Cut and paste: a no suture, small incision approach to pterygium surgery

G Koranyi, S Seregard, E D Kopp

Aim: Evaluation of the benefits of a new technique for pterygium surgery with respect to postoperative pain and surgery time.

Methods: A prospective randomised clinical trial was carried out in 43 patients. 43 eyes were operated for primary nasal pterygium. Autologous conjunctival graft taken at the superotemporal limbus was used to cover the sclera after pterygium excision. After randomisation, in 20 patients the transplant was attached to the sclera with a fibrin tissue adhesive (Tisseel Duo Quick) and in 23 patients with absorbable sutures (7–0 Vicryl Rapid). The Mann-Whitney test was used as statistical analysis. Postoperative pain was graded according to the visual analogue scale (VAS) twice daily during the first week after surgery. Surgery time was noted from the first incision until the lid speculum was removed.

Results: The average pain was significantly lower when glue had been used, p<0.05. Average surgery time was 9.7 minutes (range 6–13) for glue and 18.5 minutes (range 12–30) for sutures, p<0.001. No complications occurred.

Conclusion: Using glue instead of sutures when attaching the conjunctival transplant in pterygium surgery causes significantly less postoperative pain and shortens surgery time significantly.
and if informed consent was obtained. Power calculations with a type I error of 0.05 and type II error of 0.8 were executed. Assuming that the success proportion of the groups were 25% and 75% respectively, we needed to have 13 patients in each group. Forty three eyes of 43 patients were randomised by a computer random function into two groups. In 20 patients we used glue and in 23 patients sutures to secure the transplants. The sutures used in this study were 7–0 Vicryl Rapid (Ethicon, Johnson & Johnson, Brussels, Belgium). The reasons for this are discussed later.

The male/female distribution was 65%/35% in the glue group and 55%/45% in the suture group. The mean age was 44 (SD 14, range 23–78) years in the glue group and 48 (16, range 26–78) years in the suture group.

One surgeon (GK) performed all preoperative investigations, surgical procedures, and postoperative evaluations.

Before the surgery amethocaine (tetracaine) eye drops (AME 1.0%, Chauvin Pharm Ltd, Essex) were given three times. The pain after the first drop of amethocaine was evaluated using the visual analogue scale (VAS), and the patient was instructed how to use the VAS during the postoperative week. 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. On the back, the scale is transformed to numerical values from 0 to 100 for statistical analysis. The initial VAS value was used later as a reference pain level for each patient and subtracted from all postoperative VAS values obtained from this patient. The surgery was performed using an operation microscope. Lidocaine 0.2–0.5 ml with adrenaline (epinephrine) (Xylocaine 20 mg/ml + adrenaline 12.5 µg/ml, Astra, Södertälje, Sweden) was given subconjunctivally beneath the pterygium body along with further topical administration of the same solution when necessary.

The adhesion between the pterygium and the sclera was sharply incised at the limbus and the pterygium head was separated from the cornea by blunt dissection with use of an iris spatula (fig 1). Only the thickened and keratinised portions of the conjunctiva and the underlying Tenon’s capsule were excised. The wound bed was scraped to clean cornea and sclera and only bleeding vessels were cauterised. No extensive excision of the surrounding subconjunctival Tenon’s capsule was done (fig 2).

A free conjunctival graft of the same size as the nasal conjunctival defect was prepared at the superotemporal limbus of the same eye (fig 2). Care was taken to include as little as possible of Tenon’s tissue on the graft. The limbal edge of the graft was cut to contain a thin rim of corneal epithelium. The graft was thereafter moved to the nasal area and attached to the sclera either with sutures or with glue. Proper orientation was maintained, with the epithelium side up and the limbal edge towards the limbus.

When operating patients in the suture group, the graft was placed with the epithelium side up onto a paper template from the suture cover before being cut off at the limbus according to the technique of Shaw. This method allows easy handling and proper orientation of the graft. The corners of the graft were anchored to the sclera at the limbus. The rest of the circumference was attached to the nasal conjunctiva running sutures. The knots were not buried.
When glue was used, the graft was placed with the epithelium side down on the cornea (fig 2). It was slid carefully to the nasal side with the limbal edge facing 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 (fig 3). 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 (fig 4). 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.

