

Original Article

Outcomes of autoconjunctival grafting for primary pterygia when performed by consultant compared with trainee ophthalmologists

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ABSTRACT

Purpose: To define rates of recurrence and surgical complications of primary pterygia excision with autoconjunctival grafting when the surgery is performed by consultant ophthalmologists compared with trainee ophthalmologists.

Methods: A total of 174 patients with primary pterygia treated by excision and autoconjunctival grafting were included for analysis. Patients were divided into two groups according to whether their surgery was performed by a consultant ophthalmologist (group A) or a trainee ophthalmologist (group B). Data were collected with respect to demographics, surgical complications and recurrence. Recurrence rates were analysed utilizing Fisher's exact test. Additionally, Kaplan–Meier survival curves for interval censored data were constructed. Surgical complications were analysed utilizing Fisher's exact test.

Results: The recurrence rate in group A was 6.8% and in group B was 19.4%. This difference was statistically significant ($P = 0.05$). The rate of surgical complication occurring in group A was 6.6% and in group B was 23.3% and this was also statistically significant ($P = 0.005$). No relationship was found between either patient age or the size of pterygium and recurrence or complications in either group A or group B.

Conclusion: Autoconjunctival grafting is regarded as the gold standard for preventing pterygium recurrence following excision. This study suggests that the experience of the surgeon can influence success rates and complications.

There is a significant learning curve indicating the need to supervise trainee surgeons.

Key words: autoconjunctival graft, pterygium, surgical training.

INTRODUCTION

The optimal method for treating pterygia has been the subject of debate for at least two thousand years.^{1,2} Surgical excision of pterygium leaving bare sclera is associated with unacceptably high recurrence rates. Adjunctive therapies such as beta-irradiation or mitomycin-C reduce recurrence, but are associated with potentially serious complications including scleral melt, endophthalmitis and limbal stem cell deficiency.^{2,3} The 'gold standard' surgical procedure to minimize recurrence following excision is a free autoconjunctival graft harvested from the superior bulbar conjunctiva.⁴ Reported rates of recurrence after excision of pterygia with autoconjunctival grafting range from 5.5% to 39.0%.^{5–8}

The purpose of the present study was to determine whether the outcome of surgery was significantly different between patients whose surgery was performed by consultant ophthalmologists compared with trainee ophthalmologists. This dichotomous grouping of consultant versus trainee assumes a particular importance in a training programme as pterygium surgery is often trivialized and more readily delegated to less experienced surgeons with less supervision compared with intraocular surgery.²

METHODS

All patients who underwent excision of pterygia between January 1997 and June 2004 at the Royal Brisbane Hospital,

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Presented in part as a poster at the Royal Australian and New Zealand Annual Congress 2003, Auckland, New Zealand.

Received 3 February 2006, accepted 19 June 2006.

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Brisbane, Australia were identified from medical records. Hospital notes were obtained and demographic and clinical details were recorded. Only those patients with primary pterygia who underwent excision and autoconjunctival grafting with tissue harvested from the superior bulbar conjunctiva were included for analysis. Postoperative regime in all patients included topical chloramphenicol 0.5% and prednisolone acetate 1% administered 4–6 times daily for 4 weeks then tapered over 2–4 weeks. An attempt was made to contact patients with less than 6-month follow up to present for review.

If both eyes of a patient were operated on then only the results from the first operation were included for analysis. A total of 259 patient notes were reviewed. Excluding recurrent pterygia and patients treated with adjuvant mitomycin or an alternative surgical technique (sliding conjunctival flap, primary suture or bare sclera), 174 patients were included in the final analysis.

Patients were divided into two groups based on whether their surgery had been performed by a consultant ophthalmologist (group A) or trainee ophthalmologist (group B). There were seven consultants involved and all had a minimum of 5 years surgical experience. There were 15 trainees involved (with a range from the first year to the third year of training). Most operations performed by trainees were not supervised by a consultant ophthalmologist. The cases were analysed for selection into either group with respect to dimensions of pterygium, gender, age and length of follow up using Fisher's exact test.

Complications of surgery (other than recurrence) were recorded individually for a qualitative assessment and grouped for analysis utilizing Fisher's exact test.

Recurrence (defined as regrowth of pterygium onto the surgical limbus) was recorded from records of follow-up appointments and analysed utilizing Kaplan–Meier survival curves for interval censored data as well as Fisher's exact test.

