A COMPARATIVE STUDY OF CONJUNCTIVAL AUTOGRAPH WITH SUTURES VERSUS AUTOLOGOUS SERUM IN-SITU IN PTERYGIUM SURGERY IN A TERTIARY CARE CENTRE
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ABSTRACT

BACKGROUND
Pterygium is a very common cause of visual disturbance and is treatable surgically. It is treatable by conjunctival autograft. The autograft can be sutured or can be fixed with glue or autoserum. In this study, we have compared the procedure of suturing of conjunctival autograft and sutureless autoserum procedure after the excision of pterygium.

MATERIALS AND METHODS
We have studied 100 patients of primary pterygium attending the outpatient department of tertiary care centre for treatment of primary pterygium, during the period from November 2015 to October 2017 with the approval of ethical committee of Katuri Medical College, Guntur. We have allocated these patients in to two groups. Group I patients numbering 50 underwent pterygium excision with limbal conjunctival autograft and the auto graft was secured with autologous serum. Group 2 patients numbering 50 had conjunctival autograft secured by sutures. Patients were examined on the first postoperative day and at the end of 1st week, 6th week and 12th week post operatively.

RESULTS
Eighty percent of the patients in both groups were in the age group of 31 to 60. 78% of patients of pterygium are females. Nearly half of the patients had Grade T2 Pterygium. Most of the patients in both the groups had wide based pterygla. The mean duration of surgery in Group 2 (28.34 minutes) was found to be longer than that of Group 1 (18.68 minutes), Pain and foreign body sensation were lesser throughout the follow-up period and disappeared more rapidly in Group 1 compared to Group 2, and the difference was found to be statistically significant (p<0.001). There was no difference in graft oedema between the two groups (p>0.05). There was no evidence of recurrence in both the groups, during the period of follow-up.

CONCLUSION
Both conjunctival autografting with autologous serum and with sutures are safe with low recurrence but autografting group has lesser symptoms and duration of surgery is shorter with autologous serum group. Graft displacement and graft retraction were equal in both the groups.

KEYWORDS
Pterygium, Conjunctival Autograft, Graft Displacement, Retraction, Autoserum


BACKGROUND
Pterygium is an important vision affecting problem wherein bulbar conjunctiva encroaches on the cornea. The prevalence of pterygium varied in different studies ranging from 0.295 to 29%.1,2,3 Pterygium develops because of environmental and genetic factors. Exposure to Ultraviolet A and Ultraviolet B light rays nonvisible spectrum.4 Pterygium causes defective vision and astigmatic error. Medical treatment is not satisfactory. Surgery is performed to restore vision, prevent irritation and prevent recurrence.2

The following surgical procedures are adopted:
Bare sclera technique is used. Along with this thiotepa eye drops or beta irradiation can be given.
Mitomycin C and other antineoplastic drugs are given during the operation or postoperatively to prevent recurrence.
Amniotic membrane is transplanted to prevent postoperative recurrence.
Conjunctival autograft can be used and limbal stem cells are used to prevent recurrence. No surgical procedure is universally accepted by surgeons, but conjunctival autograft is preferred by many.4,5
Conjunctival autograft requires suturing and because of this duration of surgery is longer in this procedure. Sutures may be responsible for postoperative discomfort and irritation. Sutures may be responsible for postoperative discomfort and irritation.

Fibrin glue can be used in place of sutures thereby avoiding suture related complications. Fibrin glue is derived from plasma and because of this fact it can produce anaphylactic shock and other allergic reactions. There is also a possibility of disease transmission.

Recent studies showed the importance of conjunctival autograft without sutures but fixed by autologous serum.

**Aims and Objectives**

To compare the outcome between the use of sutures and autologous serum in-situ for conjunctival autograft after excision of pterygium in the areas of duration of surgery, reduction of symptoms and complications.

**MATERIALS AND METHODS**

The subjects for the study included a total of 100 patients with primary pterygium attending the Ophthalmology Out Patient Department of our tertiary care centre from November 2015 to October 2017.

**Inclusion Criteria**

Patients with Primary pterygium of both genders aged >20 years

**Exclusion Criteria**


**Method of Data Collection**

A prospective study was undertaken on patients who were diagnosed to have primary pterygium. A total of 100 patients were enrolled into the study after taking informed and written consent. Patients underwent comprehensive ophthalmic examination including history of previous medications and surgery. Elective surgery was planned.

Group 1 included patients who underwent pterygium excision with conjunctival autograft secured with autologous serum in-situ.

