

A Retrospective Assessment of the Complication Profile after Pterygium Excision, in Primary and Recurrent Pterygia

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Abstract

Aim: The aim of the present study was to analyze of complication profile after pterygium excision, in primary and recurrent pterygia.

Methods: The present study was conducted in the Department of Ophthalmology, SKMCH, Muzaffarpur, Bihar, India. A total of 2200 eyes in 2000 patients were included in the study. Patients who had undergone (a) Conjunctival auto grafting for primary pterygium (CAG) (b) Conjunctival Limbal auto grafting for recurrent pterygium (CLAG), (c) Vertical split conjunctival auto grafting (VsCAG) for double head pterygium (primary) were included in the study.

Results: Of 2200 cases, 2000 patients were included in the study, and these patients were retrospectively analyzed. 2000 patients had primary pterygium (1800 eyes had single head pterygium, 200 cases had double-head pterygium), 200 cases had recurrent pterygium. 1700 patients had unilateral pterygium; 300 patients had bilateral pterygium. Out of 2028 patients, 900 patients were male and 1100 patients were female. The follow-up period ranged from 6 months to 75 months, with an average of 17 months. Patients with less than 6 months of follow-up were excluded from the study.

Conclusion: Various complications can occur post pterygium surgery. Selecting a proper procedure for a particular type of pterygium with a proper graft fixation technique will improve the outcome with minimal complications.

Keywords: Complications, conjunctival auto graft, conjunctival limbal auto graft, pterygium

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Introduction

Pterygium is a pinkish fibrovascular growth on the cornea of the eye. [1] The exact cause is unknown but partly related to long-term exposure of ultraviolet light and dust. [2] The frequency ranges from 1% to 33% in various parts of the world, but commonly seen in India and African

continent which is closer to the equator. [3]

Proprioception from the ocular surface is not normally perceived, firstly because of lack of proprioceptors and secondly due to the smooth and regular surface pattern. Blinking reflex helps in the lubrication of the ocular surface with precorneal tear

film. Therefore any irregularities that alter the corneoconjunctival surface produce foreign body sensation. The exact pathophysiology of primary pterygium remains elusive in spite of its characteristic clinical appearance and florid recurrence after simple excision. It is proposed that normally the limbal stem cells provide anatomical and physiological barrier to the growth of conjunctiva blood vessels over the cornea. Hence, local or diffuse limbal stem cell deficiency is probably the accepted hypothesis for primary pterygium evolution.

A pterygium is a wing-shaped growth of fibrovascular conjunctiva onto the cornea. Its incidence varies across geographical locations. Several hypotheses have been ascribed to its aetiology. [4] Currently, it is believed that the pterygium is a growth disorder characterised by conjunctivalisation of the cornea due to localised ultraviolet induced damage to the limbal stem cells. [2] Aggressive pterygial fibroblasts are also responsible for corneal invasiveness. [5] The indications for surgery include reduced vision due to encroachment of the visual axis and irregular astigmatism, [6] chronic irritation and recurrent inflammation, restriction of ocular motility, and cosmesis.

Various aetiologies have been attributed to its cause, but mainly the ultra-violet rays are the common and important cause for the occurrence of pterygium. [7,8] The present widely accepted treatment for pterygium is pterygium excision with conjunctival auto-graft, [9,10] though various other approaches like the bare sclera technique, [11] sliding conjunctival graft, [12] amniotic membrane graft [13] has been done. Adjuvants like Mitomycin C, [14] beta-irradiation, [15] 5-fluorouracil, [16] have been used along with pterygium excision to reduce the recurrences. Pterygium is one of the commonly performed surgeries in South India due to its increased prevalence here, because of the hot climatic conditions. In this

retrospective study, we have tried to analyze the complications post pterygium, both immediate and long term for a better understanding of the complication profile.

Materials and Methods

The present study was conducted in the Department of ophthalmology, SKMCH, Muzaffarpur, Bihar, India for one year. A total of 2200 eyes in 2000 patients were included in the study.

Methodology

Patients who had undergone (a) Conjunctival autografting for primary pterygium (CAG) (b) Conjunctival Limbal autografting for recurrent pterygium (CLAG), (c) Vertical split conjunctival auto grafting (VsCAG) for double head pterygium (primary) were included in the study.

Preoperative data collection included age, sex, visual acuity, ocular examination, surgical history. Postoperatively, type of procedure, visual acuity, complications, duration of follow up was noted. Based on the involvement of pterygium over the cornea they were graded (Grade 1: crossing limbus; Grade 2: midway between limbus and pupil; Grade 3: reaching up to pupillary margin; and Grade 4: crossing pupillary margin. All the surgeries were performed by a single surgeon. Based on the type of pterygium different type of surgical procedure was performed as mentioned above.

