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Conjunctival graft from pterygium tissue itself in primary pterygium surgery

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ABSTRACT

BACKGROUND: The aim of a study was to assess the efficacy of a new surgical technique that uses conjunctival tissue from the pterygium itself as a graft with a 180-degree rotation and fibrin glue in the primary pterygium surgery.
MATERIAL AND METHODS: For this non-comparative, interventional study, 36 eyes from 36 patients with primary pterygium were operated on between January 2019 and December 2019. Pterygium was used to create a thin conjunctival graft (CAG) layer in this technique. This pterygium layer was entirely separated from the underlying fibrovascular tissue and retained on the corneal surface. A thin conjunctival graft was transferred to the bare sclera bed with the epithelial side up and rotated 180° before adhering to the bare sclera bed with fibrin glue. The primary outcome was the recurrence of pterygium. Other secondary variables included graft edema and graft retraction.
RESULTS: The primary outcome was the recurrence of pterygium. Graft edema and graft retraction were considered as other complications. The average age was 47.5 years, with an 8-month follow-up. According to the study, the patients had an 8.3% recurrence rate (3 eyes out of 36). Graft edema was the only significant complication (52.77%, 19 eyes out of 36), which resolved without intervention. Graft retraction was the second most common complication, accounting for 27.7% of all cases (10 eyes out of 36).
CONCLUSION: In this technique, there is no tissue wastage (as in excision), no trauma to the normal area (as in conjunctival autograft), no suture-related complications, and shorter operating time. This technique can be used as a safe and alternative to CAG for patients in whom CAG cannot be performed with very low recurrence rates and complications.

KEY WORDS: conjunctiva; pterygium; autograft; fibrin glue; pterygium recurrence

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INTRODUCTION

Pterygium was first described in 1000 BC by Sushrutha. Pterygium derives its etymology from the Greek word *pteros* which means wing. The prevalence rates vary in different parts of the world and are highest in the pterygium belt described by Cameron between the 30° north and south of the equator [1]. In India, the prevalence ranges from 9.5% to 13%, with rural areas having a higher prevalence [2, 3]. The most widely accepted risk factor is UV ray exposure [4].

Pterygium is an elastotic degeneration of conjunctival collagen that occurs over time [5]. However, it is now classified as a proliferative disorder as a result of an abnormal wound healing process. Matrix Metalloproteinases and MMP tissue inhibitors

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at the advancing edge of pterygium may be responsible for inflammation, tissue remodeling, and Bowman's layer destruction [6].

Indications for surgery include cosmetic problems or visual defects ranging from irregular astigmatism to total obstruction of the visual axis. Treatment options are excision, redirection, grafts, and adjuvant medications. For many years, the bare sclera method of primary excision has been used. Recurrence rates ranging from 29.2% to 88.9% have been reported [7]. The gold standard in the treatment of primary pterygium is conjunctival autograft (CAG) [8].

Conjunctival autograft is a dependable and effective method, but it has some drawbacks. Harvesting superior bulbar conjunctiva is not recommended in patients who have previously undergone trabeculectomy or tube shunt surgery or who will require such surgery in the future. CAG is also not a good option for eyes that require large or multiple grafts (double-headed pterygium) [9]. Furthermore, because of the difficulty in harvesting large and thin grafts, the inferior bulbar conjunctiva is not a favorable donor area [10].

Histopathologically, the conjunctiva is not to fault for pterygium. As a result, the conjunctival tissue overlying the pterygium can be used as a graft to cover the bare sclera. In this study, we evaluate the results of a novel surgical technique of grafting healthy conjunctival tissue excised from pterygium itself with 180° reversal of direction secured with fibrin glue. Long-term outcomes were documented.

