiotic-containing ringer lactate/normal saline solution until clear water was obtained. AM was peeled under the laminar flow hood, separating the amnion and chorion. Once a clean transparent piece of approximately 2.0 x 2.0 in (7.5 x 7.5 cm) in area was available, the nitrocellulose paper was attached on the chorion side keeping the epithelium side up. The AM was cut around the paper while rolling the edges on the other side of the paper; AM should stick to the nitrocellulose paper perfectly without gaps or air bubbles. The nitrocellulose paper was then cut to obtain small pieces of membrane as per requirements. The AM pieces (2.5 x 2.5 cm, 2.5 x 5.0 cm, and 5.0 x 5.0 cm) were then inserted into vials containing Dulbecco's Modified Eagles Medium and stored at -70°C. Just before use, the AM was thawed at 37°C for 30 minutes.

Surgical Procedure

The surgical procedure was undertaken in the operating theatre under peribulbar anaesthesia with all aseptic precautions. The informed consent forms had been signed by the patients after having the risks and benefits of surgery explained to them. Pterygium excision was done using a number 15 blade. The bleeding area was cauterised using bipolar cautery, and the epithelialised AM was spread over the bare sclera. The AM was secured with 10-0 nylon sutures at the limbus and 8-8 vicryl sutures at the fornical side. Conjunctival

limbal autograft obtained from the supero-temporal aspect of the involved eye was secured with 10-0 nylon interrupted sutures over the amniotic membrane.

Follow-up

Postoperatively, patients were prescribed topical ciprofloxacin 0.3% drops 4 times a day for 1 week, topical prednisolone acetate 1% 6 times a day for 1 week and then tapered over 6 weeks. Artificial tears were given 4 times a day for 6 weeks. Patients were followed up according to the institutional protocols of weeks 1 to 3, weeks 4 to 6, weeks 7 to 9, and monthly thereafter.

Results

The majority of the patients had fleshy growth (83.7%) [Figure 1a] and diminution of vision (40.7%). Of the operated eyes (Figure 1b), 74 (81.3%) showed no recurrence and 17 (18.7%) developed recurrence (Figure 1c). Recurrence occurring during the third follow-up period at 7 to 9 weeks was 15.6% with scarring in 1 eye and a cystic lesion in 1 eye. After 6 months, only 8 patients returned for follow-up, of whom 2 (25%) had recurrence, and after 8 months, 5 patients came for follow-up, of whom 3 (60%) had recurrence.

None of the 11 patients with symblepharon and 8 patients with ocular motility restriction experienced a recurrence. Nine eyes (16.6%) with primary pterygium and 8 eyes (18.9%) with recurrent pterygium showed a recurrence. Seven patients with recurrent pterygium had been treated with mitomycin C as adjunctive therapy and none showed recurrence after the procedure. Infection was seen in only 1 patient and was managed successfully.

Discussion

The treatment of pterygium essentially is surgical excision. Various adjunctive modalities have been tried with varying success rates. Tan et al have demonstrated

that the rate of recurrence of pterygium varies according to the fleshiness of the body of the pterygium.¹² These researchers also compared the bare sclera technique with conjunctival autograft transplantation. They found a high recurrence rate with the bare sclera technique, which was increased in patients with recurrent pterygium. No recurrences were found in the patients undergoing conjunctival autograft. The recurrence rate for conjunctival autograft varies from 2.5% to 5.4% for primary pterygium.^{14,15} Conjunctival limbal autograft has also been used for the treatment of primary and recurrent pterygium, as shown in one study with a recurrence rate of 3.8%.¹⁶

Using an animal model, Avila et al have shown that simultaneous transplantation of amniotic membrane and heterologous limbal epithelial cells in severe ocular surface disorders can restore the ocular surface and may be useful for patients with severe bilateral limbal epithelial loss.¹⁷ This gives a new perspective for the treatment of severe ocular surface disorders.

An earlier report of 2 patients treated with a combination of amniotic membrane, conjunctival limbal autograft, and mitomycin C showed a good outcome after a follow-up period of 26 months.¹⁸ Similarly, in this study, 7 patients with recurrent pterygium were treated with the same modality and did not show any recurrence. Shimazaki et al compared AM and conjunctival autograft with AM and conjunctival limbal autograft for recurrent pterygium, and found a recurrence rate of 8.3% for conjunctival autograft and 20.0% for conjunctival limbal autograft.¹⁹ Although this was not a comparative study, a similarly high recurrence rate of 15.6% for combined amniotic membrane grafting (AMG) and conjunctival limbal autograft transplant was found after 2 months. The high recurrence rate after 6 and 8 months could be due to the low number of patients at follow-up. Conjunctival autograft seems

