

## RESEARCH ARTICLE

# Pterygium Surgery: Interest of Biological Glue in the Fixation of the Autologous Conjunctival Graft

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## Abstract

**Introduction:** Pterygium is a benign conjunctivo-elastic neof ormation. Its surgical treatment is based on conjunctival autograft after complete surgical excision. The objective of our study is to evaluate the effectiveness of biological fibrin glue in the fixation of the conjunctival graft in comparison to 8/0 absorbable sutures.

**Patients and methods:** we conducted a comparative study of a series of cases of pterygium operated using two different methods over a period of one year between January and December 2022 at the ophthalmology department of the international university Cheikh Khalifa hospital of Casablanca.

**Results:** 30 cases were enrolled, the mean age was respectively 54 and 55.5 years in group 1 (sutures surgery) and group 2 (biological fibrin glue surgery). There was no gender predominance in the two groups. Regarding the stage of the pterygium, 3 were classified as stage 1, 12 classified as stage 2 and 15 classified as stage 3. In the both groups, no displacement of the limbo-conjunctival graft was found during the follow-up. Patients in group 2 (biological fibrin glue) showed fewer irritative symptoms compared to group 1 (sutures). The duration of the intervention was significantly reduced in group 2 (24,4 min) compared to group 1 (40,5 min). Furthermore, there were no significant differences in complication rate between the two groups.

**Conclusion:** Despite a slight additional cost, the autologous limbo-conjunctival autograft fixed using biological fibrin glue could become the reference technique for the surgical management of pterygium due to its quickness and efficiency.

**Keywords:** Pterygium, Fibrin glue, Suture, Conjunctival graft

## 1. Introduction

Pterygium is a benign conjunctivo-elastic neof ormation with a triangular shape with corneal apex located in the area of the palpebral cleft, preferentially in the nasal sector. It is a very frequent pathology in our country, Morocco, because of the important sunshine [1]. The surgical treatment of choice is currently based on conjunctival autograft after complete excision [1]. The use of Fibrin Glue has been introduced recently to replace the traditional suture technique of conjunctivo-limbal autograft with 8/0 absorbable suture [2,3]. Several studies have investigated the efficacy of

fibrin glue compared to traditional sutures and their conclusions are still a matter of debate. Our study goal is to evaluate the contribution of the biological fibrin glue in the fixation of the conjunctivo-limbal graft in terms of saving operative time, efficiency of anatomical fixation in comparison with the traditional sutures by 8/0 resorbable thread.

## 2. Patients and methods

### • Study population:

We conducted a comparative study of 30 patients admitted for surgical pterygium treatment between

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January and December 2022 at the ophthalmology department of the Sheikh Khalifa International University Hospital in Casablanca. The patients were divided into 2 groups of 15 patients, each group with 15 eyes operated by an experienced surgeon.

➤ Inclusion criteria:

Adult patient up to 18 years old, pterygium reaching cornea and causing corneal astigmatism or ocular surface achievement according to Cornand classification.

Pterygium is classified as stage 1, which corresponds to the early stage of the disease, when the corneal invasion doesn't exceed 2 mm. Stage 2 corresponds to a progressive form of the disease where the corneal invasion is between 2 and 4 mm and reaches the para-central zone. The thickness of the pterygium body is more important and the vessels are numerous and dilated. Stage 3 corresponds to very advanced form where the corneal invasion is bigger than 4 mm and reaches the pupillary area.

➤ Exclusion criteria:

Patients under 18 year's old, small pterygium without any corneal achievement. A history of recurrent pterygium or associated symblepharon.

