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Human Amniotic Membrane Transplantation for Ocular Surface Diseases: A Prospective Study of 27 Cases

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Abstract **Original Research Article**

Amniotic membrane transplantation (AMT) has demonstrated significant efficacy in the management of various ocular surface disorders due to its unique biological properties. These include anti-inflammatory, anti-fibrotic, and anti-angiogenic effects, as well as its ability to promote epithelial cell migration and enhance corneal healing. The aim of this study was to evaluate the effectiveness of amniotic membrane transplantation in the treatment of different ocular surface pathologies. We conducted a prospective study including all patients treated with amniotic membrane transplantation for ocular surface diseases between September 2023 and September 2025. All patients were followed for a minimum period of six months. Demographic data, clinical indications, surgical characteristics, and postoperative outcomes were analyzed. A total of 27 patients underwent amniotic membrane transplantation. The mean age of the patients was 42.7 years, with a slight male predominance (52.5%). Indications for surgery included corneal ulcers (7 patients), corneal perforations (2 patients), ocular burns (3 patients), infectious keratitis (15 patients), orbital implant exposure (1 patient), and severe dry eye syndrome (1 patient). Baseline visual acuity was ≤1.3 LogMAR in 85.6% of cases. Most procedures were performed under local anesthesia (85.18%). Postoperatively, the mean visual acuity improved to 1 LogMAR, with an average gain of three lines. Suture dehiscence occurred in two patients. The most frequent postoperative finding was corneal neovascularization, observed in 74.07% of cases. Amniotic membrane transplantation is widely used in the treatment of ocular surface diseases due to its multiple therapeutic properties, including facilitation of epithelial cell migration, enhancement of basal cell adhesion, promotion of epithelial differentiation, modulation of stromal healing, and anti-inflammatory and antibacterial effects. AMT represents a simple and effective surgical technique that should be considered an essential component of the therapeutic arsenal in the management of ocular surface disorders.

Keywords: amniotic membrane, transplantation, ocular surface diseases.

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1- INTRODUCTION

Amniotic membrane transplantation is a surgical technique that involves grafting an amniotic membrane onto the ocular surface, thereby providing an avascular and acellular structure that functions as a basement membrane. Its efficacy has been demonstrated in the treatment of various ocular surface disorders due to the unique combination of its biological properties.

2- MATERIALS AND METHODS

This prospective study was conducted between September 2023 and September 2025 at the Department of Ophthalmology, Hassan II University Hospital in Fez, Morocco. The study included all patients presenting with various ocular surface disorders who were treated with human amniotic membrane transplantation. Patients were enrolled according to the inclusion criterion of having undergone amniotic membrane grafting for the management of ocular surface pathology. All patients were followed for a minimum period of six months to evaluate clinical outcomes and postoperative evolution.

3- RESULTS

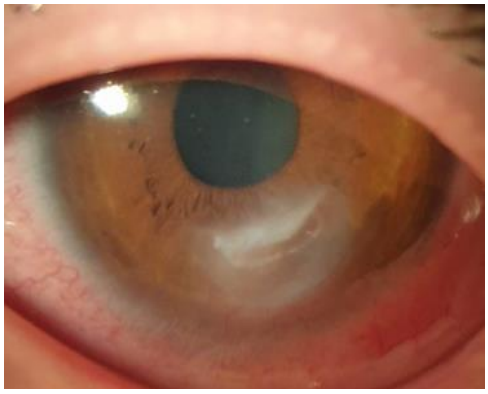
A total of 27 patients were included in the study. The mean age was 42.7 years, with a range from 5 to 75 years. The female-to-male ratio was 0.8, showing a slight male predominance (55.55%).

Regarding laterality, the left eye was more frequently affected, accounting for 66.67% of cases (18 eyes).