All surgeries were done under topical anesthesia with local infiltration. 0.5% proparacaine HCl (Aurocaine, Aurolab, India) was used as topical anesthesia. About 1 cc of 2% xylocaine (AstraZeneca, UK) was injected sub-conjunctivally into the pterygium tissue. For primary pterygium, conjunctival autografting was done without including the limbal tissue. The head of the pterygium was avulsed and fibrovascular tissue was excised with conjunctival scissors. The residual tissue was removed and smoothed with a

crescent blade. Balanced salt solution was injected into the superior conjunctiva to aid in the dissection of the graft. Adequate sized graft conjunctival graft, 0.5 mm larger than the bare sclera from all sides was measured and dissected carefully from the superior or supero-temporal conjunctiva. A thin conjunctival graft was meticulously dissected from the tenons and was placed on the bare sclera. The graft was fixed using fibrin glue, Tisseel (Baxter, Vienna, Austria). A similar procedure was followed for recurrent pterygium, except that, a thin block of corneal tissue, about 0.5 mm of the peripheral cornea was dissected at a depth of roughly 0.1–0.2 mm and was included in the conjunctival graft.

For patients having double head pterygium, 0.5% proparacaine HCL (Aurocaine, Aulabs, India) was used as topical anesthesia. About 1 cc of 2% Xylocaine (AstraZeneca, UK) was injected into the head of nasal pterygium. The head of the nasal pterygium was avulsed and the body of the pterygium was excised, the residual tissue over the cornea was scraped and smoothed with a crescent blade. Similarly, the temporal pterygium was excised. Hemostasis was achieved with the use of wet field cautery. The conjunctival graft was taken from the superior conjunctiva. Balanced salt solution was injected subconjunctivally with 26-G needle, for easy dissection of the

conjunctival graft. A small nick was given using vannas scissor near the forniceal end and a large graft was dissected from the underlying tenons till the limbus. The graft was then vertically split into two halves. The nasal half was released from its base and placed over the nasal bare sclera without changing the orientation. The temporal half of the graft was placed on the temporal bare sclera. The graft was secured on both sides with fibrin glue, Tisseel VH (Baxter AG, Vienna, Austria) ensuring complete coverage of the bare sclera on both sides.

Post-operatively, all the patients were started on topical antibiotics (0.5% Moxifloxacin), 4 times/day for 2 weeks, topical steroids (0.5% Loteprednol etabonate) 6 times/day for the first week and then tapered gradually, and preservative-free tear substitutes (0.5% carboxymethyl cellulose) for 6 weeks. The patients were followed at day 1, 2 weeks, 6 weeks, 6 months initially after the surgery, then every 6 months thereafter. All the complications were noted during the follow-up period. The recurrence was defined as fibrovascular tissue growth of 1.5 mm or more beyond the limbus onto the clear cornea with conjunctival dragging. The study was approved by the institutional ethics committee and adhered to the tenets of the Declaration of Helsinki.

Results

Table 1: Demographic data of the study and follow up period

| Parameters | N |
|--|-----------------|
| Male:Female | 900:1100 |
| Mean age | 45.55±11.59 |
| Mean follow up period | 16.32±6.90 |
| Number of patients | 2000 |
| Total of pterygium cases | 2200 |
| Unilateral: Bilateral | 1700:300 |
| Primary pterygium (single head+double head pterygia) | 2000 (1800:200) |
| Recurrent pterygium | 200 |

Of 2200 cases, 2000 patients were included in the study, and these patients were retrospectively analyzed. 2000

patients had primary pterygium (1800 eyes had single head pterygium, 200 cases had double- head pterygium), 200 cases had

recurrent pterygium. 1700 patients had unilateral pterygium; 300 patients had bilateral pterygium. Out of 2028 patients, 900 patients were male and 1100 patients were female. The follow-up period ranged from 6 months to 75 months, with an

average of 17 months. Patients with less than 6 months of follow-up were excluded from the study. Demographic data, number, types of pterygia included in the study, and the follow-up period is shown in the table 1.

Table 2: List of complications post pterygium with their respective percentage in brackets and comparison of complications between primary and recurrent pterygia with their P value

| Post-operative complications | Total no of cases (n=2200) | Primary pterygium n=2000 (%) | Recurrent pterygium n=200 | P |
|------------------------------|----------------------------|------------------------------|---------------------------|-----------|
| SCH | 900 (40.90%) | 715 (35.75%) | 120 (60%) | <0.000001 |
| Edema | 500 (22.72%) | 550 (27.50%) | 30 (15) | 0.0450 |
| Graft loss | 30 (1.36%) | 20 (1%) | 5 (2.5%) | 0.0260 |
| Graft retraction | 700 (31.81%) | 650 (32.50%) | 30 (15%) | 0.850 |
| Sliding of the graft | 10 (0.45%) | 8 (0.40%) | 2 (1%) | 0.090 |
| Granuloma | | | | |
| Host site | 5 (0.22%) | 4 (0.20%) | 1 (0.5%) | 0.920 |
| Donor site | 5 (0.22%) | 3 (0.15%) | 2 (1%) | 0.1604 |
| Recurrence | 30(1.36%) | 30 (1.50%) | 6 (3%) | 0.0499 |
| Corneal melt | 2 (0.09%) | - | 1 (0.5%) | - |
| Scleral perforation | 0 | - | - | - |
| Dellen | 18 (0.81%) | 20 (1%) | 3 (1.5%) | 0.1050 |

