A COMPARATIVE STUDY BETWEEN SURGICAL OUTCOME OF PATIENT'S OWN BLOOD VS. 10-0 NYLON FOR CONJUNCTIVAL AUTOGRAFTING IN PTERYGIUM EXCISION

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ABSTRACT

CONTEXT (BACKGROUND)

Pterygium is a frequently occurring progressive ocular surface disorder which is a fleshy triangular wing shaped growth, encroaching from conjunctiva on cornea. Pterygium is frequent in hot, dry, dusty environment and prevalence is 0.3% to 29%. Surgical removal is main treatment for pterygium. The recurrence rate after pterygium surgery varies according to type of surgery. Various surgical modalities tried like simple excision, bare sclera technique, amniotic membrane transplantation and conjunctival autografting.

AIM

To compare surgical outcome of patient's own blood Vs 10-0 Nylon for conjunctival autografting in pterygium excision.

SETTINGS AND DESIGN

It is a prospective randomised interventional control trial, with a sample size of minimum 30 patients in each group studied in a tertiary care hospital from Oct. 2013 to Dec. 2015.

METHODS AND MATERIAL

Out of 63 patients who underwent pterygium excision, patient's own blood was used in 32 patients (Group A) and 10-0 Nylon suture was used in 31 patients (Group B) for conjunctival autografting. All patients were followed up regularly on postoperative day 1, 8, 30, 90 and 180. Variables for postoperative assessment were pain, watering, irritation, redness, graft displacement, graft loss and recurrence.

STATISTICAL ANALYSIS

Statistical analysis was performed using SPSS 13.0 (SPSS, Chicago). Outcome variables between the two groups were compared using the non-parametric Mann–Whitney U Test.

RESULTS

The mean surgical time of group B (31.48±6.15 min) is significantly high as compared to group A (19.71±5.13 min) with $p<0.001$. The regression analysis revealed that except surgery type, no other variable had significant impact on the duration of surgery. Postoperative symptoms are less in group A as compared to group B. Group B showed two recurrences whereas no recurrence was seen in group A.

CONCLUSIONS

Conjunctival autografting by patient's own blood is better than 10-0 Nylon sutures due to less operative time, less postoperative ocular signs and symptoms, economical and no recurrence.

KEYWORDS

Pterygium, Conjunctival autograft, Patient's own blood, 10-0 Nylon.

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INTRODUCTION: The word pterygium derived from a Greek word "Pterygos" which means "wing". Pterygium is a degenerative condition of subconjunctival tissue characterised by a triangular portion of the bulbar conjunctiva encroaching onto the cornea. It is slightly vascular and seen in the interpalpebral fissure in the horizontal meridian; most often from the nasal side.[1] It invades the cornea destroying the superficial layers of the stroma and Bowman's membrane.

A pterygium occurs with higher frequency in warm, sunny areas between 30 degrees latitude north and south of the equator called as "pterygium belt" where there is hot, dry, dusty environment with more ultraviolet radiation.[2,3] It

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is more common in agricultural workers, young adults doing more outdoor activities, people working in dusty and sunny environment.[4] Some researchers have also shown that mutation of chromosome 17 on gene P53 can also be one of the predisposing factor.[5] Prevalence rate of pterygium varies from 0.3% to 37.46% in different parts of the world.[6]

Pterygium is a slowly progressive condition with minimal symptoms like redness and foreign body sensation after exposure to sunlight during initial stages. As pterygium progresses and encroaches up to cornea, visual symptoms arise. Diminution of vision in progressive pterygium is mainly due to flattening of horizontal meridian of cornea, giving rise to "with the rule astigmatism".[7] Vision gets severely impaired if pterygium encroaches the visual axis.

