



## Case report

## Management of a central corneal perforation in the emergency room: Tenon patch technique

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## ABSTRACT

**Purpose:** Corneal perforations are defined as a solution of continuity in the cornea. Usually, these cases evolve to the formation of a corneal-iridial scar or require surgical intervention. The tenon patch graft represents a good alternative to other methods and has many advantages.

**Observation:** A 63-year-old patient who had been followed for severe dry eyes due to rheumatoid arthritis for 10 years presented to the emergency room with a central corneal perforation, partially sealed by the iris, accompanied by significant corneal edema in the right eye. Given the clinical picture that had been developing for 5 days, we decided to perform a tenon patch graft on the perforation. At 4 weeks of follow-up, globe integrity was maintained with a well-placed tenon patch. No evidence of leakage in the Seidel test was noted.

**Conclusion:** The tenon patch graft represents a good alternative in the management of corneal perforations and has many advantages, among which the feasibility in an emergency, allowing a corneal graft afterwards.

### 1. Introduction

Corneal perforations are defined as a solution of continuity in the cornea. It is a fistulization that makes the anterior chamber communicate with the epithelial surface. Several etiologies are involved: trauma, infectious keratitis, severe dry eye... Usually, these cases evolve to the formation of a corneal-iridial scar or require surgical intervention [1]. The treatment of corneal perforations is a real challenge, both in terms of the choice of surgical technique and in the management of the causative pathology. Therapeutic management must be adequate with the goal of restoring the integrity of the eyeball and thus allowing appropriate healing. The tenon patch graft represents a good alternative to other methods and has many advantages, among which the feasibility in an emergency, allowing a subsequent corneal graft [2,3].

In this case, we describe the steps involved in performing an emergency tenon patch graft for the cure of a central corneal perforation complicating severe dry eye with the aim of a possible subsequent keratoplasty.

### 2. Case presentation

Our work consists of a case report and has been reported in accordance with SCARE 2020 criteria [4].

This is a 63-year-old patient who had been followed for severe dry eyes due to rheumatoid arthritis for 10 years and presented to the emergency room with a red and painful right eye with a sudden drop in visual acuity following an ocular rubbing that had been evolving for 5 days. She did not report any major mechanical or chemical trauma. The visual acuity was 10/10 in the left eye with an ophthalmological examination which found a severe quantitative and qualitative dry syndrome. The ocular examination of his right eye found visual acuity with hand movement. Biomicroscopic examination showed conjunctival hyperemia over 360 with palpebral subconjunctival papillae without malposition or abnormality of the palpebral free edge. There was no sign of infection. In the anterior segment, there was a 2 mm central corneal perforation with a positive spontaneous Seidel, partially sealed by the iris, accompanied by significant corneal edema that interfered with the rest of the examination. The tone was decreased on the bi-digital palpation of the globe. Given the clinical picture that had been developing for 5 days, we decided to perform a tenon patch graft on the

