



Original article

Outcome of conjunctival autograft transplantation in pterygium surgery in a community based hospital in Nepal

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Abstract

Introduction: The mainstay of treatment for pterygium is surgical excision with or without a graft. The most common problem with this intervention is recurrence, for which a multitude of factors have been described.

Objective: To evaluate the recurrence rate of pterygium in conjunctival autologous graft transplantation after its excision in people living in a hilly region of Nepal

Materials and methods: A prospective interventional study was conducted in patients undergoing pterygium excision with conjunctival autologous graft transplantation. The patients were followed up for 20 months. Any recurrence of pterygium was noted during this period.

Results: Thirty four patients with an age range of 29 to 65 years (mean 43.88 ± 9.19 years) were included. Female predominated (n=21, 61.8%) in the study. Service holders formed a majority of the cases (n=14, 41.2%) followed by farmers (n=10, 29.4%, OR 0.019, 95% CI = 0.002 to 0.209). Ocular discomfort was the main presenting complaint. Dry eye was seen in 30 patients (88.23%). Most of the patients (26, 76.5%) had a grade II pterygium. Graft displacement was the main complication in two (5.88%) patients and recurrence of pterygium was found in three (8.82%).

Conclusion: Conjunctival autologous transplantation is a safe and effective method for the treatment of pterygium with a minimal recurrence rate.

Key-words: Autologous graft, conjunctiva, pterygium, recurrence

Introduction

A pterygium is a fibrovascular, wing-shaped encroachment of conjunctiva onto the cornea. A multitude of factors are associated with the development of pterygium; the most common cause being UV type B radiation (Moran et al, 1984; Taylor et al, 1992). Recent studies have suggested that p53 genes, human papillomavirus, localized

limbal stem cell deficiency and uncontrolled cell proliferation may be associated with the development of pterygium (Di Girolamo et al, 2004; Gallagher et al, 2001; Reisman et al, 2004; Tan et al, 2000). The currently accepted pathogenesis is the Ultraviolet light-induced damage to the limbal stem cell which leads to the subsequent conjunctivalisation of the cornea (Dushku et al, 1994).

The mainstay of pterygium treatment is surgical excision of the head, neck and body of the

Received on: 12.01.2012 Accepted on: 03.05.2012

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pterygium. Indications for surgery include visual impairment, cosmetic disfigurement, ocular motility restriction, recurrent inflammation, interference with contact lens wear and, rarely, changes suggestive of neoplasia. The main histopathologic changes in primary pterygium is elastotic degeneration of the conjunctival collagen (Spencer, 1985). Meticulous surgical intervention is often combined with adjunctive measures to prevent recurrence of the disease (Leonard et al, 2007). Adjunctive measures include postoperative beta-irradiation, thiotepa drops, intraoperative and postoperative mitomycin-C, various techniques of conjunctival grafting and amniotic membrane transplantation (Singh et al, 1990; Kenyon et al, 1985; Sangwan et al, 2007).

Postoperative recurrence of pterygium is a universal problem, which is evident by the fact that operative techniques are constantly changing. In spite of great advances in the field of ophthalmic surgery, pterygium still presents a challenge to the ophthalmic surgeon. The success rate of pterygium surgery is marred by its high rate of recurrence. Though the pterygium has been incised, removed, split, excised, transplanted, coagulated and irradiated, there still is no single operation which permanently resolves it (Singh & Rana, 1982). The reported success rates of these techniques vary widely, from 5% for pterygium excision with conjunctival autografting to 89% for simple excision (Sebban et al, 1991). Pterygium excision with a conjunctival autologous graft has gained worldwide acceptance as the most favorable technique because it has proven to be both safe and effective in reducing pterygium recurrence. Although studies have reported encouraging results and fewer side effects using low-dose intraoperative application of mitomycin-C, the optimal concentration and duration of application are still being refined (Helal et al, 1996).

We report our technique and results of pterygium excision with conjunctival-limbal auto grafting in the management of advanced primary pterygium occurring in a hilly region of Nepal (Kavrepalanchowk and surrounding districts).

Materials and methods

This prospective interventional study was conducted in patients attending the Ophthalmology Department of Kathmandu University Hospital, Dhulikhel. All patients with primary pterygium were included in the study. Recurrent pterygium, pseudopterygium and patients not willing to participate in the study were excluded. The study was approved by the local Institutional Research Committee. Visual acuity was assessed by Snellen Vision Box with multiple optotype; E-chart was used for illiterate patients. After informed consent was obtained, patient characteristics were collected on a predesigned pro forma. After taking the relevant history, the anterior segment was evaluated in detail using slit-lamp biomicroscopy (Topcon) under appropriate magnification and illumination. On slit-lamp examination with the slit beam focused on the nasal limbus, the pterygium was graded depending on the extent of corneal involvement as follows.

