



Case Series

Outcomes of Amniotic membrane transplantation (AMT) after excision of conjunctival tumours- A case series

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ABSTRACT

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Aim: to evaluate the clinical outcomes of patients treated with amniotic membrane transplantation (AMT) following excision of conjunctival and limbal tumors.

Methods: The eyes of three patients who presented with conjunctival and limbal tumours and underwent surgical excision and biopsy with the 'no-touch technique', followed by AMT, along with intraoperative Mitomycin C(MMC)0.04% application and perilesional double freeze-thaw cryotherapy were evaluated.

Results: The mean age of patients was 53.3 years. The affected quadrants were the temporal conjunctiva in two cases and the nasal quadrant in one case. In our case series, all the lesions were benign, and additional treatment was required in only one case. Postoperative complications noted were conjunctival granuloma in one case and minimal conjunctival scarring in another. In our case series, no recurrence was noted during the long follow-up period.

The functional outcomes were excellent in all cases, with no recurrence.

The cosmetic outcome was good in two cases, and minimal scarring was observed in one case. No other studies have reported cosmetic outcomes earlier.

Conclusion: The use of amniotic membrane, combined with intraoperative MMC and cryotherapy, facilitates the reconstruction of large ocular surface defects without causing recurrence or major postoperative complications.

Keywords: conjunctival tumour, amniotic membrane transplantation, cryotherapy.

INTRODUCTION

Conjunctival and limbal tumors comprise conditions that affect the cosmetic appearance and ocular morbidity of the patient. They are classified as benign, pre-invasive, or invasive. Benign ocular surface squamous neoplasia (OSSN) comprises papilloma, pseudoepitheliomatous hyperplasia, and benign hereditary intraepithelial dyskeratosis.^{1,6}

The amniotic membrane (AM) is a thin, translucent biological structure devoid of nerves, blood, or lymph vessels. It has anti-inflammatory and anti-scarring effects on the ocular surface. Therefore, AM is an ideal tissue for the reconstruction of ocular surface tumors.^{2,7}

Cryotherapy reduces recurrence rates by destroying tumor cells at the margins or the base of the sclera using superficial and deep-freezing techniques.^{3,8,9} In this case series, we report our long-term experience with Amniotic Membrane Transplantation (AMT) followed by topical mitomycin C (MMC) 0.04% application and cryotherapy after the excision of large conjunctival and limbal tumors.

MATERIALS AND METHODS:

This case series was conducted in accordance with the Declaration of Helsinki.

Written informed consent was obtained from the patients for the use of their images and clinical information.

This prospective, interventional case series reviewed the long-term outcomes of three patients who underwent AMT followed by topical MMC and double freeze-thaw cryotherapy after excision of conjunctival and limbal tumours performed by a single surgeon from December 2023 to May 2024.

Surgical intervention techniques:

Surgical excision of the tumour by 'No touch' technique:

All interventions were performed under peribulbar anesthesia in the operating theatre. Wide surgical excision was performed, maintaining 4 mm tumour-free margins for the conjunctival component and 2 mm margins for the corneal component after alcohol keratoepitheliectomy to reduce the risk of tumour seeding.^{4,10}

Topical MMC (0.04%): Topical MMC was applied to the area of the lesion and subconjunctival tissue, using a merocele sponge for 2 minutes. This was performed to reduce scarring and the risk of recurrence. The sponge was then discarded, and MMC was washed off with sterile normal saline.³

Cryotherapy: Double freeze-thaw cryotherapy was applied to the resected conjunctival margins. The conjunctival margin was lifted, and the cryoprobe was placed at a point on the lifted margin for 15 seconds and then removed. A freeze-thaw cycle was then applied to the adjacent area. This was repeated over the entire perimeter. This cycle was repeated once more.^{3,8,9}

Amniotic Membrane transplantation:

The ocular surface was reconstructed using cryopreserved AM. A single layer of amniotic membrane was placed over the defect with the stromal face down and secured with fibrin glue. A bandage contact lens was placed over it.¹

Functional outcome was defined as complete excision of the conjunctival mass with no recurrence. Cosmetic outcome was defined as a clear or scarred ocular surface.

CASES:

Case 1: A 72-year-old man presented with a gradually progressive painless conjunctival mass in his left eye for three months. On slit lamp examination (SLE), his left eye (OS) showed leucomatous growth of size 3.5 mm x 3 mm in the temporal bulbar conjunctiva and involving one clock hour of the cornea. The margins were irregular, fimbriated with a feeder vessel supplying it (Figure 1).

Optical coherence tomography of the anterior segment (AS-OCT) in OS showed an abrupt transition from normal to abnormal epithelium, with thickened, hyperreflective epithelium and backshadowing, suggesting a diagnosis of OSSN.

Surgical intervention was performed according to the above-mentioned protocol.

