



## Fibrin Glue :Freedom from Sutures in Transplant Surgery of Pterygium

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### ABSTRACT

**Aim :** evaluation of a new technique for pterygium surgery with respect to postoperative pain ,surgery time , transplant loss & recurrence rate . **Methods:** A prospective randomized study was carried out in 100 cases of primary pterygium . Conjunctival autograft or amniotic membrane was used to cover the sclera after pterygium excision .In 50 cases the transplant was attached to sclera with Baxter glue and in 50 cases by sutures ( 8-0 vicryl ) . Postoperative pain was graded according to the visual analogue scale ( V A S ) twice daily during the first week after surgery. **Surgery time, loss of transplant & recurrence rates were noted in the follow up period of 12 months. Results:** The average pain, surgery time & recurrence rates were more in suture l cases where as transplant losses were only noted in glue cases.

**KEYWORDS :** no suture, glue, pterygium surgery

### INTRODUCTION

Pterygium is a wing shaped conjunctival encroachment onto the cornea generally situated on the nasal side. It sometimes occurs both nasally and temporally, and rarely only on the temporal side. Pterygium is more frequent in areas with more ultraviolet radiation,<sup>1</sup> in hot, dry, windy, dusty, and smoky environments.<sup>2,3</sup> There is also a hereditary factor.<sup>4</sup> During the past decade numerous authors have been interested in corneal stem cells. These are situated in the deeper layers at the limbus according to Tseng and coworkers. When deeper parts of the limbal epithelium is damaged or removed, an abnormal corneal surface is produced. The characteristic changes are conjunctival epithelial ingrowth, vascularisation, and inflammation. These signs are also seen in pterygia; thus the authors speculate that pterygium manifests limbal deficiency. Anti-inflammatory drugs and lubricants have an important role minimising the patients' discomfort but do not cure the disease. Ablation with erbium:YAG laser<sup>5</sup> and smoothing the corneal surface with excimer laser<sup>6</sup> have been tried but the results were not encouraging.

Surgical removal is the treatment of choice. Many techniques have been suggested, as have adjunct therapies such as  $\beta$  radiation, thiotepa, 5-FU, and mitomycin C. High recurrence rates are weighted against eye threatening postoperative complications. Conjunctival autografting or amniotic membrane grafting seems to be the best method, giving both low recurrence rate and high safety.<sup>7-9</sup> The recurrence in most cases is seen within 6 months, but can sometimes occur later.<sup>10</sup> Our objective was to lessen patient discomfort by using glue rather than sutures when securing the graft.

Baxter is a two-component tissue adhesive which mimics the natural fibrin formation. It has been used in neurosurgery, plastic surgery, ENT, and ocular surgery. This glue has two components. One consists of fibrinogen mixed with factor XIII and aprotinin. The other component is a thrombin-CaCl<sub>2</sub> solution. All components are prepared from banked and well controlled human blood. Equal amounts of the components are mixed together. Through the action of thrombin, the fibrinopeptides are split to fibrin monomers. These monomers aggregate by cross linking, resulting in a fibrin clot. Thrombin concentration can be varied to regulate the speed of coagulation. Low thrombin concentrations (4 NIH-U/ml) with slow clotting are used, for example, in skin grafting while high thrombin concentrations (500 NIH-U/ml) are beneficial where almost instantaneous clotting is desired. The double syringe applicator (Duploject) is usually advocated for mixing, in order to obtain precise amounts of the components. However, the sealant can be applied sequentially or premixed through needles, spraying heads, or catheters. The glue does not stick to intact corneal or conjunctival epithelium.<sup>11</sup>

In ocular surgery sealing perforations in the lens capsule, treating conjunctival wounds and fistulas, adapting free skin transplant in lid surgery, repairing injured canaliculi and sealing the wound in cataract surgery are described.<sup>12-14</sup> We could find only one report of its appli-

cation in pterygium surgery<sup>15</sup>: six conjunctival transplants were both glued and sutured to ensure graft adhesion.

There is very little reported on postoperative pain and operation time in pterygium surgery. Wishaw and coworkers compared different analgesic methods.<sup>16</sup> We found no references regarding postoperative pain and surgery time when comparing different methods in pterygium surgery. In this study we present a new method, where amniotic membrane or conjunctival autograft was glued on the sclera and we compare the results with those obtained with sutured grafts. Outcome measures were postoperative pain, surgical time, and transplant loss & recurrence rate.

### SUBJECTS AND METHODS

A randomised prospective was done to compare the pain , the surgery time ,transplant loss & recurrence rates for sutured and for glued amniotic membrane or conjunctival autograft transplants in pterygium surgery. Patients referred to our hospital for pterygium surgery were enrolled in the study if they had a nasal primary pterygium and an informed consent was obtained. 100patients included in this study were divided in four groups of 25 cases each. Groups A & B consisted of cases with conjunctival autograft or amniotic membrane secured by suture ( 8-0 vicryl ) respectively .Groups C & D consisted of cases with conjunctival autograft or amniotic membrane secured by glue respectively .

