



## Case Report

Journal Homepage: <http://crp.tums.ac.ir>

# Severe Exposure Keratopathy Leading to Sterile Corneal Perforation Treated Successfully by Lamellar Corneal Patch Graft: A Case Report



Iman Ansari<sup>1</sup> , Hamed Abbasi<sup>1</sup>, Amir Mohammadzadeh<sup>1</sup>, Kiana Hassanpour<sup>1,2\*</sup> 

1. Ophthalmic Research Center, Research Institute for Ophthalmology and Vision Science, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
2. Department of Ophthalmology, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.



**Citation** Ansari I, Abbasi H, Mohammadzadeh A, Hassanpour K. Severe Exposure Keratopathy Leading to Sterile Corneal Perforation Treated Successfully by Lamellar Corneal Patch Graft: A Case Report. *Case Reports in Clinical Practice*. 2021; 6(5):197-200.

**Running Title** Corneal Perforation Treatment by Lamellar Patch Graft

**Article info:**

**Received:** 02 Sep 2021

**Revised:** 22 Sep 2021

**Accepted:** 18 Oct 2021

**Keywords:**

Exposure keratopathy; Corneal perforation; Corneal ulcer; Corneal perforation; Keratitis

**ABSTRACT**

We reported a case of corneal perforation due to longstanding exposure keratopathy treated successfully with lamellar corneal patch graft, conjunctival flap, and lateral tarsorrhaphy. A 75-year-old male presented with ocular pain and decreased visual acuity in his right eye since 2 weeks ago. On external examination, lagophthalmos in the right eye was evident. Visual acuity was hand motion on slit-lamp examination. 2×3 mm perforated area in the right cornea accompanied by adjacent corneal melting and diffuse punctate epithelial keratopathy were observed. The anterior chamber was flat. Intraoperatively, a 7×2.5 mm-diameter corneal patch graft was fashioned manually; its thickness was reduced and placed over the perforated area, successfully sealed the cornea, a partial bipedicle conjunctival flap was also applied over the graft, and lateral tarsorrhaphy was performed. Four weeks after surgery, Corrected Distance Visual Acuity (CDVA) improved to Counting Finger (CF) 20 cm. The lamellar corneal patch graft was intact without a leak, and the conjunctival flap was partially removed retracted. Corneal perforation can occur in patients with severe exposure to keratopathy, and corneal patch graft is a good option when a sizeable corneal perforation (≥3 mm diameter) is not amenable to corneal gluing.

**\* Corresponding Author:**

**Kiana Hassanpour, MD.**

**Address:** Ophthalmic Research Center, Research Institute for Ophthalmology and Vision Science, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

**E-mail:** [kiana.hassanpour@gmail.com](mailto:kiana.hassanpour@gmail.com)



## Introduction

**E**xposure keratopathy is dryness of the cornea caused by incomplete or inadequate eyelid closure, resulting in evaporative tear loss and tear film inadequacy [1]. Lagophthalmos is the significant risk factor for exposure to keratopathy that may be caused by medications, chemosis, facial nerve palsy, proptosis, ectropion, trauma, or surgery [2, 3]. Exposure to keratopathy leads to corneal damage with a spectrum of severity and extent [1]. Mild case might experience pain, blurry vision, and photophobia. They are usually benign and easily treated, but severe, undiagnosed, and undertreated cases might cause permanent corneal scarring, vision loss, and severe sequels can result [1]. The most harmful complication is microbial keratitis, which could lead to corneal perforation, endophthalmitis, blindness, and even the loss of the eye [1]. Since the scarcity of sterile perforated cornea is secondary to exposure keratopathy. The treatment plans are not always straightforward in extreme cases. Herein, we report a patient with severe exposure to keratopathy causing corneal perforation, emphasizing its management.

## Case Presentation

The patient was a 75-year-old male complaining of ocular discomfort with a 4-year history of lagophthalmos in the right eye due to unresolved peripheral facial nerve palsy after radial maxillofacial malignancy surgery, adjuvant systemic chemotherapy, and radiotherapy. The patient underwent bilateral cataract surgery 15 years ago. There were no other ocular and systemic disorders. The patient used topical lubrication and eye taping for exposure keratopathy. The Corrected Distance Visual Acuity (CDVA) was Hand Motion (HM). Intraocular Pressure (IOP) was not measured due to corneal perforation and a flat anterior chamber in the right eye. Peripheral right facial nerve palsy, near 4 mm lagophthalmos, apparent loss of Bell's phenomenon, and complete corneal anesthesia were noted in the right eye. Slit-lamp examination revealed conjunctival hyperemia and discharge, punctate epithelial keratopathy, corneal melting, and a 2×3 mm perforated area in the inferior part of the cornea of the right eye (Figure 1-A). The Intraocular Lens (IOL) was in place, and other ocular structures and the left eye were without any pathological changes.