The indications for amniotic membrane transplantation were predominantly infectious keratitis

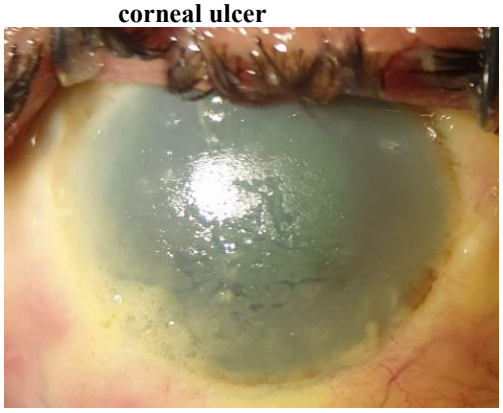
(15 cases) and corneal ulcers (7 cases). Other indications included ocular burns (3 cases) and corneal perforations (2 cases). Less common indications were severe dry eye syndrome (1 case) and orbital implant exposure (1 case).

Overall, infectious keratitis and corneal ulcers represented the majority of indications for amniotic membrane transplantation in our series.

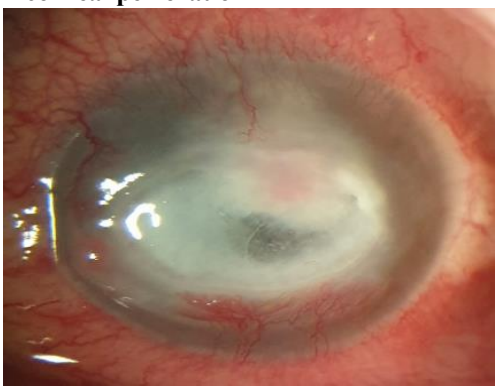


corneal ulcer

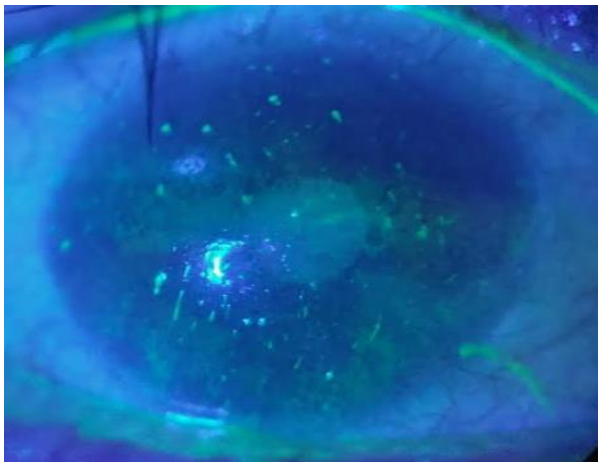
corneal perforation



ocular burn



infectious keratitis



Dry eye syndrome

Regarding the type of anesthesia, topical/local anesthesia was the most frequently used technique, performed in 85.2% of cases, while general anesthesia was required in 14.8% of patients.

A significant improvement in visual acuity was observed after surgery. The mean initial visual acuity was 1.3 LogMAR, which improved to 1 LogMAR postoperatively, corresponding to an average gain of three lines of visual acuity.

The mean time for amniotic membrane resorption was 18.7 days (Figure 1).

The main postoperative complication observed in our series was corneal neovascularization, occurring in 74.07% of cases (Figure 2).

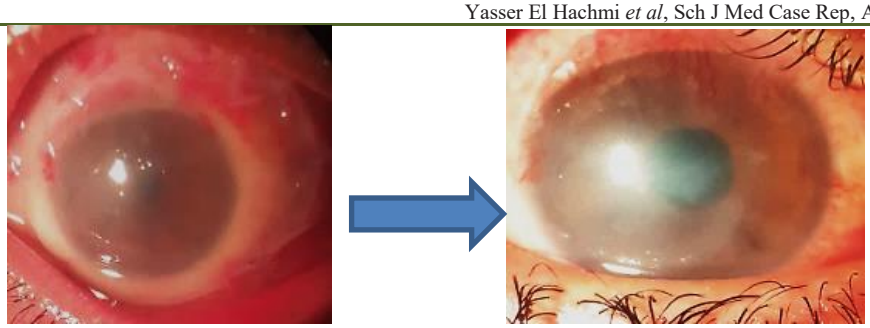


FIGURE 1: Clinical outcome 15 days after amniotic membrane resorption in a patient with ocular burn.