Group 2 included patients who underwent pterygium excision with Conjunctival autograft secured with sutures.

Procedures adopted in Group 1 Patients: The graft was resected with conjunctival scissors. A small amount of Tenon tissue is included in the graft. The graft is placed on the bare sclera with limbal orientation. The graft is kept opposed to scleral bed for 10 minutes by applying gentle pressure with fine non toothed forceps. With a small bleed in the scleral bed there is always a small amount of oozing of serum with fibrin which acts as an adhesive. Haemostasis was allowed to occur spontaneously, diligently avoiding cautery. Host graft junctional borders were dried using cotton-buds, squeezing out fluid at the interface. Autologous fibrin rich serum was allowed to glue the graft to the bed and the scleral bed was viewed through the transparent conjunctiva to ensure that residual bleeding did not lift the graft. Small central haemorrhages were tamponaded with direct compression. The free graft was allowed to dry in position for 10 minutes

Procedure adopted in Group 2 Patients: In the second group, the graft was secured to the host bed by 10-0 Nylon sutures, usually 4 in number at the corners. Both the groups received sub-conjunctival injection of corticosteroid and antibiotic at the end of the procedure away from the site of the graft and the eye was bandaged for 24 hours.
On the first postoperative day, the bandage was removed, and patients were examined and started on antibiotic-steroid eye drops, six times a day and artificial tear supplements, six times a day. Follow up visits were at 1st week, 6th week and 12 weeks postoperatively. Loose sutures were removed during the follow-up period. Steroid-antibiotic drops were tapered depending on the resolution of inflammation. On each follow-up visit, patients were evaluated for pain, foreign body sensation, graft stability and any other complications.

Pterygium recurrence, graft success and graft failure were assessed as per standard protocols. Subjective pain and foreign body sensation were assessed using a scale adapted from Lim-Bon-Siong and coworkers.9 Pain is graded in five grades starting from 0 to 5, where 0 indicates mild pain and 5 affecting sleep and routine activity.

Graft displacement and retraction are graded from 0 to 5, Graft oedema is graded from 0 to 3.10

**Data Analysis**

Data was entered in Microsoft Excel and analysis was done using SPSS software. Descriptive statistical analysis was done. Results on continuous measurements have been presented as Mean values. Results on categorical measurements have been presented as percentages. Significance is assessed at 5% level of significance. Chi-square test was used to find out the significance of study parameters.

**RESULTS**

Age: Forty out of fifty Pterygium patients in both the groups belong to 31 to sixty age group. Only four in group 1 and five patients in group 2 belong to 21-30 age group. Only 6 patients in group 1 and 5 patients in group 2 belong to 61 to 70 age groups. Most of the patients (80%) belonged to the age group 31-60.

Sex Distribution

33 out of 50 patients in group 1 (66%) and 45 out of 50 patients in group 2 (90%) are females.

Grade of Pterygium: 48% of Group 1 and 46% of Group 2 had Grade T2 pterygium. Majority of patients in both the groups had Grade T2 pterygium.

<table>
<thead>
<tr>
<th>Span of Pterygium at Limbus</th>
<th>Group 1 (autoserum) (n=50) %</th>
<th>Group 2 (sutures) (n=50) %</th>
<th>No. of Patients %</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB</td>
<td>9  18  5  10</td>
<td></td>
<td>14  14</td>
</tr>
<tr>
<td>WB</td>
<td>41  82  45  90</td>
<td></td>
<td>86  86</td>
</tr>
</tbody>
</table>

*Table 1. Distribution of Patients According to the Span of Pterygium at the limbus*

82% of Group 1 and 90% of Group 2 had wide base pterygium. Majority of the patients in both the groups had wide base pterygium

Average duration of surgery in Group 1 was 19.8 minutes and in Group 2 was 28.13 minutes and the difference between the 2 groups was found to be statistically significant (p<0.001). Prolonged duration in Group 2 is evidently due to time taken for suturing the graft.

**Pain Group 1 and Group 2**

<table>
<thead>
<tr>
<th>Pain</th>
<th>Group 1 POP Day 1</th>
<th>Group 1 1st Week</th>
<th>Group 1 6 Weeks</th>
<th>Group 1 12 Weeks</th>
<th>Group 2 POP Day 1</th>
<th>Group 2 1 Week</th>
<th>Group 2 6 Weeks</th>
<th>Group 2 12 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Grade 1</td>
<td>3</td>
<td>34</td>
<td>43</td>
<td>28</td>
<td>2</td>
<td>8</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>Grade 2</td>
<td>38</td>
<td>8</td>
<td>4</td>
<td>16</td>
<td>28</td>
<td>35</td>
<td>25</td>
<td>36</td>
</tr>
<tr>
<td>Grade 3</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td>4</td>
<td>19</td>
<td>5</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Grade 4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*Table 2. Distribution According to Pain Grading on Postoperative Day 1, 1 Wk, 6 Wks. and 12 Wks. after Surgery*

On post-operative day 1, pain was more in group 2 than group 1 and the difference was not found to be statistically significant (p>0.05).