MATERIAL AND METHODS

This is a one-year prospective hospital-based interventional study conducted in a tertiary care center (Narayana Medical College Hospital, Nellore, Andhra Pradesh) (January 2019 to December 2019). Patients provided informed consent, and the institute's ethical committee approved the study. The study included 36 eyes from 36 patients with primary pterygium. Pterygium was graded according to corneal involvement as:

- Grade 1: crossing the limbus;
- Grade 2: midway between the limbus and pupil;
- Grade 3: reaching up to the pupillary margin;
- Grade 4: crossing the pupillary margin.

The study included patients over the age of 30 with primary pterygium up to grade 3. Those who had recurrent pterygium, grade 4 pterygium, degeneration, or dystrophic corneal disease were excluded from the study. The patient's age, gender, eye (R or L), and side (nasal or temporal) in which the pterygium is located, as well as a complete ocular history, were all collected. Extensive examinations, which means the operating eye is examined thoroughly, both anterior and posterior segment evaluations were carried out.

Surgical procedure

All surgeries were performed using the same technique by a single surgeon. Following peribulbar anesthesia, the conjunctiva overlying the PTG was dissected until it was 1 mm inside the limbus. A thin layer of the conjunctival graft was obtained from the pterygium body by meticulous separation. The rest of the neck and apex of the PTG is avulsed with forceps. The fibrovascular tissue was then excised. Hemostasis was achieved. After excision of fibrovascular tissue, some bleeding usually subsided on its own, but in some cases where there was extensive bleeding of vessels, gentle cautery was applied to achieve hemostasis. The disengaged conjunctival graft was rotated 180° and then transferred onto the bare sclera bed with the epithelial side up and adhered using fibrin glue. Eyes were patched overnight.

Post-operatively, patients were placed on gatifloxin-dexamethasone eye drops in tapering doses for six weeks and tear substitutes. Patients were examined on post-operative day one, and they were followed up with at one week, one month, three months, six months, and eight months. Recurrence was defined as 1.5 mm or more of fibrovascular tissue growth beyond the limbus onto the clear cornea.

The primary outcome was pterygium recurrence, with graft retraction and graft edema considered secondary variables. A descriptive analysis was performed using the mean and standard deviation for quantitative variables.

RESULTS

The following results were obtained from an analysis of 36 eyes with primary pterygium treated with this technique. The mean age was 47.5 ± 8.5 years (30–70years). The study included 21 males and 15 females. The average duration of follow-up was 8 ± 1.2 months. The right eye has 20 numbers, and the left eye has 16 numbers. The average operating time was 15.1 minutes. According to the study, the patients had an 8.3% recurrence rate (3 eyes out of 36). Graft edema was the only significant compli-

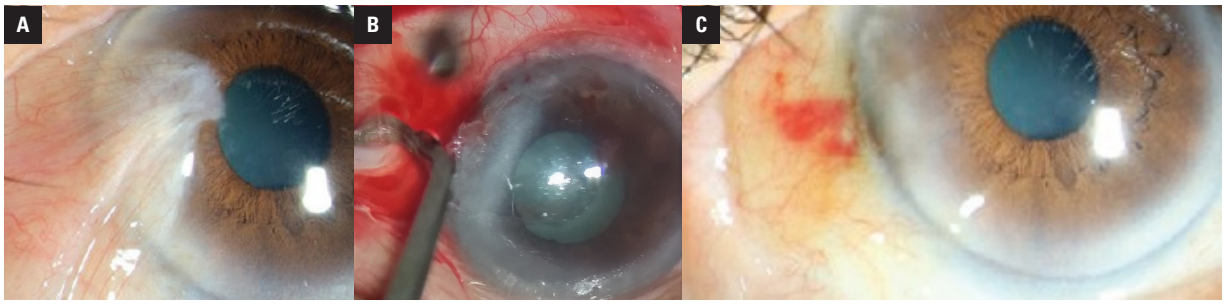

FIGURE 1. Pre-operative (**A**), intra-operative (**B**), and post-operative (**C**) images of a patient with primary pterygium

cation, with a rate of 52.77% (19 eyes out of 36), which resolved without intervention. Graft retraction was the second most common complication, accounting for 27.7 percent of all cases (10 eyes out of 36). The pre-operative and post-operative images have been depicted in Figure 1.