RESULTS

A total of 174 cases were analysed. Group A consisted of 45 patients (male : female 27:18) operated on by consultant ophthalmologists and group B consisted of 129 patients (male : female 71:58) operated on by trainee ophthalmologists. The age of patients in group A ranged from 27 to 75 years (mean = 50 years). The age of patients in group B ranged from 27 to 73 years (mean = 49 years). The size of the pterygia (measured from limbus to apex of lesion) in group A ranged from 2.2 to 4.9 mm (mean = 3.3 mm) and in group B ranged from 1.4 to 5.7 mm (mean = 3.6 mm). There were no significant differences between groups A and B with respect to age, gender or size of lesions.

The length of follow up in group A ranged from 1 week to 4 years (mean = 34 weeks). In group B the length of follow up ranged from 1 week to 3 years (mean = 22.2 weeks). Unfortunately, a follow-up time of 6 months or less occurred in the majority of patients – in Group A with 30 patients (66.7%) and in Group B with 81 patients (62.8%) (Table 1).

Table 1. Length of follow up comparing consultants with trainees

Follow up (weeks)	Consultants	Registrars
0–8	14 (31.1%)	33 (25.6%)
9–16	9 (20.0%)	28 (21.7%)
17–24	7 (15.6%)	20 (15.5%)
25–32	4 (8.9%)	14 (10.9%)
>32	11 (24.4%)	34 (26.4%)

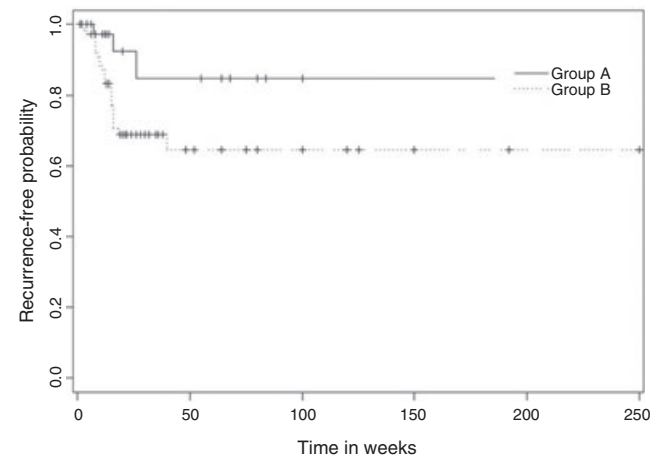


Figure 1. Kaplan–Meier survival curves indicating proportion of patients recurrence-free over time.

There was no significant difference in the length of follow up between the two groups. Attempts to contact patients and/or their referring practitioners were limited by the lack of current address details and long distances for patients to return for review.

With respect to recurrence rates, three out of 45 patients (6.7%) in group A experienced pterygium recurrence compared with 25 out of 129 patients (19.4%) in group B at last follow up. Analysed utilizing Fisher's exact test this difference was found to be statistically significant with two tailed *P*-value of 0.05. The results for groups A and B were plotted on Kaplan–Meier survival curves for interval censored data (Fig. 1).

In group A, the three recurrences were noted to have occurred at 7 weeks, 16 weeks and 26 weeks, respectively. In group B, 23 of the 25 recurrences had occurred by 16 weeks with a further recurrence at 18 weeks and one at 40 weeks. The mean time for recurrence in group A was 16 weeks and in group B was 12.3 weeks. There were no recurrences reported after 40 weeks and the difference in time to recurrence in group A and B was not statistically significant. According to the survival plot, the probability of being recurrence free at 1 year was 85% in group A and 65% in group B. Patient age and size of lesion were not related to the risk of recurrence in either group.

Surgical complications were compared between groups A and B. In group A individual complications recorded were:

Table 2. Surgical complications comparing consultants with trainees

Complication	Consultants	Trainees
Corneal scar	3/45 (6.7%)	11/129 (8.5%)
Graft retraction	–	4/129 (3.1%)
Irregular astigmatism	–	2/129 (1.6%)
Stromal thinning	–	3/129 (2.3%)
Damage to medial rectus	–	2/129 (1.6%)
Avulsed graft	–	1/129 (0.8%)
Necrotic graft	–	1/129 (0.8%)
Conjunctival infection	–	1/129 (0.8%)
Stitch granuloma	–	1/129 (0.8%)
Epithelial cyst	–	1/129 (0.8%)

scar/cosmetic defect (3/45). In group B the complications recorded were: epithelial cyst (1/129), residual fibrovascular tissue (1/129), damage to medial rectus (2/129), stromal thinning (3/129), scar/cosmetic defect (11/129), prolonged irritation post operatively (persisting at 1 year) (1/129), dislocated graft (1/129), retracted graft leaving an area of bare sclera (4/129), thickened irregular graft (1/129), Tenon's prolapse (1/129), necrotic graft (1/129), postoperative infection (1/129), irregular astigmatism (2/129), and stitch granuloma (1/129) (Table 2).