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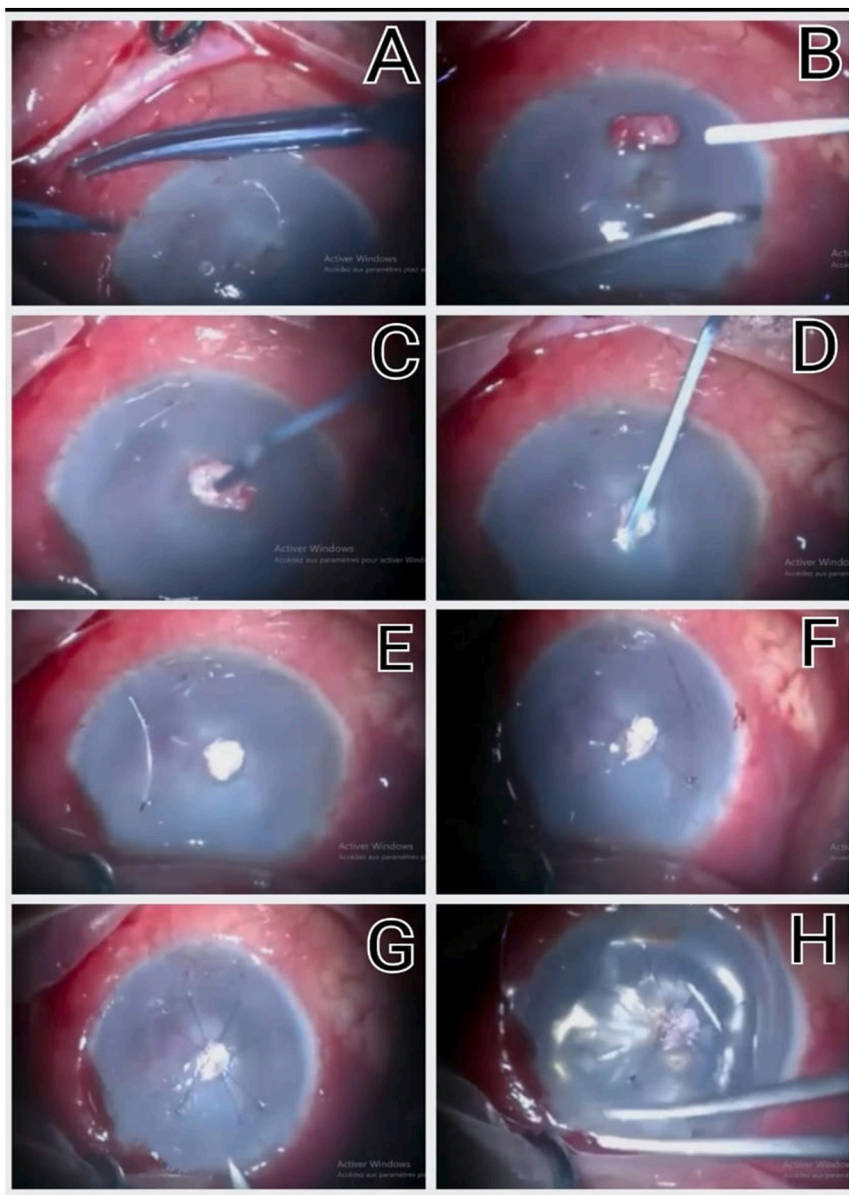
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**Fig. 1.** A: First, a careful conjunctival uncovering is performed to isolate the tenon capsule. The tenon graft is harvested sufficient to fill the defect. B: The edges are debrided to remove any fibrin that may be present. A 360 degree intrastromal space is created. C & D: the graft is placed by inserting it intra-stromally. It is easier to use the spatula to insert the graft properly, E: X-stitches are made with 10/0 monofilament. The best way is to move away from the graft and be as symmetrical as possible between the two corneal points forming the X, F: the stitch is made so that the cross stamps the graf, G: the second point is placed at X to reinforce the adhesion of the tenon patch, H: A service door is made to free the iris and reform the anterior chamber with an air bubble. A soft lens is placed to ensure a good seal.

perforation (Fig. 1).

Under local anaesthesia in the operating room under microscopic control, the surgical technique consisted of making a meticulous conjunctival uncovering, allowing isolation of the tenon capsule. The tenon graft was harvested in sufficient quantity to fill the defect. The edges are debrided to remove any fibrin that may be present. A 360-degree intrastromal space is created. The graft is placed by embedding it intrastromally. The spatula is used more easily to insert the graft. The X-stitches are made with the 10/0 monofilament so that the cross buffers the graft and the second X-stitch is placed to reinforce the adhesion of the tenon patch. A service door is made to free the iris and reform the anterior chamber with an air bubble. A soft lens and local antibiotic therapy are placed.

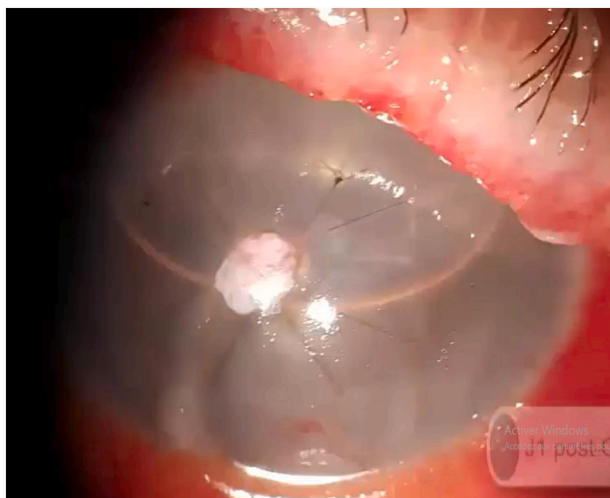
The control at D1 post-op shows a brightened cornea, a nicely reformed anterior chamber with an air bubble and a well in place graft (Fig. 2). The Seidel test was negative, and the intraocular pressure was normal. Postoperative follow-up was performed at D1, D7, D15, and D30, by slit lamp examination as well as by optical coherence tomography of the anterior segment, also performed at D1, D15, and D30. Removal of the soft lens and stitches was done after one month. The

main postoperative monitoring parameters were: anterior chamber formation, post-patch integration, and corneal stromal thickness stability. After 4 weeks of follow-up, the integrity of the globe was maintained with a well-placed tenon patch, clearly visible on OCT that objectifies the fibrosis with the corneal layers (Fig. 3). The patient then underwent transfixing keratoplasty with good postoperative results and a final uncorrected visual acuity of 5/10.