Surgical removal is still the main treatment available for pterygium.[8] The main reason for surgical excision is cosmetic and for visual purposes, but the main challenge of pterygium surgery is prevention of recurrence. The recurrence rate after pterygium surgery may vary according to type of surgery done. The recurrence rate of simple excision has been reported to be 25% to 45%.[9] Due to the high recurrence rate, various surgical modalities have been tried which include simple excisions, bare sclera technique, amniotic membrane transplantation and conjunctival autografting. Bare Sclera Technique is associated with recurrence rates around 38.9%.[10] Adjuvant measures such as beta-irradiation, Thiotepa, 5- fluorouracil, Mitomycin-C reduces recurrence rates but associated with complications.

MATERIAL AND METHOD: A comparative prospective randomised clinical study was conducted in Department of Ophthalmology, in rural based tertiary care centre, from October 2013 to December 2015. All patients were selected from the Ophthalmology Outpatient Department randomly by a computer generated sheet. The study was done on 63 patients with primary nasal pterygium.

Inclusion Criteria:

1. Patients with primary pterygium.
2. Both male and female gender.
3. Patients aged between 18 to 60 years.
4. Patients having pterygium covering more than 2 mm of cornea.

Exclusion Criteria:

1. Age less than 18 years and more than 60 years.
2. Pterygium covering less than 2 mm of cornea.
3. Patients with systemic or neurological deficit.
4. Recurrent pterygium.
5. Pseudopterygium.
6. Pregnant women.
7. Ocular surface disorder and infection.
8. Ocular trauma.

An informed consent was obtained from all patients. After detailed ocular and systemic history, a through ocular examination including visual acuity, refraction, keratometry, ocular movements, fluorescein staining and slit-lamp examination was done. All patients underwent the routine lab. investigations like the haemogram, blood sugar and urine examination.

Patients were divided in two groups and undergone pterygium excision followed by conjunctival autografting either by patient's own blood (group A) or by 10-0 Nylon suture (group B).

Under local anaesthesia (peribulbar block), eye was painted and draped, lid speculum applied. Pterygium was dissected from the cornea and the limbus by blunt dissection. The bare sclera on the nasal side measured by Vernier calliper. A free conjunctival graft of same size is prepared at supratemporal limbus. Proper orientation of graft was maintained with epithelial side up and limbal edge toward limbus, while transferring it to recipient site.

In Group A, haemostasis was allowed to occur spontaneously without use of cautery. Graft was positioned without tension. The sclera bed was seen through transparent conjunctiva so that residual blood does not lift the graft. Direct compression using non-toothed forceps for 8-10 min given to achieve haemostasis.

In Group B, after opposing the graft to recipient site, 5-6 interrupted absorbable (Nylon 10-0) sutures were used to secure the graft. Sutures should be equidistant. Knot of the sutures not buried in sclera. Sutures removed later on postoperative day 7 during followup.

Then, a topical antibiotic is put and a patch was applied for 24 hours so that graft and recipient site fix properly. A topical corticosteroid preparation preferably surface acting corticosteroid was given at the dose of 4 times a day for 5 days, then 2 times a day for next 5 days.

Various parameters like operating time (starting from placement of lid speculum to its removal at the end of surgery) as well as postoperative symptoms, signs were noted for both the groups.

Followup was done on postoperative day 1, 8, 30, 90 and 180. During each postoperative visit, slit-lamp examination was done, the acceptance of the graft and any suture related complications was checked.

RESULTS: Out of 63 patients in study, 35 were males (55.6%) and 28 were females (44.4%). The ocular signs and symptoms like redness, watering, photophobia and diminution of vision due to pterygium were studied and were marked in older age group. Out of 63 cases, 43 patients (68%) had 3 to 4 mm of pterygium extending on the cornea. The mean age of the patient in group A was 49.21 and in group B was 47.54.

The duration of surgery in group A (19.71±5.13) was significantly less as compared to group B (31.48±6.15) with $p < 0.001$. A multiple regression analysis was performed to determine the combined effect of independent factors like size of pterygium, grade of pterygium and surgery type on the duration of surgery which shows that except surgery type, no other variable had significant impact on the duration of surgery.