Histopathology (HPE) reports revealed hyperkeratosis, parakeratosis, and patchy areas of hyperplastic epithelium containing scattered goblet cells, suggesting benign hereditary epithelial dyskeratosis.

Topical MMC 1 MU/ml was started for 3 cycles, 1 week on and 1 week off, because, despite the biopsy result being benign, it was clinically suspected to be a preinvasive lesion.

At the end of 2 months, the patient had a well-resolved AMG. There was no recurrence at 24 months.

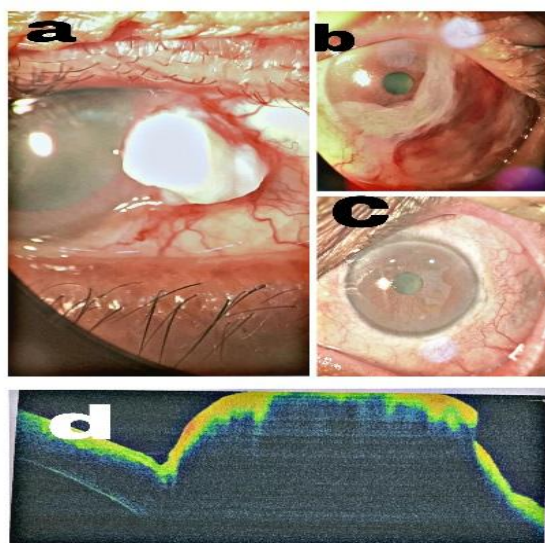


Figure 1

CASE 2: A 42-year-old man presented with a painless temporal bulbar conjunctival mass in the right eye (OD) that had gradually progressed in size for 2 months. The patient had no history of trauma or ocular surgery.

On SLE, it measured 3 x 3 mm, was cystic, had irregular margins, and showed no overlying keratin or pigmentation. There was a congenital pigmented nevus just adjacent to the cystic lesion (Figure 2).

Surgical intervention was carried out.

HPE revealed loose fibrous tissue lined by a flattened layer of squamous epithelium, suggesting an epidermal inclusion cyst.

At 2 months, a granuloma (2x2 mm) was observed in the inferior temporal bulbar conjunctiva. Oral prednisolone (1 mg/kg bw) along with topical prednisolone 1% was administered in a tapered dose over 1 month.

At 6 months, granulation tissue disappeared.

At 36 months, the ocular surface was well-epithelialized with no recurrence.

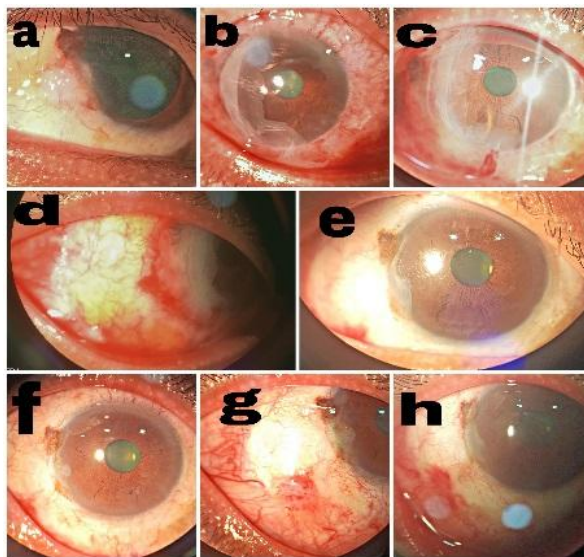


Figure 2

CASE 3:

A 46-year-old man presented in the OS with a nasal conjunctival mass that had gradually progressed in size for 2 months. The patient had no history of trauma or any previous surgery.

On SLE, the left eye showed a fibrotic mass of 2 x 3 mm in the nasal bulbar conjunctiva touching the limbus. There were no feeder vessels, pigmentation, or overlying keratin (Figure 3).

Surgical intervention was carried out.

HPE revealed papillomatosis of the bulbar conjunctival squamous epithelium.

At 2 months, the AMG resolved.

At 24 months, there was no recurrence, but minimal conjunctival scarring was noted.

In all cases, postoperatively, topical dexamethasone and moxifloxacin were started and tapered over 6 weeks, along with lubricants.

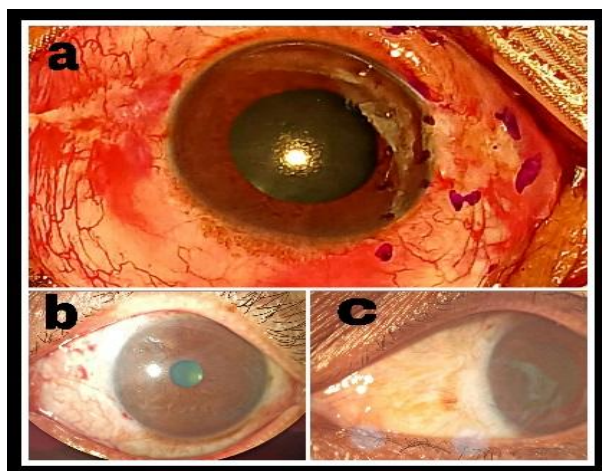


Figure 3

Figure legends:

Figure 1: Preoperative and postoperative images a) Preoperative image showing leucomatous growth of size 3.5 mmx 3 mm in the temporal bulbar conjunctiva and involving 1 clock hour of cornea. b) Post-operative image at 1 month c) Post-operative image at 10 months d) AS OCT image showing abrupt transition from normal to abnormal epithelium with thickened and hyperreflective epithelium with back shadowing.

