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Limbal Conjunctival Auto graft: Comparison of surgical techniques in Pterygium surgery

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Abstract:
Aim: *To compare the incidence of granuloma formation, post-operative outcome and recurrence in Limbal-conjunctival auto graft techniques in Pterygium excision using autologous blood Vs Sutures.*
Materials and Methods : *This was a prospective observational study undertaken in a tertiary health centre involving patients with primary onset Pterygium involving 100 patients divided into two groups, with group I auto graft attached in place using 10-0 polyamide monofilament suture, and group II using autologous blood. The groups were then compared in terms of post-operative complications, recurrence and outcome.*
Results: *Mean surgical time for limbal-conjunctival auto graft using sutures was found to be 48.6 min as compared to with autologous blood grafting to be 40.8 min. One case of Recurrence was found in each of the suture and autologous blood method at the end of 6 month. No incidence of Granuloma was found in either technique.*
Conclusion: *The study concluded that out of the two methods for limbal-conjunctival auto graft autologous blood was found to be most effective method for Pterygium surgery, with least surgical time and post-operative discomfort. Autologous blood transfusion is an effective alternative to sutures, readily available, economical and cost effective, with least post-operative complications, as compared to suture which are costly and cause major post-operative discomfort and need for removal at a later stage.*
Keywords: *Autologous blood, conjunctival auto graft, Pterygium.*

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I. Introduction

Pterygium is one of the common ocular surface disorders. From two Greek words, the word "pterygium" has been derived: (pteryx) meaning wing and (pterygion) meaning fin. Sushruta was the first to describe it in 1000 BC, the first recorded ophthalmic surgeon. Pterygium is basically a fibrovascular overgrowth of the subconjunctival tissue, triangular in shape, and encroaching on to the cornea in the medial and lateral palpebral fissure[1]. The prevalence rates are different in various parts of the world. It is highest in the "Pterygium belt" described by Cameron, which lies between 37° north and south of the equator. The prevalence of Pterygium was stated to vary widely from 0.3 to 29 percent in the world. In India, the prevalence ranges from 9.5 to 13%.[2] It is more commonly found in rural parts of the country.[3] Working outdoors increase the risk 1.5-fold. Although exact etiology is not known, risk factors include genetic predisposition, chronic environmental irritations such as dust, dryness, heat, and ultraviolet rays.[4] Males work outdoors much longer than females, so it has been shown that Pterygium is found more often in males compared to females.[5]

Pterygium is managed conservatively when small unless encroachment occurs over papillary area causing Astigmatism or causes papillary block. Simple excision of primary Pterygia is associated with a high recurrence rate (33–45%). Removal of recurrent Pterygium is more difficult due to corneal thinning, Symblepharon, and extension of the scar tissue to recti muscles.[6] Some authors revealed that the recurrence rate for primary closure varies from 5% to 69%.[7] The high rates of the recurrence have been explained by the theory of corneal limbal stem cell deficiency.[8] In a study explained the modification of the surgical technique using conjunctival auto graft for covering bare sclera after Pterygium excision, which resulted in decreased recurrence rates.[9]

After primary Pterygium excision has been done, the conjunctival auto graft is secured in place by the agency of non-absorbable or absorbable sutures or alternatively autologous blood. Each method presents itself with its own merits and demerits. The sutures are easy to place but are quite costly and cause post-op lacrimation, local discomfort, and at times granuloma or local infection. Alternatively homologous blood is easily available and easy to use, those taking nonspecific cyclo-oxygenase inhibitors such as aspirin, or any coagulation profile defects.

This study has been undertaken to ascertain the efficacy of sutures as compared to autologous blood, in employing the conjunctival auto graft method in primary Pterygium.

II. Materials And Methods

After Obtaining a informed consent, and obtaining permission from the ethical community, 100 patients were recruited for the study, after obtaining patient's medical and ocular history and thorough ophthalmic examination, and fulfilling underlying criteria.

Study Design: Prospective observational study.

Study Location: This was a tertiary care teaching hospital based study done in department of Ophthalmology, at Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh.

Study Duration: August 2019 to December 2019.

Inclusion Criteria

1. Willing to participate in the study.
2. Primary onset Pterygium.
3. Any ocular local infection.

Exclusion Criteria

1. No history of recurrence.
2. No history of previous Surgery.
3. Any other co-morbidies
4. No history of hypersensitivity to Anesthetic Agents.

Patients were divided into two groups, each containing 50 patients, each in patient group, was operated by initially primary Pterygium resection followed by securing autograft placement, which in Group I using 10-0 polyamide monofilament suture and Group II using autologous blood method.

III. Procedure Methology

After written informed consent was obtained, All surgeries were performed under local Anesthesia using a 10 ml combination of 2% Lignocaine with Hyaluronic acid and 0.5% Bupivacaine in a 3:2 ratio respectively. Hyaluronic acid is used for better tissue penetration and anesthetic penetration into the periocular tissues. Peribulbar block was given in the affected eye preceded by proper cleaning and sterile drape.

All patients were administered Tobramycin 0.3% eyedrops (@ 4 drops per day) 24hours before the surgery for intra and post-op disinfection. Pterygium (fig 1.1)was removed from the corneal surface using roll-over technique using combination of Lim's forceps to hold the base of Pterygium, and simultaneously using suture tying forceps for removal of Pterygium apex from corneal surface. Pterygium resection was done using corneal–conjunctival scissors and crescent blade was used for clearing corneal surface. Bleeding was controlled by local pressure by cotton buds. No cauterization was done. Devoid Conjunctival area was measured using Castroviejo calipers and a auto graft was obtained from supero-temporal quadrant of bulbar conjunctiva, and placed over affected area ensuring proper orientation. Depending on the criteria for allocation of patients to designated group, conjunctival-limbal auto graft was placed and securely fixed. In Group I (fig 1.2) conjunctival graft was secured in place using 10-0 sutures at superior and inferior positions and 1-2 interrupted sutures for additional fixation. In Group II (fig 1.3) the graft was placed over the denuded area of Pterygium excision and was fixed in placed using firm pressure over the graft for 3-5 minutes ensuring proper fixation. Any other bleeding points are tamponed by direct pressure.