On postoperative day 1, in group B, among all the postoperative sign and symptoms, the mean score of

watering and irritation is 0.80 and 0.77 which was significantly high with p=0.0058 for watering and p=0.0006 for irritations compared to mean score of respective symptoms in group A. Whereas mean score of pain in group B is 0.35, which is significant as compared to mean score of pain in group A (p=0.0134).

Day 1 Sign and Symptoms	Mean±SD and percent of patients with positive symptoms		p-value
	Group-A	Group-B	
Pain	0.09±0.29 (9.4%)	0.35±0.48 (35.5%)	0.0134
Redness	0.78±0.42 (78.1%)	0.35±0.48 (35.5%)	0.2357
Watering	0.46±0.50 (46.9%)	0.80±0.40 (80.6%)	0.0058
Irritation	0.34±0.48 (34.4%)	0.77±0.42 (77.4%)	0.0006
Graft displacement	0.18±0.39 (18.8%)	0.13±0.34 (12.9%)	0.5286
Graft loss	0.06±0.24 (6.3%)	0.03±0.18 (3.2%)	0.5762

Table 1: Postoperative assessment of different symptoms on day 1 for two surgery type

On postoperative Day 7, in group B mean score of pain (0.13) and redness (0.35) is significant as compared to mean score of pain (0) and redness (0.09) in group A. It is also found that in group B, mean score of watering (0.64) and irritation (0.61) is significantly high as compared to mean score of watering (0.25) and irritation (0.28) in group A. Whereas mean score of graft displacement is significantly high (p=0.0086) in group A (0.03) as compared to group B. No new cases of graft loss was seen on postoperative day 7 in both groups.

Day 7 Sign and Symptoms	Mean±SD and percent of patients with positive sign and symptoms		p-value
	Group-A	Group-B	
Pain	0	0.13±0.34 (12.9%)	0.0372
Redness	0.09±0.29 (9.4%)	0.35±0.48 (35.55)	0.0134
Watering	0.25±0.44 (25%)	0.64±0.48 (64.5%)	0.0017
Irritation	0.28±0.45 (28.1%)	0.61±0.49 (61.3%)	0.0017
Graft displacement	0.03±0.17 (3.1%)	0	0.0086
Graft loss	0	0	-

Table 2: Postoperative assessment of different symptoms on Day 7 for two surgery types

On postoperative day 30, among all the postoperative sign and symptoms only watering and irritation was still present. In group B, means score of irritation (0.22) is significant (p=0.0214) as compared to group A.

Day 30 Sign and symptoms	Mean±SD and percent of patients with positive sign and symptoms		p-value
	Group-A	Group-B	
Pain	0	0	-
Redness	0	0	-
Lacrimation	0.06±0.24 (6.3%)	0.22±0.42 (22.6%)	0.0662
Irritation	0.03±0.17 (3.15)	0.22±0.42 (22.6%)	0.0214
Graft displacement	0	0	-
Graft loss	0	0	-

Table 3: Postoperative assessment of different symptoms on day 30

The recurrence of pterygium was studied at day 90 and day 180 postoperatively. No recurrence was observed at day 90 in both groups. On day 180, group B showed two recurrences whereas no recurrence was seen in group A, which is statistically insignificant (p=0.238).