Complications between primary and recurrent pterygia were compared [Table 2]. Chi-square test was used to compare the categorical outcomes, and a P value <0.05 was considered statistically significant. Subconjunctivally hemorrhage was seen in 715 cases (35.75%) in primary pterygium and 120 cases (60%) of recurrent pterygium with a significant P < 0.000001. Graft edema was seen in 550 cases (27.50%) of primary pterygium and in 30 cases (15%) of recurrent pterygium, with a significant P value (P = 0.0450). Graft loss occurred in 20 cases (1%) of primary pterygium and in 5 cases (2.5%) of recurrent pterygium, with a significant P value (P = 0.0260). Graft retraction was seen in 650 cases (32.50%) and 30 cases (15%) in primary and recurrent pterygium respectively, with no significant P value (P = 0.850). Sliding of the graft was seen in 8 cases (0.40%) of primary and 2 cases (1%) of recurrent pterygium, and their P value was not significant (P = 0.090).

Recurrence was noted in 30 (1.50%) of primary pterygium cases and in 6 cases (3%) of recurrent pterygium, and the P value was significant (P = 0.0499). Dellen was seen in 20 cases (1%) of primary pterygium and 3 cases (1.5%) of recurrent pterygium, without a significant P value (P = 0.1050).

Discussion

Although the exact aetiology of the pterygium is elusive, it is hypothesised that the ultraviolet induced stem cell disruption might be one of the factors. [17] Several predisposing factors were implicated in its causation that included exposure to the heat, dust and prolonged outdoor activity. At one time 'bare sclera' technique was the most widely adopted procedure for the management of the pterygium despite the high recurrence rates (30–70%) and complications. [18] With the introduction of the simple conjunctival graft and the amniotic membrane transplantation with or

without intraoperative use of mitomycin-C as adjuvant the recurrence rates were decreased. The successful results with mitomycin-C encouraging for the routine adoption, unfortunately the procedure were heralded by the sight threatening complications and ocular surface disruption in the long run. In a previous comparative study, a recurrence rate of 15.9% with the mitomycin-C group and 1.9% in the limbal conjunctival group suggested that the latter procedure showed acceptable recurrence rate. [19]

The complications that have been noted include intra-operative complications like perforation of the globe, thinning of sclera or cornea from dissection, intraoperative bleeding, muscle injury, buttonholing, graft tear. Early postoperative complications like dellen, Haematoma beneath the graft/subconjunctival hemorrhage, graft edema, graft retraction/loss of graft, granuloma. Late postoperative complications include recurrence, corneoscleral necrosis, scleritis, endophthalmitis. [20]

Primary pterygium, recurrent pterygium, and double head pterygium were included in the study. In all the cases fibrin glue was used for graft fixation. A study was done by the author to know the outcomes of glue versus autologous blood versus sutures showed that all three techniques had equally comparable results. [21,22] A meta-analysis done by Vito et al. [23] to evaluate the effectiveness of fibrin glue compared to sutures in conjunctival autografting for the surgical treatment of pterygium showed that fibrin glue had fewer recurrence rates and the time taken for the surgery was reduced compared to sutures for fixing the conjunctival graft in place during pterygium surgery. In the present study, we have used fibrin glue in all the cases and did not find any disadvantage over sutures. For recurrent pterygium, about 0.5 mm of the peripheral cornea was also dissected and included in the autograft tissue.

In patients with double head pterygium, vertical split conjunctival grafting was done and the procedure was considered under primary pterygium in this study. The studies done by the author on vertical split conjunctival grafting have shown that vertical split conjunctival autograft with or without limbal orientation, just large enough to cover the bare sclera is a successful technique with promising results and has a lower recurrence rate. [24,25] The other complications in primary and recurrent pterygium with significant P value (<0.05) were graft edema and graft loss. The complications like sliding of the graft, graft retraction, dellen, granuloma, corneal melt were also been noted in both primary and secondary pterygium cases but were not clinically significant ($P > 0.05\%$). Corneal melt was noted in only one case which had recurrent pterygium and none of the cases had scleral perforation or melt. The conventional method of managing pterygium in cataract cases is to perform the pterygium surgery first followed by phacoemulsification. In cases with up to grade 2 pterygium with cataract and astigmatism <2 D can be managed in the same setting with good visual outcome. [26]

Complete pterygium tissue excision, adequately sized conjunctival autograft, thin graft with minimal tenons, proper orientation of the graft, complete coverage of the bare sclera with proper fixation of the graft to the sclera, preventing post-operative inflammation are all prerequisites to minimise the complications.

Conclusion

The complications post pterygium excision and auto-grafting include subconjunctival hemorrhage, graft edema, graft loss, retraction, graft sliding, granuloma, and recurrence. Less commonly corneal melt, perforation. Complications can develop in pterygium surgery, but selecting a proper procedure for a particular type of

pterygium with a proper graft fixation technique will improve the outcome with minimal complications. Conjunctival autografting, limbal conjunctival autografting and vertically split conjunctival autografting has been safe and effective in primary pterygia, recurrent pterygia, and primary double head pterygia respectively.

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