At the end of surgery, sterile eye pad is placed after local application of moxifloxacin ointment. Post-operatively all patients were administered topical Tobramycin 0.3% eyedrop with fluorometholone (@ 4 times a week) followed by gradual tapering over a period of 2 weeks, along with CMC 0.5% for lubrication. Patients were examined on day 1, day2 followed by regular follow up visits on day 7, day 14 for possible complications such as ocular pain, tearing, foreign body sensation and any other discomfort, at the end of 1 month and 6 month for recurrence.

Table 1.1

	Pain		Foreign Body Sensation		Lacrimation		Sub-conjunctival Hemorrhage		Graft Retraction		Recurrence	
Groups	I	II	I	II	I	II	I	II	I	II	I	II
Day I	50	50	50	50	50	50	4	3	2	1	0	0
Day II	16	14	10	12	10	12	4	3	1	0	0	0
Day VII	8	6	4	2	4	2	0	0	1	0	0	0
Day XIV	0	0	1	0	1	0	1	0	1	0	0	0
1 Month	0	0	0	0	0	0	0	0	0	0	1	1

6 Month	0	0	0	0	0	0	0	0	0	0	1	1

IV. Result

In Group I, there were 38 males (76%) and 12 females (24%). Age of patients in the group ranged from 25-48 years with mean age of 36.4 years, whereas Group II has 33 males (66%) and 17 females (34 %), with mean age of 38.2 years.

Mean surgical time for group I was 48.6 min compared to Group II to be 40.8 min.

Pain, foreign body sensation and Lacrimation was present in all 50 cases of both groups, which continued for 1 week duration and decreased progressively to mild discomfort and at the end of 1 month duration, Pain and associated symptoms were completely absent.

Sub-conjunctival Hemorrhage was present in 4 and 3 patients in Group I and Group II respectively, although mild in character (grade I-II) at the end of day I post-operatively, which cleared by the end of 7 days post-op without any sequelae. Graft retraction was present in 2 cases in Group I and 1 case in Group II respectively.

During follow-up of all patients, they were examined for signs of recurrence. Recurrence was found in 1 patient in both groups at the end of 30 days and continued to follow-up at the end of 6 month.

V. Discussion

Pterygium is an active, invasive, inflammatory process, a key feature of which is focal limbal failure. In a two-stage process, "conjunctivalization" of the cornea occurs with tissue characterized by extensive chronic inflammation, cellular proliferation, connective tissue remodeling, and angiogenesis. An understanding of this process has resulted in efforts aimed at limbal reconstruction, which is considered the gold standard for surgical care [10]. Chronic exposure to ultraviolet radiation plays an important role in the pathogenesis of this disorder. However, there is conflicting evidence indicating that chronic inflammation from other causes can induce the disease[11]. Pterygium is not closely linked to other chronic actinic disorders such as pinguecula and climatic droplet keratopathy. Pterygia differ from these disorders by their vascularity which is probably induced by chronic inflammation. Excised Pterygia contained a lymphocytic infiltration consisting predominantly of T cells. In the pathogenesis of Pterygium we believe that chronic irritation (from whatever cause) produces a chronic inflammatory cell infiltration with resultant inflammatory oedema, attempt at repair and cell induced angiogenesis. These processes, together with actinic damage, are responsible for the fibrovascular reaction so characteristic of a growing Pterygium[11]. Use of a conjunctival graft to cover the bare sclera after excision of pterygium has been reported to be the most effective method of lowering recurrence rate (2–9%) and complications[12,13,14]. The transplantation of conjunctivo-limbal auto graft helps to cover the limbal stem cell deficiency [15]. Care should be taken to include the limbal part while harvesting the graft so that stem cells are included [14].

From bare sclera technique to mini-simple limbal epithelial transplant, surgical techniques for Pterygium are constantly evolving. The majority of these techniques require sutures with postoperative suture related complications, such as patient discomfort, lacrimation, symblepharon and Graft rupture [16].

Attaching conjunctival auto graft using autologous blood is a new approach, also known as "suture and glue free autologous graft." This procedure has excellent results without any complications associated

with sutures. The mechanism of action of autologous blood as a sealant is the natural clotting cascade resulting in fibrin polymerization [17]. In Sharma *et al*.'s study, [18] – out of 150 cases, who underwent graft fixation with autologous blood – recurrence during the follow-up period was seen in 4 patients –2.6%. In this study, there was one case of recurrence in 20 patients, i.e., 10%. This high percentage could be because of small size of group selected for surgery.

Autologous fibrin is associated with disadvantages such as graft dehiscence and graft loss. In these patients with graft loss, a second surgery is generally required in which the CAG is retrieved from the fellow eye being ultimately and reliably affixed by sutures.

VI. Conclusion

Autologous blood and sutures are both good alternatives for attachment of conjunctival auto graft to denuded bed in Pterygium surgery. Suture on one hand provide good Attachment and adherence at the cost of postoperative discomfort and other complications, whereas the autologous blood is comparatively safe.

Attachment of conjunctival auto graft with autologous blood is a technically difficult procedure but can be learned with regular practice and an excellent procedure alleviating the need of sutures for the surgery.

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Conflicts of Interest
None

Fig 1.1

Fig 1.2

Fig 1.3

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