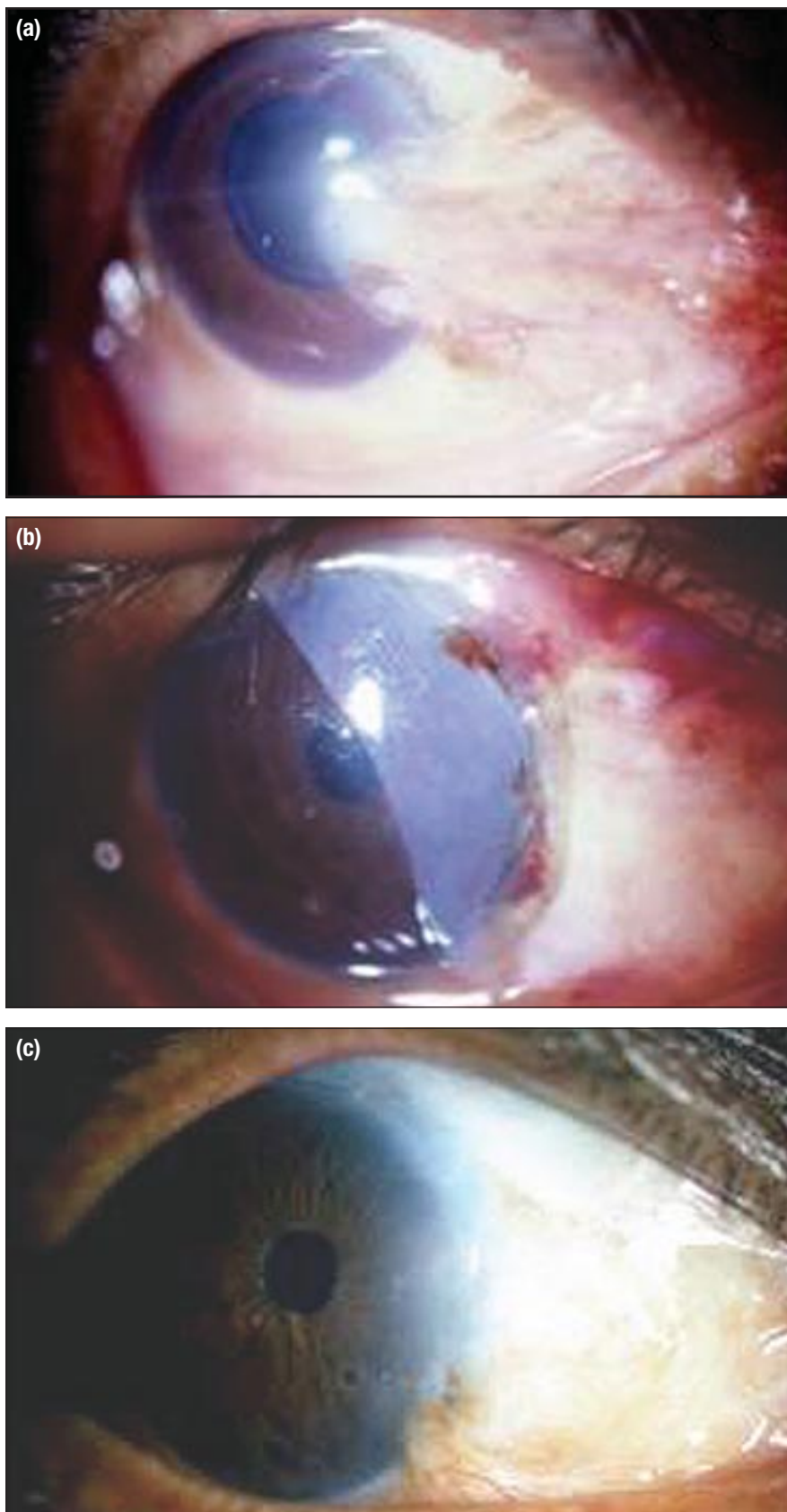


Figure 1. Slit-lamp photograph showing (a) fleshy pterygium preoperatively; (b) amniotic membrane and conjunctival limbal autograft in place 2 days postoperatively; and (c) recurrence 3 months postoperatively.

to be a safe and effective method as shown by various studies.^{12,14,15}

Studies have shown the usefulness of AMG for ocular surface reconstruction after symblepharon removal.²⁰ In this study of 91 eyes with primary and recurrent pterygium, the surgical procedure of AMG with conjunctival limbal autograft showed encouraging results for surface reconstruction and motility restoration after pterygium excision in patients with motility restriction due to symblepharon. There were 11 eyes with symblepharon of which 8 had restricted ocular motility. All these eyes showed improvement in ocular motility without any recurrence of symblepharon. Application of mitomycin C was done for 7 patients with recurrent pterygium, none of whom experienced recurrence. This surgical modality seems to be a good option for patients with symblepharon and restricted ocular motility and when used with mitomycin C for recurrence.

AM transplant along with conjunctival limbal autograft shows a recurrence rate of 15.6% for primary and recurrent pterygium after 2 months. It is a safe procedure for ocular surface reconstruction after pterygium excision for patients with ocular motility restriction and symblepharon formation. Mitomycin C used as an adjunctive therapy intraoperatively can be considered effective for recurrent pterygium, although a study with a large sample size and a longer follow-up should be performed.

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