

Post-operative outcomes of pterygium surgery using autologous blood and sutures: A comparative study

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Abstract

Aims and Objectives: To compare the two modalities of treatment in pterygium surgery in terms of duration of surgery and post-operative outcomes.

Study Design: Prospective study

Place and duration of study: The present study was conducted from **October 2013 to June 2015** at the Department of Ophthalmology, Government Medical College Haldwani, Nainital, Uttarakhand.

Methodology: A total number of 64 cases with **Primary Nasal Pterygium** classified as **grade 2 or more** were selected from out-patient department (OPD) for surgical intervention. The patients were randomly divided into two groups for pterygium excision with autograft using either autologous blood(30 patients) or sutures(34 patients). After surgical intervention eyes were patched for 24 hours in suture group and for 48 hours in blood group. And two groups were compared for: duration of surgery post-operative discomfort, recurrence, graft edema, graft stability and other Complications.

Results: In comparison to autologous blood technique post-operative discomfort was more in suture group after pterygium excision with conjunctival autografting.

Conclusion: Fixing of graft in pterygium surgery with autologous blood is a better and cost effective technique when compared with sutures without increasing complications.

Introduction

Pterygium is a degenerative condition of sub-conjunctival tissue which proliferates as vascularized granulation tissue to invade the cornea, destroying the superficial layers of stroma and Bowman's membrane, whole being covered by conjunctival epithelium.¹ Its prevalence rate varies from 0.3% to 29% in different parts of the world.²

Asymptomatic pterygium is common and diagnosed accidentally. Recurrent redness and foreign body sensation are due to mechanical irritation, recurrent inflammation and tear film instability.

In advanced cases, vascularized granulation tissue of aggressive, rapidly growing pterygium may invade the cornea, destroying the superficial layers of stroma and Bowman's membrane, and encroaches upon pupillary area. As a result of tissue fibrosis it may lead to alteration of corneal curvature leading to astigmatism and corneal opacity.¹ These patients presents with visual impairment.

Pterygium is more often seen in men than in women.³ This is attributed to the fact that males are exposed to dust and environmental irritants more than women. Higher prevalence noticed with increasing age.

Ultraviolet rays (UVR) induced elastoid degeneration of subepithelial connective tissue,⁴ genetic trauma and consequent altered cytokine expression⁵ plays role in pathogenesis of pterygium. Mathur⁶ and Ishioka⁷ found an association between pterygium and a shortened tear break-up time and Schirmer's test in the case-control studies. Reports suggest vascular endothelial growth factor (VEGF) is highly expressed in

new vessels in pterygium tissue compared with normal conjunctiva (Marcovich, Morad *et al.* 2002). Therefore, angiogenesis is likely to play a role in pterygium (Marcovich, Morad *et al.* 2002; Aspiotis, Tsanou *et al.* 2007).

Now a day's static pterygium of grade 1 to 2 is managed conservatively by NSAIDS and ocular lubricants as former reduces recurrent inflammation and later is given for tear film instability.

Surgical removal is done only when medical measures failed to relieve the symptoms and signs or big pterygium causing, obscuration of visual axis, diplopia, and astigmatism due to pressure by head.

The main challenge of pterygium surgery is prevention of recurrence.⁸ In recent past the debate over best approach to surgery was centered on sutures and fibrin glue to affix the conjunctival graft. Former requires good surgical skill and is associated with high postoperative suture related discomfort. Because of its biological and biodegradable properties, fibrin-based adhesives may be used under a superficial covering layer (conjunctiva, amniotic membrane, etc.) without inducing inflammation. High cost of fibrin glue, risk of transmission of prion disease and risk of anaphylaxis in susceptible individuals⁹ are main limiting factor in glue method of treatment.

Therefore, a new method of adhering graft to recipient site by patient's own blood reduces complications associated with other surgical technique like use of sutures and fibrin glue.

There are limited studies in which suture autograft was compared with autologous blood so present study

was undertaken to decide efficacy and post-operative outcome of autologous blood in comparison to sutures.

Material and Methods

The present study was conducted at the Department of Ophthalmology, Government Medical College Haldwani, Nainital, Uttarakhand.

A total number of 64 cases with **Primary Nasal Pterygium** classified as **grade 2 or more** were selected from out-patient department (OPD) for surgical intervention during the period from **October 2013 to June 2015**. The following points were tabulated as under: **name, age, sex, address, occupation, history, general examination, local examination.**

Informed consent was taken from the patient before performing the surgery.

The patients were randomly divided into two groups for pterygium excision with autograft using either autologous blood (Group-A, 30 patients) or sutures (Group-B, 34 patients). After surgical intervention eyes were patched for 24 hours in suture group and for 48 hours in blood group.

Topical antibiotic and topical steroids and lubricants were given postoperatively. Follow up visits were done on 1 week, 1 month, 3 month and 6 month

Two groups were compared for: post-operative discomfort, recurrence, graft edema, graft stability and suture related complications like granuloma formation, suture abscess, pyogenic granuloma.