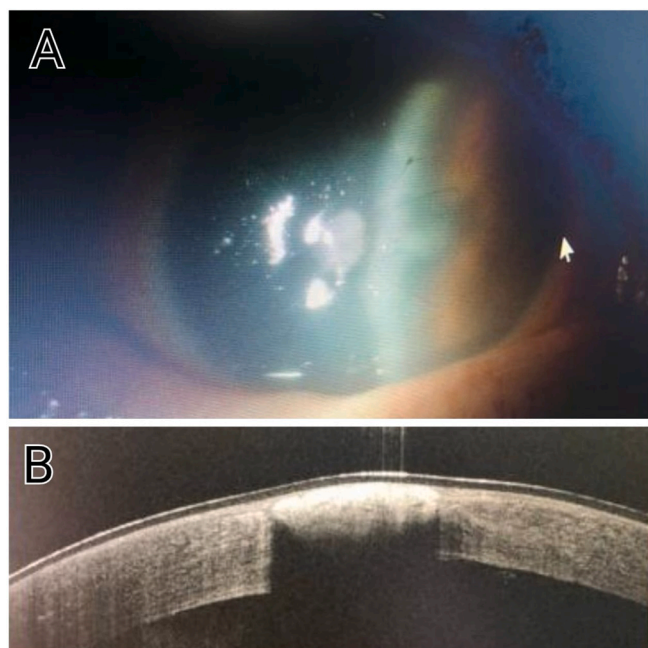
### 3. Discussion

Corneal perforation occurs when all layers of the cornea are broken with communication between the anterior chamber and the corneal surface. They result from a process of tissue breakdown of inflammatory or infectious origin. The dominant etiologies of non-traumatic corneal perforations vary according to the studies. Inflammation remains the most incriminating etiology in various studies, followed by neurotrophic ulcers, which often superinfect and are considered corneal infections because patients consult rather late [5].

Corneal perforations require early intervention and can be managed with tissue adhesives. Several surgical techniques can be used. The



**Fig. 2.** A control at D1 post-op shows a brightened cornea, a beautiful anterior chamber well reformed with an air bubble and a graft well in place.



**Fig. 3.** A: appearance at one month post-op, showing a clear cornea with a nice anterior chamber and a graft in place. B: OCT aspect at one month post-op, showing good integration of the graft in the corneal layers, re-epithelialization with intra-stromal fibrosis..

surgical procedure used is determined on the size, location, and origin of the perforation, as well as the resources available. Cyanoacrylate glue works effectively on small perforations. A partial conjunctival covering or an autologous corneal patch can be used to seal peripheral holes. Large holes and recurrences may necessitate a transfixing corneal graft as a first-line treatment. For perforations of immunological origin, many procedures may be required to achieve anatomical success and improve the functional prognosis [5]. Some are temporary, others are definitive, such as transfixing keratoplasty [6].

However, in developing countries, various problems must be addressed, such as cost containment, scarcity of corneal donors, and the cost of setting up and maintaining a corneal eye bank or stem cell laboratory. The goal of treatment for corneal perforation is to maintain the integrity of the globe and provide useful vision. All of the tenon graft's

interest is found there.

Tenon patch grafting has been previously described for the management of scleromalacia after excision of a pterygium, perforation of the scleral perforation and blood leakage from trabeculectomy [7,8]. But it has demonstrated its effectiveness in the management of corneal perforations and is increasingly adopted, especially in developing countries without other alternatives in the immediate future [2,3,9].

In our case, the tenon patch was used to avoid the complications associated with perforation as well as the lack of availability of other therapeutic alternatives. In addition, it has other advantages, such as the autologous nature of the tissue and minimal postoperative inflammation [2]. The use of tenon patch grafting has fulfilled all these objectives.

Follow-up of the tenon graft by slit lamp examination remains essential. Also, monitoring by optical coherence tomography of the anterior segment allows for better quantification of corneal thickness and structure. We believe that close follow-up is necessary until complete healing or keratoplasty.

#### 4. Conclusion

The use of tenon cap grafting is a safe, simple, inexpensive and effective technique. Advantages include the autologous nature of the graft with no risk of rejection, cost-effectiveness, and ease of availability. This surgical procedure is a promising technique in the management of corneal perforations to preserve the eyeball morphology for subsequent corneal transplantation. Close monitoring is very important and relies on biomicroscopic examination and optical coherence tomography of the anterior segment.

#### Provenance and peer review

Not commissioned, externally peer-reviewed.

#### Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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#### CRediT authorship contribution statement

Moctar Issiaka: as first and corresponding author made substantial contributions to the conception, the design of the work, the acquisition, analysis and interpretation of data.

Meryem Bellamine: writing the paper, analysis and interpretation of data

Adil Mchachi: the design of the work, analysis and revision of the work

Leila Benhmidoune: analysis and revision of the work,

Rayad Rachid: analysis and revision of the work

Mohamed El Belhadji: made a significant contribution to the final revision of the paper and approved it.

#### Declaration of competing interest

None.

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