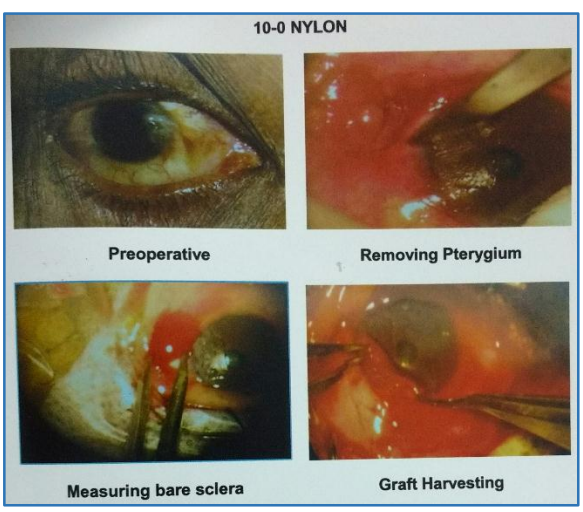

Fig. 1

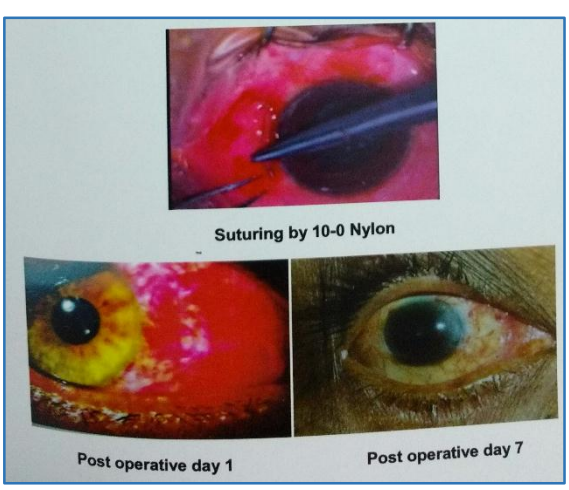

Fig. 2

DISCUSSION: Our study shows males were more affected by pterygium as compared to female i.e. 55.60% males and 44.40% female. We found more number of patients in older age group. Srinivasan S et al in 2009[11] and Jiao W et al in 2014,[12] found that prevalence of pterygium increases with age, which is comparable to our study. Cajucom-Uy H et al in 2010[13] found that incidence of pterygium is more in males. In our study, we found that main complaints were redness, watering, photophobia and diminution of vision, and maximum number of patients were in the age group of 46-60 years. Detorakis ET et al in 2009[14] in their study found that redness, watering and blurring of vision were main complaints of patients with pterygium.

In our study, mean age in patient's own blood group was 49.21 years and in 10-0 Nylon group was 47.54 years. Mikaniki E et al in 2007[15] in their comparative study on two surgical methods of pterygium found the mean age was 49 years and 47 years. The mean operative time for the patient's own blood group was found to be 19.71±5.13 minutes and that of 10-0 Nylon group was 31.48±6.15 minutes and the p <0.001 which indicates highly significant difference between both groups.

Pain subsides completely on postoperative day 7 in patient's own blood group while in 10-0 Nylon group, it subsides completely by day 30. We observed that on postoperative day 1, mean pain score in patient's own blood group was 0.09 where as in 10-0 Nylon group it was 0.35. This shows that pain was less in patient's own blood group than 10-0 Nylon group. On postoperative day 7, pain was present only in 10-0 Nylon group. On postoperative day 30, 90 and 180, no complaint of pain was reported in either group. Elwan SA in 2014[16] and Sharma A et al in 2015,[17] found that pain in suture group subsides in 4 weeks where as in patient's own blood group pain subsides by 2 weeks, which is comparable to our study.

In our study, on postoperative day 1, mean redness score in patient's own blood group was 0.78 and in 10-0 Nylon group was 0.64, which is statistically insignificant. On postoperative day 7, mean redness score in patient's own blood group was 0.09 and in 10-0 Nylon group was 0.35, which is statistically significant. There was more reduction in redness in patient's own blood group (88.5%) than in 10-0 Nylon group (45.3%). On postoperative day 30, redness subsided totally in both the groups. Sharma A et al in 2015[17] found that there is significant reduction postoperative redness after 1 week in patient's own blood group as compared to suture group, which is comparable to our study.

On day 1, watering was present in 46.95% (mean score –0.46) in patient's own blood group and 80.6% (mean score –0.80) in 10-0 Nylon group, with p=0.0058 which is statistically highly significant. On day 7, watering was present in 25% (mean score–0.25) in patient's own blood group and 64.5% (mean score–0.64) in 10-0 Nylon group, with p=0.0017, which is also statistically highly significant. On day 30, watering was present in 6.3% (mean score–0.06) in patient's own group and 22.6% (mean score – 0.22) in 10-0 Nylon group, with p=0.062, which is statistically not significant. Thus, watering was found less in patient's own blood group as compared to 10-0 Nylon group and number of patients with watering reduced rapidly in patient's own blood group. Kim HH et al in 2008[18] and Sharma et al in 2015[17] in their study found that postoperative watering was present in less number of patients and for a shorter duration of time in autologous blood group as compared to suture group. Finding of both studies were comparable to our study.