Figure 2: Preoperative and Postoperative images: a) Preoperative image showing a temporal conjunctival mass 3 mmx 3 mm in size, cystic in nature, with irregular margins, with an adjacent congenital nevus b) Postoperative image on day 1 c) Postoperative image on day 8 d) Postoperative image at 1 month e) Postoperative image at 2 months f) Postoperative image at 3 months g) Postoperative image at 6 months h) Postoperative image at 18 months.

Figure 3: Preoperative and postoperative images showing a) Preoperative image showing nasal conjunctival mass b) Postoperative image at day 8 c) Postoperative image at 1 year

DISCUSSION:

After excising the tumor with clear margins, the aim was to achieve optimal functional and cosmetic results. To cover the defects, AM is a suitable substitute because it does not induce scarring, inflammation, or vascularization, is necrosis-resistant, remains transparent, and prevents recurrence by downregulating inflammation and fibrosis.²

Defects larger than 10 mm can cause scarring, restriction of eye movements, or discomfort for the patient. AM acts as a scaffold for conjunctival epithelial migration.⁵

The patients' preoperative findings, interventions, **and** postoperative data are summarized in Table 1.

In our case series, the mean patient age was 53 years. In another case series by Goktay Enor Senaz et al, the mean age was 56 years.¹ In the study of Agraval U et al, the mean age was 54 years.⁵

In our case series, the affected quadrants were the temporal conjunctiva in 2 cases and the nasal quadrant in 1 case.

In the case series by Goktas E.S et al, the nasal conjunctiva affected (8 cases) was more than the temporal conjunctiva (6 cases).¹

In our case series, all the lesions were benign. In the case series by Goktas E.S et al, one case was Carcinoma in situ, one case was Squamous cell carcinoma, and the rest were benign.¹

In the case series by Agraval U et al., 3 cases were malignant, and 1 was benign.⁵

One study by Furdova A et al showed 54 malignant cases and 14 benign cases.²

Additional treatments were required in only one case in our case series. In the study by Agraval et al, additional treatment was required in carcinoma in situ cases.⁵

Postoperative complications in our case series were conjunctival granuloma in one case and conjunctival scarring in another.

In the case series by Goktas E.S et al, complications were noted in 4 cases (corneal scarring, vascularization, limbal insufficiency).¹

In the study by Agraval U et al, complications noted were granuloma, symblepharon, and minimal scarring in 5 out of 53 patients.⁵

In our case series, no recurrence was noted during a long follow-up period. Goktas E. S. et al. found recurrence in 4 cases out of 14. Agraval U. et al. found recurrence in 5 cases, but not at the graft site.⁵

The mean follow-up period in our case series was 28 months, which was comparable to other studies. In the case series by Goktas E.S et al, the mean follow-up period was 20 months.¹ In the study by Agraval U et al, the mean follow-up period was 21 months.⁵

The functional outcomes were excellent in all cases, with no recurrence.

The cosmetic outcome was good in two cases, and minimal scarring was observed in one case. No other studies have reported cosmetic outcomes earlier.

The limitations of our case series are as follows:

1. Small case series
2. AS OCT could not be documented in two cases, as they were from the nonpaying section.

Table 1: Preoperative data, interventions and postoperative findings of the conjunctival tumours

Case number	Eye affected	Area affected	Pathologic diagnosis	Postoperative use of MMC(Yes/no)	Postoperative Complications	Recurrence	Cosmetic appearance	Follow up period
Case 1	OS	Limbus and temporal conjunctiva	Benign hereditary epithelial dyskeratosis	Yes	None	No	Good	24 months
Case 2	OD	Limbus and temporal conjunctiva	Epithelial inclusion cyst	No	Conjunctival granuloma	No	Good	36 months
Case 3	OS	Nasal conjunctiva	papilloma	No	Minimal scarring	No	Fair	24 months

3. OD= right eye, OS= left eye, MMC= Mitomycin C

CONCLUSION:

The use of AMT, along with intraoperative MMC and cryotherapy, helps reconstruct large ocular surface defects without recurrence or major postoperative complications.

However, larger studies with longer follow-up periods in the future will help confirm our findings.

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Conflicts of Interest: None

Conflicts of interest statement: None declared

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