Post-operative discomfort was graded on visual analogue scale (VAS) as mild (1-3 score on numeric VAS scale), moderate (4-6 score on numeric VAS scale), and severe (7-10 score on numeric VAS scale).

Graft stability was assessed on day 1 in suture group and day 2 in autologous blood group.

Mean duration of surgery was noted in both the groups and it was calculated from the time putting the traction suture to the removal of lid speculum.

Inclusion Criteria:

- Encroachment upon visual axis,
- Causing significant decrease in visual acuity due to astigmatism,
- Causing recurrent irritation
- Cosmetically bothersome to the patient.
- Patients older than 20 years and younger than 60 years.

Exclusion Criteria:

- Temporal pterygium
- Recurrent pterygium

- Atrophic pterygium
- Pseudo-ptyerygium
- Patients on anticoagulants
- Patients with pre-existing glaucoma
- History of previous ocular surgery or trauma.

Observation and Results

Total no of patient in present study were 64, which were randomly divided in two group, 30 patients in autologous blood group, 34 patient in suture group.

Twenty four Males (37.50%) and forty females (62.50%) were randomly distributed in study for pterygium excision via autologous blood (group A) and sutures (group B). (Table 2)

Table 1: Distribution according to gender in both the groups

| Group | Male (No. of cases) | Female (No. of cases) |
|----------------------------|------------------------|--------------------------|
| Group A:(Autologous blood) | 13 (43.34%) | 17 (56.66%) |
| Group B: (Suture) | 11 (32.35%) | 23 (67.64%) |
| Total | 24 (37.50%) | 40 (62.50%) |

Most of the patients in this study were outdoor/field workers (59.37%), and House wives (17.18%).

Table 2: distribution according to occupation

| Occupation | No. of cases | Percentage |
|------------------------|--------------|------------|
| Field Workers/Laborers | 38 | 59.37% |
| Housewives | 11 | 17.18% |
| Study/Computer Work | 3 | 4.68% |
| Business/Professionals | 3 | 4.68% |
| Others | 9 | 14.06% |

Postoperative discomfort (day 1 in group B, and in day 2 group A) was greater in patients treated with sutures (moderate 50%, severe 23.52%) in comparison to autologous blood (moderate 13.33%, severe 10%).

Most of patient in both groups did not reported discomfort beyond 1st week of follow-up. Severe and moderate discomfort was not reported in any group beyond 1st week of follow-up. Mild discomfort was reported mainly in suture group in few patient mainly in suture group beyond 1st week of follow-up.

Table 3: Comparison of post-operative discomfort in Autologous Blood group(Group A), and suture group(Group B)

| Post op Follow up Discomfort | 1 st day in Group B, 2 nd day in Group A No. of Cases | | 1 Week No. of Cases | | 1 Month No. of Cases | | 3 Month No. of Cases | | 6 Month No. of Cases | |
|------------------------------|---|---------------|---------------------|----------------|----------------------|---------------|----------------------|----------------|----------------------|----------------|
| | Group A | Group B | Group A | Group B | Group A | Group B | Group A | Group B | Group A | Group B |
| Nothing | 2 (6.66%) | 2 (5.88%) | 28 (93.33%) | 6 (17.64%) | 30 (100%) | 31 (91.1%) | 30 (100%) | 33 (97.05%) | 29 (96.66%) | 32 (94.11%) |
| Mild | 21 (70%) | 7 (20.58%) | 2 (6.66%) | 18 (52.94%) | 0 | 3 (8.82%) | 0 | 1 (2.94%) | 1 (3.33%) | 2 (5.88%) |
| Moderate | 4 (13.33%) | 17 (50%) | 0 | 10 (29.41%) | 0 | 0 | 0 | 0 | 0 | 0 |
| Severe | 3 (10%) | 8 (23.52%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Recurrence at 6 month of follow-up, was slightly higher in suture group 2 patient(5.28%) in comparison to autologous blood group 1 patient(3.33%).

Graft was stable in all cases in suture group where as it was displaced in 1 case (3.33%) in autologous blood group.

Graft edema was higher in patients treated with sutures (44.11%) than autologous blood (36.66%).

There was 1 case(2.94%) of suture related granuloma observed with sutures at one week follow up.

From above comparison it seems that post-operative discomfort was much less in patients where graft was secured with patient's own blood whereas other parameters of postoperative outcome were almost comparable in both groups.

Table 4: Distribution of Complications in both the groups including Recurrence

| | Group A(Autologous Blood) No. of Cases | Group B(Suture Group) No. of Cases |
|---|--|------------------------------------|
| Graft displacement | 1(3.33%) | 0(0%) |
| Graft edema | 11(36.66%) | 15(44.11%) |
| Recurrence | 1(3.33%) | 2(5.28%) |
| Other Complications- suture related granuloma | 0(0%) | 1(2.94%) |

Mean duration of surgery in Autologous Blood Group was 23.83±1.05 minutes with upper and lower limit being ranging from 22 min to 28 min. Mean duration of surgery in Suture group was 24.41±2.62 minutes with upper and lower limit ranging from 21 min to 31 min.