On day 1, irritation was present in 34.4% (mean score–0.34) in patient's own blood group and 77.4% (mean score –0.77) in 10-0 Nylon group, with p=0.0006 which is statistically highly significant. On day 7, irritation was present in 28.1% (mean score–0.28) in patient's own blood group and 61.3% (mean score–0.61) in 10-0 Nylon group with p=0.0017 which is statistically highly significant. On day 30, irritation was present in 3.15% (mean score–0.03) in patient's own blood group and 22.6% (mean score–0.22) in 10-0 Nylon group with p=0.0214 which is statistically significant. This shows that irritation was found less in patient's own blood group as compared to 10-0 Nylon group and number of patients with irritation reduced rapidly in patient's own blood group. Singh PK et al in 2013[19] observed that postoperative irritation was less in conjunctival autografting by patient's own blood. Sati A et al in 2014[20] and Peeush P et al in 2015[21] in their comparative study found that irritation was less in autologous blood group as compared to suture group and subsides earlier in autologous blood group.

On day 1, graft displacement was present in 18.8% (mean score-0.18) in patient's own blood group and 0.13% (mean score–12.9) in 10-0 Nylon group with p=0.5286 which is statistically not significant. On day 7, graft displacement was present in 3.1% (mean score–0.03) in patient's own blood group and 0% in 10-0 Nylon group with p=0.086 which is statistically highly significant. On subsequent visit, no new case of graft displacement was seen in either group. This observation shows that graft displacement was present only during initial postoperative days and more in patient's own blood group. Elwan SA et al and Choudhury S et al in 2014[16,22] in similar study observed more graft displacement in autologous blood group as compared to 10-0 Nylon group.

We studied recurrence at day 90 and day 180 postoperatively. We found that, no recurrence on day 90 postoperatively. On day 180, recurrence was seen in 10-0 Nylon group in 2 patients (6.5%) and no recurrence was seen in patient's own blood group.

Sati A et al in 2014[20] found equal number of recurrence in both autologous blood and suture groups. Elwan SAM et al in 2014[16] found that 6% recurrence in patient's own blood group and 8% recurrence in 10-0 Nylon group. Sharma A et al in 2015[17] observed no recurrence in autologous blood group but 4% recurrence in 10-0 Nylon group on 6-month followup.

Operative Complications of pterygium excision are uncommon and are generally related to the surgical technique, but the postoperative complications of the pterygium surgery are common and closely studied. In our

study, the patients were followed up to 6 months postoperatively.

We reported more cases of graft displacement and is more in patient's own blood group as compared to 10-0 Nylon group. Graft displacement in patient's own blood group was managed conservatively and in few cases graft repositioning was done over the fresh bleed. Graft displacement in 10-0 Nylon group manages by removing loose suture if present and repositioning the graft by taking new sutures. There was button holing of the graft in two patients, chemosis of the graft in one patient, pale graft in two patients and residual corneal opacity in three patients. Korangy G et al[23] observed that graft displacement is due to movement of graft due to lid movement. In 2009, Srinivasan et al[11] in his study of pterygium excision reported excessive bleeding, button hole of the conjunctival graft, perforation of the globe with the suture needle, and injury to the medial rectus muscle.

CONCLUSION: Conjunctival autografting by patient's own blood is better than 10-0 Nylon sutures as:

- Less operative time.
- Less postoperative ocular signs and symptoms.
- Better patient comfort.
- Absence of potential adverse reaction caused due to use of foreign material.
- Economical.
- No recurrence.

Thus, from our study, it is concluded that conjunctival autografting by patient's own blood is more effective as compared to 10-0 Nylon group.

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