The male/female distribution (Table I) was 60%/40% in group A , 52%/48% in group B, 60%/40% in group C & 48%/52% in group D. The mean age (Table 2) was 53 (range 20–78) years group A, 49 (range 22–76) years in group B, 51 (range 20–69) years in group C & 50 (range 23–70) years in group D. The pain was evaluated using the visual analogue scale (VAS). VAS is a simple scale, consists of a 10 cm line anchored at one end by a label "no pain" and at the other end by "worst possible pain." The patient marks on the line how severe the pain is at the moment. The surgery was performed using an operation microscope. 5 ml of 2 %Lignocaine was given by peribulbar injection in all cases. Pterygium was excised in all cases by standard technique. A free conjunctival graft of the same size as the nasal conjunctival defect was prepared at the superotemporal limbus of the same eye and attached to sclera by suture and glue in groups A & C respectively. Amniotic membrane, preserved in glycerol was attached to scleral bed by suture & glue in groups B & D respectively. When glue was used, the graft was placed on the cornea. It was slid carefully towards the wound. One drop of the thrombin component was placed on the scleral bed and one drop of the protein solution was put onto the graft. Thereafter, the graft was quickly flipped over to the sclera and smoothed out while the fibrinogen was activated by the thrombin, forming the fibrin glue. After the graft was positioned, there was about 30 seconds to smooth out the graft and press it gently to the scleral bed, attaching the graft firmly but not stiffly. Excess glue was removed and the graft was trimmed if necessary. Surgery time was monitored and noted from the first incision to the removal

of the lid speculum. Antibiotic-steroid and NSAID eye drops were prescribed six times daily, tapered out during 6 weeks. The patients were asked to fill out a questionnaire with copies of the VAS on the evening of the operation day and then twice daily during 1 week until the first postoperative check up. At day 7, all sutures were removed in the suture groups A & B.

**RESULTS**

We found significantly lower pain levels in the glue groups C & D both on day 0, and at each point of time during the first postoperative week. Median surgery time (Table 3) was 23 minutes (range 16–25) in group A, 20 minutes (range 17–25) in group B, 18 minutes (range 16–22) in group C & 17 minutes (range 12–30) in group D. The surgery times sorted in date order did not indicate any learning curve. There were no transplant losses in groups A & B whereas groups C & D showed transplant losses of 16 % each (Table 4). They were again taken up for amniotic membrane transplant with 100% success. No side effects of the glue were noted. Recurrence rates (Table 5) were 8 %, 8 %, 4 % & 4 % in the groups A, B, C & D respectively with 12 months' follow up. The transplants healed with excellent cosmetic result. The donor sites healed in every case without any problems.

**CONCLUSION**

There have been many attempts to optimise pterygium surgery. Today, a wide variety of techniques are in use. The aim is to excise the pterygium and prevent its recurrence. Authors describing their surgical technique usually report only the method and the recurrence rate after different lengths of follow up, and sometimes the complications, especially if they are serious. The glue method described here was developed to address patient discomfort, especially postoperative pain and surgical time. In addition, postoperative morbidity is decreased which is of concern in this era. Evaluating pain is not easy. Patients report different sensitivity for the same stimulus. In addition, they have different capacity to withstand the pain. Furthermore, they have different ability to report their experience. In this study, the patients did not know whether the sutures or the glue would cause more pain. They received exactly the same preoperative information. In this paper we have shown that the use of a fibrin tissue adhesive when securing the graft in pterygium surgery causes significantly less pain than using sutures. In addition removal of the stitches was a great problem for many patients. This caused considerable extra effort in time, and additional pain to them. Surgery time was also significantly shorter. The cost of one double syringe of Baxter glue<sup>®</sup> about equal to the cost of ten sutures. Typically, we operate on six to seven patients on one day with the same glue syringe, although those would be enough for eight to nine patients. Thus, the material cost of the glue method became somewhat more than that of the sutures. The immediate adhesion of the whole graft may inhibit the fibroblasts of the nasal Tenon's tissue from proliferating towards the cornea, keeping recurrence rate low.

**Table-1**  
**Sex incidence pterygium cases**

Group	% of males	% of females
A	60	40
B	52	48
C	60	40
D	48	52

**Table-2**  
**Age incidence pterygium cases**

Group	Age range (yrs)	Mean age
A	20-78	53
B	22-76	49
C	20-69	51
D	23-70	50

**Table-3**  
**Surgical time**

group	time range ( mins )	Mean time ( mins )
A	16-27	23
B	17-25	20
C	16-24	19
D	12-19	16

**Table-4**  
**Transplant loss**

group	No of transplant loss	% of transplant loss
A	nil	nil
B	nil	nil
C	04	16
D	04	16

**Table-5**  
**Recurrence rate**

group	No of recurrence	% of recurrence
A	2	8
B	2	8
C	1	4
D	1	4

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