Table 5: Mean Duration of Surgery in both Groups

| | Mean Duration of Surgery (minutes) |
|-----------------------------------|------------------------------------|
| Group: A (Autologous Blood Group) | 23.83 |
| Group: B (Suture Group) | 24.41 |

Discussion

Pterygium is a degenerative and proliferative disorder of bulbar conjunctiva and its severe form can cause visual impairment. Several surveys have consistently shown that countries nearer to the equator have higher rate of pterygium because of higher exposure to UV light.

Many previous studies suggest that the prevalence of pterygium was higher in male than female gender

(Hilgers JH et al³). But in present study we have seen higher prevalence of pterygium in female (62%). Reason for higher prevalence could be higher cosmetic awareness among women and greater outdoor exposure of women in hilly region of Kumaon to earn livelihood than men.

Study by Lu P *et al*¹⁰ reported a higher prevalence of pterygium in female than male, which he suggested could be due to Tibetan life style where women had mainly rural and outdoor work. Most of patients in present study were from in middle age group, (mean age in autologous group;36.9 years, and in suture group 43.97years).

In present study most of the patients were field worker/ laborers (59.37%). Mackenzie FD et al who reported that there is 4 to 11 times more chances of having pterygium in persons working outdoors, exposed to sun and dust.¹¹

Treatment of pterygium always remained a point of discussion in ophthalmic practice whether it is medical or surgical. Medical treatment was changing from time to time in the form of topical NSAIDS, topical steroids, topical drops of lubricants, and injection of anti VEGF agents beneath the head of pterygium. All have partial effect and none of the curative medical regimen is known

till now in published literature. Till this moment surgical management remains treatment of choice. But there are problems with surgical treatment also. Bare Sclera Excision alone is associated with recurrence rates of 30% to 70%. With adjunctive measures such as topical Thiotepa, 5-fluorouracil, or mitomycin C, the recurrence rate is lowered but is associated with high risk of complications.

Conjunctival autografting after pterygium excision is associated with lower recurrence rates (2% to 9%) and relatively few sight threatening complication.^{12,13}

Different methods of securing graft to scleral bed are in practice now. But securing graft with sutures is most commonly performed procedure. Koranyi and associates¹⁴ were the first to report the use of fibrin glue, risk of transmission of prion disease and risk of anaphylaxis in susceptible individuals⁹ are main limiting factor in glue method of treatment.

We have used another technique of securing graft to the recipient bed by using patient's own blood as an adhesive. In present study we have compared different postoperative outcomes in patients with who have grafts secured with autologous blood (30 patients) and sutures(34 patients). Postoperative discomfort (day 1 in group B, and in day 2 group A) was greater in patients treated with sutures (moderate 50%, severe 23.52%) in comparison to autologous blood (moderate 13.33%, severe 10%). Most of patient in both groups did not reported discomfort beyond 1st week of follow-up. Several other studies also reveals similar discomfort in postoperative period.(SAM Elwan et al.¹⁵, P Peeush et al.¹⁶, D de Wit et al.⁹).

Graft displacement is a major concern in grafts fixed by patients own blood in immediate post-operative period and most of them occur within 24 to 48 hours of surgery. It is considered that graft usually displaces due to undue rubbing of operated eye due to foreign body sensation. Graft retraction at its bed is also an issue with this technique but appropriately thin graft of adequate size avoids this complication in most of the patients. So care must be taken for thin and appropriate size of graft when performing surgery with autologous blood technique. Proper counselling of patients for not to rub their eyes avoids complication related to graft displacement. In present study graft was displaced in 1 patient (3.33%) and patient gave the history of rubbing of his eyes postoperatively this was further secured with sutures. Nisha Dulani *et al* who reported graft displacement in only 3.39% of the patient¹⁷.

Graft edema was noted in 36.66% patients in autologous blood technique and in 44.11% of patients in suture technique which subsided after giving prednisolone acetate drops topically.

In study of Celeva Markovaska *et al*¹⁸ graft edema was present in 22.5% of cases in Suture group. In our study this is greater. Type of pterygium and intraoperative manipulation may be responsible for greater graft edema

At the end of 6 month recurrence was seen in 5.28% in suture group and 3.33% in autologous blood group. Similar studies by Malik KPS *et al*¹⁹ and Nisha Dulani *et al*¹⁷, also correlates with recurrence rates of present study.

Mean duration of surgery in Autologous Blood Group was 23.83±1.05 minutes and in Suture group was 24.41±2.62 minutes. In similar study by S.A.M. Elwan *et al*¹⁷³ mean operating time was 24 minutes in Autologous blood group and 28.64 minutes in Suture group which co relates with present study.

Conclusion

Suture related complications remains draw back in suture group and graft displacement remains a problem with Autologous blood group. But overall incidences of these complications are very less. Another technique for graft fixation is by use of fibrin glue, but affordability is an issue in our patients, who are mainly field worker and labourers. In developing countries like, India cost effective treatment remains big issue. Fibrin glue being costly is not affordable by most of the poor peoples.

So considering cost effectiveness, less post-operative discomfort and no issue of viral disease transmission, pterygium surgery with Autologous blood may be a preferable surgical method in treatment of pterygium.

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