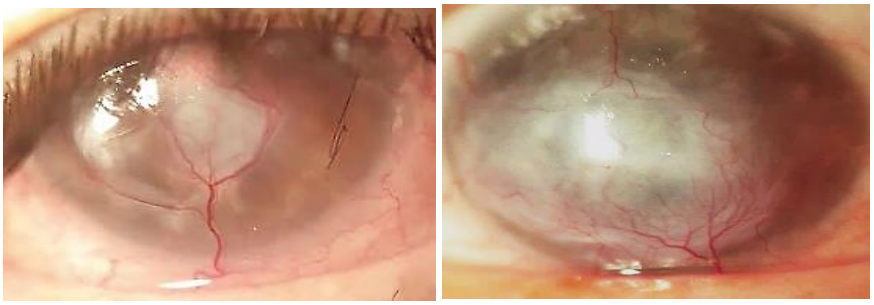


FIGURE 2: Corneal neovascularization observed after amniotic membrane transplantation.

FIGURE 3: Clinical course of a patient with pre-perforative infectious keratitis treated with amniotic membrane transplantation, demonstrating a favorable outcome

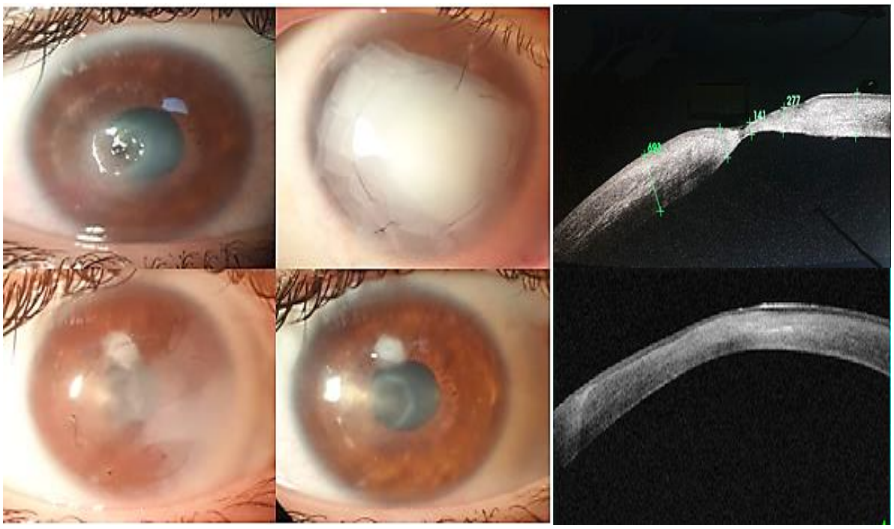


Figure 4: Clinical course of a patient with a pre-perforative neurotrophic corneal ulcer showing ulcer healing after amniotic membrane transplantation

4- DISCUSSION

The first use of amniotic membrane transplantation in ophthalmology was reported in 1940 by De Roth for the treatment of symblepharon and conjunctival defects [1]. Since then, numerous studies have demonstrated its effectiveness in the management of ocular surface disorders [2].

Due to its multiple biological properties, the amniotic membrane has become a promising therapeutic option in the treatment of ocular surface diseases. Its beneficial effects include promotion of wound healing, facilitation of rapid corneal epithelial regeneration [3,4], and anti-inflammatory properties, acting as a protective barrier against inflammatory cell infiltration on the ocular surface [5]. In addition, the amniotic membrane exhibits antibacterial and anti-angiogenic properties, which further contribute to its therapeutic value in ocular surface reconstruction.

5- CONCLUSION

Amniotic membrane transplantation is a simple, straightforward, and effective surgical technique for the management of ocular surface disorders, as demonstrated by numerous studies. It should be considered an important component of the therapeutic arsenal in the treatment and management of ocular surface diseases.

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