Analysing the data with respect to the rate of postoperative surgical complications, group A had a rate of 6.7% and group B a rate of 24.0%. Utilizing Fisher's exact test, this difference was significant with a two-tailed *P*-value of 0.005.

DISCUSSION

Most studies on the treatment outcomes for pterygia have focused on either surgical technique, adjuvant therapies or on patient factors to elucidate variables that may influence rates of recurrence. Lewallen reported the influence of age (the younger the patient the more likely to experience a recurrence)⁷ and Tan *et al.* developed a slit-lamp based morphological grading system suggesting that fleshy pterygia had a greater chance of recurring after excision than thin pterygia.⁹ In contrast, very few studies have looked into surgeon experience as a determining factor in the outcome of pterygium treatment. Sebban *et al.* reviewed the success rates of pterygium surgery performed by trainee ophthalmologists and found a recurrence rate of 46%.¹⁰ These figures, however, represented the results from a range of techniques and were not compared with the results obtained by more experienced operators working during the same time period and on patients with similar demographics. More recently, Ti *et al.* analysed the variation in success rates among consultant ophthalmologists performing autoconjunctival grafting for primary and recurrent pterygia. They demonstrated that individual surgeon's success rates varied widely (5% to 82% recurrence) and that such variation correlated with previous experience.¹¹

The present study is, to the best of our knowledge, the first study to specifically compare the outcomes between

consultant ophthalmologists and trainee ophthalmologists performing autoconjunctival grafting for the treatment of primary pterygia. All operations were performed in the operating theatre of a tertiary referral institution and during the same time period on patients with similar demographics. All patients included in the study had similar postoperative regimes consisting of antibiotic and steroid drops administered for between 6 and 8 weeks. There was no selection bias with respect to age, gender or size of lesion. Similarly, follow up was not statistically different between the two groups.

The results of the present study revealed differences between the two groups with respect to both rates of recurrent lesions and surgical complications. In particular, consultant ophthalmologists achieved lower rates of recurrence and fewer postoperative complications than trainee surgeons. No difference was found between the time to recurrence between the two groups and nearly all recurrences occurred within the first 6 months postoperatively. The appearance of most recurrences relatively early in the postoperative period concurs with other studies.¹²

Several explanations for the marked influence of operator experience in autoconjunctival grafting were proposed by Ti *et al.* Specifically, the importance of taking an adequately sized graft with minimum Tenon's tissue requires considerable surgical skill and is associated with a substantial learning curve. Another important factor influencing recurrence is that there must be adequate clearance of the subconjunctival tissue (so called 'activated Tenon's') in addition to excision of the pterygium itself. The extent of this subconjunctival dissection is frequently inadequate if performed too tentatively by a less experienced surgeon. Occasionally the rectus muscle must be hooked and isolated to gain adequate Tenon's clearance while protecting the muscle from damage. Conversely, recurrence could also result from a technique that is too vigorous rather than too tentative as surgical trauma and postoperative inflammation resulting in activation and proliferation of fibroblasts may ultimately lead to a recurrence.¹³ Other factors such as the extent of diathermy and consequent necrotic tissue may well prove to be important but as yet have not been studied in detail.

One of the limitations of a retrospective chart review is that the quality of the notes is highly variable. A major limitation of this study is the short follow-up period. This leads to underreporting of recurrence and complication rates. Generally, however, because of the nature of the public hospital system in Queensland, patients would tend to return for review to the hospital at which they had their surgery, rather than present to another hospital or the private health system. The use of the Kaplan–Meier survival curve for interval censored data also accounts for the loss of data owing to limited follow-up time. Although the figures do not suggest any case selection bias, it is possible that operators with more recurrences and/or complications were operating on the more difficult cases such as fleshy or more extensive pterygia. Operating theatre notes record clearly who performed the surgery but do not always indicate (in the case of trainees) how much, if any, supervision was given during the case.

Also, there was no attempt in this study to stratify either the trainees or the consultants into categories based on past experience. Further studies are required to more specifically address quantitative aspects of the training effect.

Autoconjunctival grafting for the management of pterygium is a well-established treatment. The reported success rates depend on patient factors and lesion characteristics and as this study suggests, surgical experience is also a significant contributing factor. The implications for surgical traineeship are also very clear. Pterygium surgery must not be trivialized as recurrent lesions are often more challenging with higher rates of associated complications. Trainees must gain experience via adequate supervision by qualified consultants with the surgery requiring the same level of competency as any intraocular procedure.

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