• Methods:

Surgery procedure: anesthetic drops (Oxybuprocaine 0.4% and Tetracaine 0.1%) were instilled several times before surgery. After placement of the blepharostat, a subconjunctival injection of 0.5 ml of 2% Xylocaine was performed under the body of the pterygium, followed by removal of the pterygium head by lamellar keratectomy and scraping of all remnants of the pterygium from the cornea with a blade or a scarifier until a clear corneal bed was obtained. We dissected the body of the pterygium and excised it approximately 4 mm from the limbus. A large tenonectomy was then performed, and the pterygium bed was scarified until the sclera was bare. Soft cauterization was performed in case of active bleeding. A conjunctivo-limbal graft was harvested from the upper limbus and sized to the area of pterygium excision, and then fixed in the area of excision, respecting the anatomical orientation of the limbus and the graft's epithelium.

For group 1, the graft fixation to the conjunctiva surrounding the excision zone was conventional, performed with 8/0 absorbable sutures, starting by 4 cardinal points. For group 2, we used fibrin glue for graft fixation. The limbo-conjunctival graft was first

placed near the defect area. A first drop of fibrinogen solution was applied to the sclera, then a second drop of the thrombin-based solution was applied to activate the glue and we immediately place the graft over the defect area and holding it for 30 s (Fig. 1). In both groups of patients, occlusion of the operated eye was recommended for 48 h. Post-operative care consisted of local antibiotic (Tobramycin 0.3%, 3 drops per day during 15 days), steroidal anti-inflammatory (Dexamethasone 0.1%) instilled four times a day for one week, then a gradual dose decrease for an additional 4 weeks, combined with ocular lubricating eye drops and healing agents. Patients were reviewed at D1, D7, and D30 and at 6 months.

• Data analysis:

The following data were acquired: demographic data (age, sex and ethnic origin), pterygium location and morphology, corneal and limbal invasion according to the anatomical classification of Cornand [4].

The primary evaluation criteria were recurrence of the pterygium and need for another surgery to fix displacement or loss of the fixed graft. The secondary evaluation criteria were postoperative side effects (inflammatory granuloma). This study also evaluated the surgical procedure duration and the patient's postoperative comfort.

### 3. Results

Our patient's average age was 54 and 55.5 years in group 1 and group 2 respectively. There was no gender predominance in the two groups. The included patients were classified according to the Cornand classification [4] as following: 3 pterygium in stage 1, 12 pterygium in stage 2, and 15 pterygium in stage 3 (Fig. 2). In group 1, we enrolled 1 pterygium stage 1, 6 pterygium stage 2 and 8 pterygium stage 3. In group 2 we included 2 pterygium stage 1, 6 pterygium stage 2 and 7 pterygium stage 3.

In both groups, the limbo-conjunctival graft was well fixed without loosening during the first month with ad integrum restoration of the corneo-limbo-conjunctival excision zone (Fig. 3).

The fibrin glue group was associated with a significant decrease in operating time compared to the limbo-conjunctival sutures group, in fact, the average operating time for group 1 (sutures group) was 40.5 min, while it was 24.4 min in group 2 (fibrin glue).

In addition, we found two cases of inflammatory granuloma in the sutures group (13.4% of cases). Subconjunctival hemorrhage on day 1 was noted in 7 cases in group 1, whereas it was totally absent in

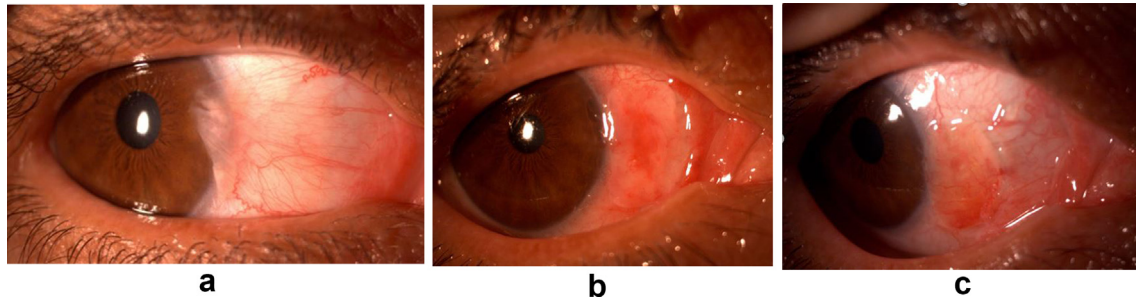


Fig. 1. a. Nasal pterygium, stage 1 according to the Cornand classification. b: Day 1 post-op. c. Day 7 post-op, graft in place, slightly retracted.