DISCUSSION

Pterygium is a common ophthalmic condition found primarily in tropical and subtropical areas such as India. Pterygium is present in 10.2% of people worldwide [11]. Pterygium can be treated with anything from the bare sclera to grafts. However, the main complication is a recurrence, the rate of which is highly variable and unpredictable. Because of the high recurrence rate, the bare sclera method is not routinely used. To reduce the high incidence of recurrence, the technique of covering the bare sclera with grafts was introduced. These include conjunctival autografts (CAG) with or without limbal stem cells [12, 13], conjunctival rotational autograft (CRA) [10, 14], the procedure of pterygium extended removal followed by extended conjunctival transplant (PERFECT) [15, and amniotic membrane transplantation (AMT) [16]. All these techniques have their own merits and demerits. Different adjuvant therapies ranging from β-radiation [17] to mitomycin (MMC) [18] and more recently, anti-VEGF agents [19] have been used to minimize recurrence. These were not devoid of complications or offered no added advantage hence lost their popularity.

Conjunctival graft is the gold standard in PTG management and was first described by Kenyon et al. in 1985 [20]. Many clinical studies report different recurrent rates with this technique. Syan et al. reported a recurrence rate of 3.3%, Konyagi et al. reported 13.5%, Ferandea et al. reported 12.2%, Ma et al. reported 5.4%, and Al Fayez et.al reported an 8.3% recurrence rate. CAG is a reliable and effective method, but it has some drawbacks. There are times when superior bulbar conjunctiva cannot be used as donor tissue. Amniotic membrane transplantation (AMT) is a viable option in these cases. However, its low availability and high cost make its use limited.

Using fibrin glue, we fashioned a thin layer of conjunctival graft from the Pterygium surface and placed it on the bare scleral defect with 1800 rotation. This technique has the benefit of not traumatizing adjacent healthy ocular tissue. On follow-up, patients showed good outcomes comparable to CAG.

Graft edema was observed in 52.77% (19 eyes out of 36) of the patients in our study and was the most common outcome. This could be due to excessive graft handling. At 8–10 days postoperatively, graft edema resolved without intervention. Graft edema was the most common complication in limbal CAG transplantation, according to Mutlu et al. [21]. Graft retraction was seen in 10 eyes (27.77%), which could be due to subepithelial tissue inclusion in the graft and can be minimized by meticulous dissection of subepithelial tissue [22]. Generally, pterygium recurrence occurs within the first six months after surgery. The overall recurrence rate in this study was 8.33% (3 eyes out of 36), which was comparable to other studies [23–25]. This could be explained by the fact that obtaining a thin conjunctival layer graft from pterygium tissue is technically more difficult. This conjunctival sheet is delicate and prone to tearing with even the slightest manipulation. It is also challenging to obtain an oversized pterygium graft. The graft is either the same size or slightly smaller than the defect. This can cause increased tension on the graft, resulting in graft retraction and loss and an increased risk of recurrence.

Our study's limitations include a smaller sample size and the fact that it is not a randomized control

trial. However, all ophthalmologists can practice this technique in cases where CAG is not an ideal option.

CONCLUSIONS

This study involved a technique of using conjunctival tissue from the pterygium itself as a graft. The procedure can be recommended for patients with PTG, where the superior bulbar conjunctiva is either not available (post-trabeculectomy or tube shunt surgery), or patients may need in the future filtering procedure (glaucoma cases and suspects), and when the superior bulbar conjunctiva is insufficient to cover both bare scleral defects in patients with double-headed PTG. Advantages of this technique include no tissue wastage (as in excision), no trauma to normal conjunctiva (as in CAG), no suture-related complications, and a shorter operating time. Therefore this technique can be considered a safe and good alternative to CAG for patients in whom CAG cannot be performed with acceptable recurrence rates and complications.

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