- Grade I: between limbus and a point midway between limbus and pupillary margin
- Grade II: head of pterygium present between a point midway between limbus and pupillary margin (nasal pupillary margin in case of nasal pterygium and temporal margin in case of temporal pterygium)
- Grade III: crossing pupillary margin

Schirmer test-II was performed in all the patients to estimate the degree of dry eyes.

The cases with grade II and III were posted for pterygium surgery.

Surgical technique

After giving a peribulbar block, a wire speculum was used to separate the lids. A superior rectus bridle suture was inserted using 4-0 black silk. A small incision was made in the conjunctiva just medial to the head of the pterygium; the conjunctiva was progressively dissected from the body of the pterygium towards the caruncle. The process was completed towards the upper fornix, caruncle and lower fornix in the shape of a triangle with its apex

at the limbus avoiding any conjunctival button-holing.

The corneal epithelium was scraped off 2 mm ahead of the head of the pterygium with a hockey-stick knife. Once this plane was defined, the pterygium head was easily avulsed using a combination of blunt dissection and traction. Residual fibrous tissue on the cornea was removed by sharp dissection with a No.15 Bard-Parker blade. The body of the pterygium with the involved Tenon's capsule and cicatrix was then excised, taking care to ensure the safety of the underlying medial rectus muscle and the overlying conjunctiva. The abnormal tissue at the limbal end of the pterygium was aggressively resected, often extending 2-3 mm beyond the visible extent of the pterygium to avoid leaving behind any scaffold for a later recurrence and to have a good bed for placement of the graft.

The size of the conjunctival graft required to resurface the exposed sclera surface was determined using Castroviejo calipers in 3 directions. The size of the graft was calculated as 2 mm more than the size of the bare area of sclera in all directions. Careful hemostasis of the exposed scleral surface was done using wet-field cautery. The limbus was smoothed. About 2 ml of normal saline was injected into the conjunctiva to form chemosis and the graft was excised starting at the forniceal end. Care was taken to obtain as thin a graft as possible without button-holing. Once the limbus was reached, the graft was flipped over onto the cornea and the tenon's attachments at the limbus were meticulously dissected. The flap was then excised using a Vannas scissors, taking care to include the limbal tissue.

Without lifting the tissue off the cornea, it was rotated and moved onto its scleral bed with fine non-toothed forceps. A limbus-limbus orientation was maintained. The graft was smoothed out on its bed taking care to avoid any folding of the edges. The four corners of the graft were anchored with episcleral bites to maintain position. The additional 3 sutures were kept to hold the conjunctiva. Absorbable No 8/0 Vicryl suture was used for suturing. No sutures were placed on the limbal side

of the graft. The superior rectus bridle suture was removed and the donor area was covered by pulling the forniceal conjunctiva forward. At the conclusion of the procedure the eye was patched firmly after the application of antibiotic eye ointment.

Postoperatively, topical chloramphenicol and betamethasone eye drops were used every 2 hours for the first post-operative week and then tapered over the next 5-6 weeks. Antibiotic ointment was used 3 times daily for the first 2 weeks. Any retained sutures were removed at 4 weeks.

Follow-up of the patient was done on first postoperative day at first week, fourth week, third month and then every six months. The patients were also advised to report immediately if any discomfort other than that described during counseling occurred. A recurrence was defined as fibrovascular tissue growing in a parallel direction towards the limbus crossing the corneoscleral limbus onto the clear cornea in the area of previous pterygium excision.

All data collected were entered into Statistical Package for Social Sciences version 11.5 and analyzed.

Results

Thirty four patients were evaluated. Their ages ranged from 29 to 65 years with a mean age of 43.88 ± 9.19 . Female gender predominated in the study (21, 61.8%). Service (14, 41.2%) and agriculture (10, 29.4%) related occupations dominated (Table 1). Twenty six (76.5%) persons had grade II pterygium of and 8 (23.5%) had grade III (Table 2) pterygium.

Table 1
Occupation of the patients

Occupation	Frequency	Percentage
Agriculture	10	29.4
Mason	3	8.8
Domestic affairs	4	11.8
Service	14	41.2
Business	3	8.8
Total	34	100.0

Table 2
Risk estimation for the grade of pterygium with occupation

Occupation	Pterygium grade		Statistics (95% CI)
	Grade II	Grade III	
Farmers	3	7	0.019 (0.002 to 0.209)
Non-farmers	23	1	

Presenting complaint of the patients varied largely as follows: ocular discomfort (8, 23.5%), appearance of the fleshy growth in the white portion of the eye (7, 20.6%), ocular redness (5, 14.7%), foreign body sensation (4, 11.8%) and blurring of vision (1, 2.9%). However, few patients had multiple complaints (9, 26.5%) which included the cosmetic reasons. The duration since the development of pterygium varied largely from 2 years (16, 47.1%) to more than 5 years (4, 11.8%) (Table 3).