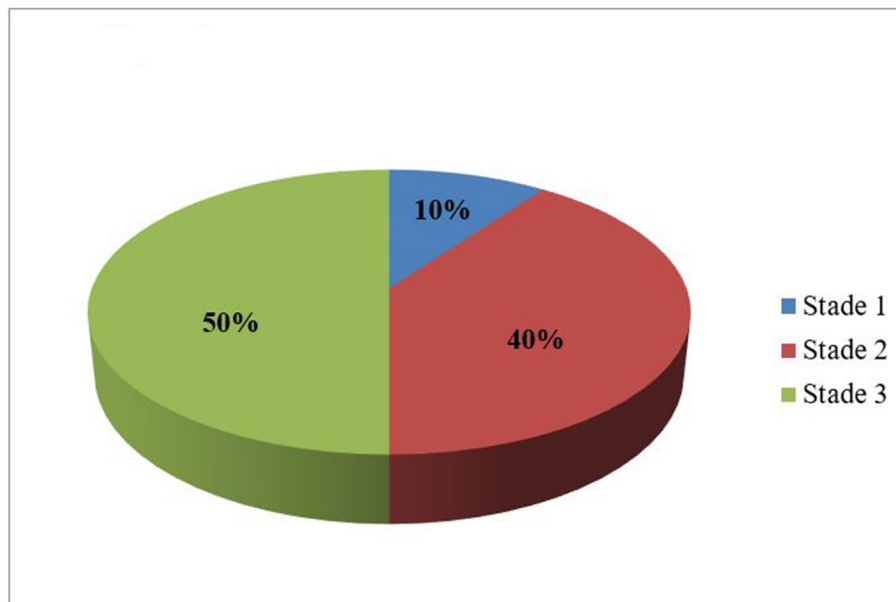


Fig. 2. Repartition des pterygions selon la classification de Corland.

group 2. Irritative signs (foreign body sensation, lacrimation and photophobia) were noted in all patients in group 1 (100% of cases), whereas they were present in 9 patients in group 2 (60% of cases) testifying to a better comfort and less conjunctival hyperemia after the surgery with biological glue. We did not note any case of recurrence of the pterygium at 6 months in the 2 groups.

#### 4. Discussion

Pterygium is a benign fibrovascular proliferation of the tenon capsule and bulbar conjunctiva on the cornea, involving preferentially the nasal side. Its prevalence is very important and varies between 0.7% and 31% depending on the series and geographical regions [5,6]. Surgical excision of the

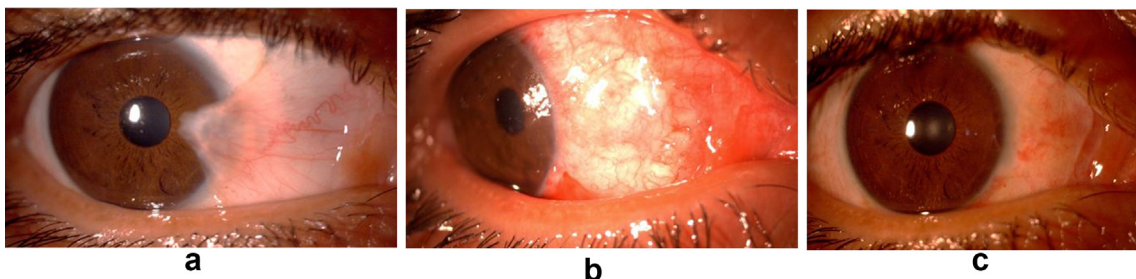


Fig. 3. a: Nasal pterygium stage 1. b: Appearance at day 1, graft well fixed, no subconjunctival hemorrhage. c: At day 7, no inflammatory granuloma, well fixed and integrated graft.