The patient was admitted and intravenous antibiotics, including vancomycin (15 mg/kg every 12 hours) and Ceftazidime (50 mg/kg every eight hours), was initiated and continued for 3 days. The conjunctival discharge was

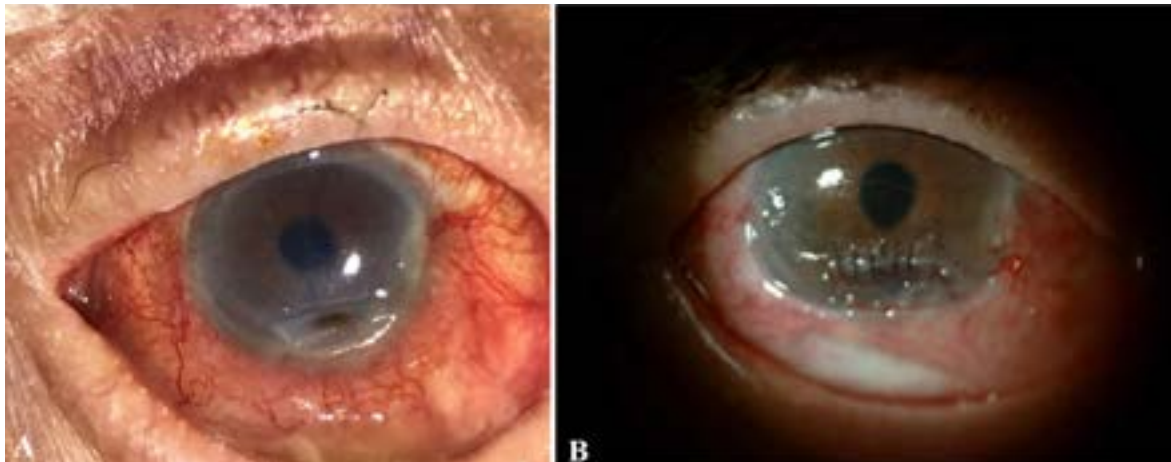
sent for the smear and culture. The patient underwent an acute corneal patch graft, partial conjunctival flap, and lateral tarsorrhaphy in the right eye. A corneal graft button was fashioned manually to cover the perforated area. The approximate size of the corneal patch graft was 7 mm wide and 2.5 mm in height with a crescent shape. The graft's thickness was also manually reduced to resemble lamellar grafts. The graft was sutured to the edges of the adjacent healthy cornea using Nylon 10-0 sutures. The grafted area was covered with a bipedicle conjunctival flap. The patient was discharged on topical Ciprofloxacin every 6 hours, topical Betamethasone every 6 hours, and Lubrication. Four weeks postoperatively, the CDVA improved to Counting Finger (CF) from 20 cm. The corneal patch graft was intact without a leak, the conjunctival flap was partially retracted, and the lateral tarsorrhaphy was effective (Figure 1-B).

## Discussion

Herein, we reported a patient with a longstanding exposure keratopathy resulting in a sterile corneal perforation successfully treated with corneal patch graft, conjunctival flap, and lateral tarsorrhaphy. This situation is not a frequent sequela of exposure keratopathy, and the evidence on the best treatment options is scarce.

Management of exposure keratopathy can be more challenging in severe cases, while most patients experience mild to moderate severity [1]. The best management includes prevention, followed by conservative management like tear film replacement with artificial tear and lubricating solutions or ointments [1]. In severe cases, there are needed frequent usage of the preservative-free solution to prevent preservative-related corneal toxicity [1]. in the setting of poor eyelid closure, artificial tear evaporates rapidly and drains quickly through the nasolacrimal system; however, lubricating ointments are more resistant to drainage and evaporation [1]. In a prospective randomized study of 50 consecutive ICU patients receiving propofol or neuromuscular blockade, lubricating ointment applied every 4 hours significantly reduced the incidence of exposure keratopathy, compared to passive eyelid closure alone [4]. There exist various methods, such as eyelid taping, moisture chambers, and tarsorrhaphy for reducing tear evaporation [1]. in a prospective randomized trial of 207 intubated, mechanically ventilated children, the addition of a moisture chamber suggested no added benefit over the use of lubricating ointment every 6 hours [5].