Table 3
Duration since the first appearance of pterygium

Duration in years	Frequency	Percentage
0-2years	16	47.1
3-5 years	14	41.2
>5 years	4	11.8
Total	34	100

Inflammation of the pterygium occurred twice in 14 (41.2%), thrice in 5 (14.7%) and once in 4 (11.8%). The pterygium was inflamed multiple times in 11 patients (32.4%). Dry eye was seen in 30 (88.23%) patients. Eighteen (52.9%) patients had a history of using topical drugs in the past for the treatment of this fleshy growth. Ten patients (29.4%) had presenting visual acuity of 6/6 on their affected eye and only nine patients (26.4%) had visual acuity below 6/18 (Table 4).

Table 4
The presenting visual acuity

Visual acuity	Frequency	Percentage
6/6	10	29.4
6/9	8	23.5
6/12	7	20.6
6/18	6	17.6
6/24	2	5.9
6/60	1	2.9
Total	34	100.0

Two patients had displaced grafts, one in the third and the other in the seventh post operative follow up visit. One patient had a sutural granuloma present at the two week postoperative period which improved with suture removal and topical steroid treatment. Only three subjects (8.82%) had a recurrence of pterygium: one in two months, and the other two in six months post-operatively. No major complications were noticed in any of these patients.

Discussion

In spite of numerous techniques and improvements in microsurgery, recurrence of pterygium is still a major concern for ophthalmic surgeons. While the definitive management of a pterygium is surgical, the ideal adjunctive procedure is still to be determined. A wide range of recurrence rates reported has been attributed to various study differences including methodology (prospective/retrospective), patient characteristics (race, age), nature of pterygium advanced/inflamed/recurrent/progressive/atrophic), geographic area of domicile, number of patients studied, definition of recurrence, duration of follow up and loss of follow up, surgical technique and surgeon's experience.

In our study, service holders and farmers were mostly involved, which could be due to increased computer use in service holders and exposure to dust and UV rays in farmers. Exposure to dryness, hot weather and ultraviolet rays causes the primary thickening of a limbal mass, leading to limbal elevation. This in turn causes irritation and further elevation which causes exposure of the cornea due to improper apposition of the lids. Thus, a dellen forms and prevents a smooth tear film from covering the cornea. In a study done by Pandey et al (1984) males were predominant (males 1051, 75.1%; females, 349; 24.9%). It suggests that males have more exposure to external atmosphere than females, indicating that the environment plays a predominant role in pterygium formation.

However, in our study there is female preponderance, which could be due to a high



prevalence of dry eyes in women, particularly in menopausal women, in which the main cause for dry eyes is the fluctuations in estrogen and androgen hormones.

The primary aim of the surgical intervention in pterygium is to excise the pterygium and prevent recurrence. As bare sclera excision is associated with a high recurrence rate, pterygium excision is often combined with conjunctival autograft, mitomycin C, beta-irradiation or other adjunctive therapies to reduce recurrence rates. There is currently, however, no consensus on the ideal treatment of the disease (Ang et al, 2007). Rao (1998) highlighted that the surgical technique could probably be the single most important factor influencing recurrence. He emphasized that the meticulousness with which the limbal tissue was included in the autograft, determines the success of the procedure. We also followed the surgical technique described by him which involved conjunctival limbal stem cells to treat the pterygium of patients in Kavrepalanchowk and surrounding districts of Nepal.

Koch et al (1992) described that a pterygium also exhibits features seen in limbal stem cell deficiency (SCD) states, stromal inflammation and corneal vascularisation and conjunctivalization. Thus, the importance of limbal transplantation in ensuring low recurrence rates has also been stressed by Figueiredo et al (1997) and Dushku et al (1994).

Fernandes et al (2005) has compared the outcome of various surgical techniques following primary and recurrent unilateral pterygium excision respectively. Recurrences were noted in 46 (19.4%) and one (33.3%) eyes after bare sclera technique; in five (16.7%) and 0 after primary closure; in 28 (26.7%) and 0 with Amniotic membrane graft (AMG); in 42 (12.2%) and five (31.3%) with conjunctival autologous graft (CAG) and in nine (17.3%) and two (40%) with conjunctival limbal autograft (CLAG).

Solomon et al (2001) reported in a non-comparative study that double-layered AMG combined with the intraoperative injection of triamcinolone significantly reduced the recurrence

rates to 3% for primary pterygium; a result that is comparable with that after CAG.

Conclusion

Pterygium excision combined with conjunctival autograft surgery is the safe and effective method for treating pterygium. However, additional large randomized clinical trials need to be performed to evaluate the relative efficacy and long-term safety of the various treatment options to define a suitable treatment option for people living with pterygium in hilly regions of Nepal.

Acknowledgement

Surgical team (Mr Utsav Khoju and Ganga Thapa) and all the colleagues of our department are highly acknowledged for their help and support.

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Source of support: nil. Conflict of interest: none