pterygium associated with autologous conjunctival grafting (conjunctival autograft) is the best surgical technique combining good reproducibility of results and low recurrence rate [7–9]. The operating indication must include only pterygium that reaching cornea and causing corneal astigmatism, visual loss or ocular surface achievement. It's important to not operating the first stages of pterygium in order to reduce recurrence risk.

The use of absorbable sutures implies a prolonged operative time for the surgeon and intraoperative pain for the patient despite local anesthesia as well as postoperative discomfort that can last several weeks, the time it takes for the sutures to be resorbed [6]. Moreover, absorbable sutures can be complicated in some cases by infections, inflammatory granuloma or unsightly buttonholes [10,11].

In our series, the average operating time for group 1 was 40.5 min, while it was 24.4 min for group 2, which is a reduction in operating time of 16.1 min on average with the use of biological glue.

In order to facilitate the surgical procedure, to improve patient comfort, and to decrease the occurrence of complications and recurrences, fibrin-based biological glue is used as an alternative to conventional sutures for conjunctival graft fixation [12,13]. The use of biological glue has shown several advantages, despite a relatively higher cost. This technique has its own complications such as loss or displacement of the graft which is more unstable especially during the first hours after surgery, wound dehiscence and tenon capsule cysts [14–16]. In addition, the frequency of graft retraction and granuloma development was higher in the biological glue group compared to the conventional suture group [14,17,18]. Cagatay et al. reported a rate of Tenon cysts of 9.4% in the biologic glue group that were not resolved by topical corticosteroid treatment after 14 days and therefore required excision at a second surgical procedure [14]. Hall et al. [18] reported the comparative results of a 25 patients operated using the biological glue and 25 patients operated using the absorbable suture. The authors reported a clear improvement in operative time and a decrease in postoperative pain in the first 48 h after surgery, as in our series. Thus, the average operating time was 12 min in the biological glue group, compared with 26 min in the group operated with sutures. Vichare et al. found that the mean operating time was reduced in the biological glue group (on average 34 min) compared with the suture group (on average 51 min) [19].

Küçükerdönmez et al. also compared conjunctival autograft with fibrin glue to sutures [20]. They found 2 cases (8%) of severe dehiscence in the biological

glue group requiring suture revision, 3 cases (12%) of granuloma and 8 cases (32%) of retraction of the graft. No cases of graft dehiscence were observed in the suture group. In the same series, recurrence of pterygium was observed in 1 case in the fibrin glue group (4%) and in 3 eyes in the suture group (12%) after a follow-up of several months. They concluded that autografted conjunctiva with fibrin glue in pterygium surgery resulted in less postoperative pain in the first 48 h but had a higher rate of displacement and revision compared with sutures. Sati et al. reported a recurrence rate of 6.67% for the biological glue group and 10% for the suture group, 12 months after pterygium surgery [21]. The meta-analysis by Maita et al. concluded that the recurrence rate was lower when using biological glue than when using sutures, in addition to a 40% reduction in operating time [22]. Graft integration also remained good in both techniques with a comparable anatomical result and recurrence rate. Only the high cost of the fibrin biological glue may be seen as a drawback [23].

## 5. Conclusion

In light of our study, the autologous limboconjunctival transposition graft fixed by fibrin-based biological glue could become the reference technique for the surgical management of pterygium in our facility because of its rapidity, its effectiveness and its simpler postoperative follow-up despite a higher cost.

However, other studies with a larger sample and a longer follow-up period are necessary to complete our work.

## Conflict of interest

The authors declare that there is no conflict of interest.

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