Severe exposure keratopathy is among the non-traumatic Corneal perforation causes, leading to ocular morbidity and profound visual loss [6]. Corneal perforation



**Figure 1.** Slit-lamp photograph



A: A Slit-lamp photograph with diffuse illumination showing conjunctival hyperemia, corneal melting, and a perforated area in the inferior part of the cornea of the right eye approximately measure 2×3 mm; B: Postoperative slit-lamp photograph demonstrating corneal patch graft which was manually fashioned, its thickness was reduced to fit the perforated area completely; the conjunctival flap is partially retracted after one month.

should be treated immediately to restore the cornea's anatomic integrity and prevent complications such as secondary glaucoma or endophthalmitis [7]. In our patient, the severity of the disease could be ascribed to the simultaneous severe dry eye, possibly secondary to the history of radiotherapy and the presence of facial malignancy. However, the longstanding lagophthalmos without tarsorrhaphy could be another cause leading to the perforation.

Selecting a suitable treatment option depends on the size and location of the perforation and the underlying cause [7]. Corneal perforation may be treated by temporary procedures like using bandage contact lens and gluing or permanent measures like corneal transplantation [7]. A large corneal perforation ( $\geq 3$  mm diameter) is not amenable to corneal gluing and requires therapeutic keratoplasty along with management of the underlying condition [8]. Depending on the size and depth of the perforation, a small diameter patch graft/large diameter keratoplasty and lamellar/full-thickness graft are being performed [7]. Tectonic grafts, also called patch grafts, cover corneal stromal defects, restore the cornea or sclera structure, preserve the integrity of the globe, and are used when the perforations are not too large. Lamellar or perforating patch grafts can be used temporarily for central corneal perforations (for future optical penetrating keratoplasty) or permanently to repair peripheral perforations and descemetocelae [7].

### Conclusion

Corneal perforation can occur in patients with severe exposure to keratopathy, leading to ocular morbidity

and profound visual loss. This condition requires immediate treatment to preserve the cornea's anatomic integrity and prevent complications, such as secondary glaucoma or endophthalmitis. Corneal patch graft was a good option for a large corneal perforation ( $\geq 3$  mm diameter), i.e., not amenable to corneal gluing.

### Ethical Considerations

#### Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed of the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information. They were free to leave the study whenever they wished, and if desired, the research results would be available to them. Written consent has been obtained from the subjects. Principles of the Helsinki Convention were also observed.

#### Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

#### Conflict of interest

The authors declared no conflict of interest.

#### Acknowledgments

Special thanks to the medical staff of the operating room and the staff of the eye clinic of Imam Hossein Hospital.

## References

- [1] Risma JM, Syed NA. Exposure keratopathy in the critically ill: A case report, discussion, and systems-based intervention [Internet]. 2014 [Updated 01 July 2014]. Available from: <http://EyeRounds.org/cases/189-exposure-keratopathy.htm>
- [2] Jammal H, Khader Y, Shihadeh W, Ababneh L, AlJizawi G, AlQasem A. Exposure keratopathy in sedated and ventilated patients. *Journal of Critical Care*. 2012; 27(6):537-41. [DOI:10.1016/j.jcrc.2012.02.005] [PMID]
- [3] McHugh J, Alexander P, Kalhor A, Ionides A. Screening for ocular surface disease in the intensive care unit. *Eye*. 2008; 22(12):1465-8. [DOI:10.1038/sj.eye.6702930] [PMID]
- [4] Lenart SB, Garrity JA. Eye care for patients receiving neuromuscular blocking agents or propofol during mechanical ventilation. *American Journal of Critical Care*. 2000; 9(3):188-91. [DOI:10.4037/ajcc2000.9.3.188]
- [5] Sorce LR, Hamilton SM, Gauvreau K, Mets MB, Hunter DG, Rahmani B, et al. Preventing corneal abrasions in critically ill children receiving neuromuscular blockade: A randomized, controlled trial. *Pediatric Critical Care Medicine*. 2009; 10(2):171-5. [DOI:10.1097/PCC.0b013e3181956ccf] [PMID]
- [6] Lekskul M, Fracht HU, Cohen EJ, Rapuano CJ, Laibson PR. Non-traumatic corneal perforation. *Cornea*. 2000; 19(3):313-9. [DOI:10.1097/00003226-200005000-00011] [PMID]
- [7] Jhanji V, Young AL, Mehta JS, Sharma N, Agarwal T, Vajpayee RB. Management of corneal perforation. *Survey of Ophthalmology*. 2011; 56(6):522-38. [DOI:10.1016/j.survophthal.2011.06.003] [PMID]
- [8] Cowden JW, Copeland RA, Schneider MS. Large diameter therapeutic penetrating keratoplasties. *Journal of Refractive Surgery*. 1989; 5(4):244-8. [DOI:10.3928/1081-597X-19890701-09]