No patching or bandage contact lenses were used. Rimexolone (Vexol, Alcon Lab Inc, Forth Worth, TX, USA) eye drops six times daily, tapered out during 6 weeks, and chloramphenicol ointment (Chloromycetin, Parke-Davis, Stockholm, Sweden) twice daily for 1 week were prescribed. Rimexolone was chosen for its low inclination to cause 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.

The patients were asked to fill out a questionnaire with the 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 group. VAS figures were adjusted individually according to the reference level obtained for each patient preoperatively to avoid possible differences in pain thresholds. Pain values and surgery times were evaluated using the Mann-Whitney U test as statistical analysis.

**RESULTS**

One patient in the suture group was withdrawn because of inability to fill out the VAS questionnaire.

The medians of the VAS values at each measurement occasion are shown (fig 5). After adjusting for individual pain sensitivity we found significantly lower pain levels in the glue group both on day 0, and at each point of time during the first postoperative week, \( p < 0.05 \) (fig 6).

**DISCUSSION**

There have been many attempts to optimise pterygium surgery. Today, a wide variety of techniques are in use, from the bare sclera procedure without using a microscope to very complex approaches like amniotic membrane transplantation and lamellar keratoplasty. 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. Autologous conjunctival transplantation avoids the risk of scleral necrosis associated with the alternative conjunctival therapies at the cost of increased surgical time and early postoperative discomfort.

The cut and paste method described here was developed to address patient discomfort, especially postoperative pain and surgical time. In addition, postoperative patching, healing time and restrictions in normal life after surgery were of concern. 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 from the same person. We believe that adjusting the VAS values by subtracting the value after a uniform stimulus gives us a fair possibility to compare pain measurements. In this paper we have shown that the use of a fibrin tissue adhesive when securing the autologous conjunctival graft in pterygium surgery causes significantly less...
pain than using sutures. For suturing, several materials and techniques are in use—Vicryl, nylon, catgut in different dimensions, interrupted or/and running, buried or not buried knots. During previous years, when suturing the conjunctival transplant, we have tried interrupted and running 7–0 Vicryl and Vicryl Rapid, 8–0 Vicryl, 10–0 nylon, also with buried knots. We did not experience any major difference in pain sensation. On the other hand patients reported remarkably little pain, when we started with glue. Removal of the stitches, especially the buried knots was a great problem for many patients. This caused considerable extra effort in time, and additional pain to them. Of the absorbable sutures 7–0 Vicryl Rapid dissolves fastest and, in addition, it softens markedly during the first day, causing less pain than other sutures. For these reasons this suture became our preferred choice, and it seemed natural to use it for the study.

Surgery time was also significantly shorter. This method entails excision of a smaller amount of tissue and thus smaller grafts, which leads to faster healing and less inflammation and pain. Excising only a small amount of conjunctiva is essential in this method as is the blunt dissection of the pterygium head. The flipover manoeuvre leaves a thin membrane of glue on the corneal epithelial defect. This covering of the nerve endings in the cornea could contribute to the reduction of the postoperative pain.

The cost of one double syringe of Tisseel Duo Quick (0.5 ml) is about equal to the cost of five sutures. Typically, we operate on six to seven patients on one day with the same Tisseel syringes, although those would be enough for eight to nine patients. Thus, the material cost of the cut and paste method became somewhat lower than that of the sutures. In addition, the time cost is about the half of that with sutures. Thus, the presence of the sutures causes significantly more postoperative pain. This may be due to the sutures themselves and/or the inflammatory process around the sutures during degradation.21

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.

Prospective series in the literature report 2%–39% recurrence rate.22 The total recurrence rate in this study is 14%. All six recurrences in our study were small; no reoperations were required. The two recurrences in the glue group started at the inferior graft corners; the cause could be inadequate excision of the pterygium tissue or perhaps too much Tenon’s tissue left on the graft. Using fibrin glue for graft fixation in pterygium surgery is a safe, fast method and does not have any side effects. The recurrence rate seems not to be higher than with that sutures. The total discomfort is considerably less. Further evaluation of the recurrence rate is needed with larger series. Based on these results we recommend early intervention, thus shortening the suffering time for these patients and also keeping postoperative astigmatism and postoperative corneal haze to a minimum.

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