At 1-week post-operative follow-up, pain was more in group 2 than group 1 and the difference was found to be significant (p<0.001).

At 6 weeks post-operative follow-up, pain was more in group 2 than group 1 and the difference was found to be statistically significant (p<0.001).
At 6 weeks post-operative follow-up, graft oedema was more in group 2 than group 1 and the difference was not found to be statistically significant (p>0.05).

Graft Displacement: Group 1 n= 50, Group 2 n=50

Graft Oedema: Group 1 n=50, Group 2 n=50

Graft Oedema:

On post-operative day 1, foreign body sensation was more in group 2 than group 1, and the difference was found to be statistically significant (p<0.001).

At 1-week post-operative follow-up, foreign body sensation was more in group 2 than group 1 and the difference was found to be statistically significant (p<0.01).

At 12 weeks post-operative follow-up, foreign body sensation was more in group 2 than group 1 and the difference was found to be statistically significant (p<0.001).

Graft Oedema: Group 1 n=50, Group 2 n=50

Graft Displacement

On post-operative day 1, graft displacement was more in group 1 than group 2, and the difference was not found to be statistically significant (p>0.05)

At 1-week post-operative follow-up, graft displacement was more in group 1 than group 2 and the difference was not found to be statistically significant (p>0.05)

Graft Retraction

At 12 weeks post-operative follow-up, graft retraction was similar in both the groups without any statistically significant difference (p>0.05)

DISCUSSION

Medical management of pterygium is preoperative anti-inflammatory agents, corticosteroids drops usually used preoperatively. Recurrence after surgical resection is an important problem and a lot of techniques are adopted to prevent recurrence.

 Conjunctival autografts with sutures and with fibrin glue are adopted. But Conjunctival autograft with autologous serum is adopted recently. It has the advantage of causing no anaphylaxis. As the serum contains clotting factors fibrinogen is converted to fibrin and the fibrin derived from the patient’s own serum acts as a glue. This technique uses blood oozing from the surgical site.

In the present study, in Group 1, 8% of the patients were in the age group 21-30 years, 20% were in the age...
group 31-40 years, 34% were in the age group 41-50 years, 26% were in the age group 51-60 years and 12% were in the age group 61-70 years. In Group 2, 10% of the patients were in the age group 21-30 years, 30% were in the age group 31-40 years, 28% were in the age group 41-50 years, 22% were in the age group 51-60 years and 10% were in the age group 61-70 years. Distribution of patients according to age, was similar in both the groups. Eighty percent of patients of both groups belonged to the age group 31-60 years. In the present study, the mean age was 48.82 years in Group 1 and 46.58 years in Group 2. In the Andhra Pradesh Eye Disease Study conducted by MaramulaS et al the mean age of the subjects was 47.5 years, and the observation is similar to our study.

In our study majority of the patients are females. This observation varied in different studies.

In Group 1, 66% were females and 34% were males, and in Group 2, 90% were females and 10% were males. In a study conducted by Hassan Hashemiet.al., the prevalence of pterygium was found to be higher in men than females. In the present study, in Group 1, 14% of the patients had Grade T1 pterygium, 48% had Grade T2 pterygium, 38% had Grade T3 pterygium, and in Group 2, 22% had Grade T1 pterygium, 46% had Grade T2 pterygium and 32% had Grade T3 pterygium. Distribution of patients according to the Tan grading of pterygium in both the groups was comparable. Majority of patients in the present study are women.

Majority of patients in the present study (47%) had Grade T2 pterygium. In a study done by Gazzard G et al. majority of the subjects had Grade T1 pterygium. Majority of the patients in the present study (86%) had wide base of pterygium at the limbus. In Group 1, 18% had narrow base pterygium and 82% had wide base pterygium, and in Group 2, 10% had narrow base pterygium and 90% had wide base pterygium. Distribution of patients according to the span of the pterygium at limbus in both the groups was comparable. In a study done by Ana Torres-Gimeno et al. wide base pterygia showed strong association with recurrence. During the follow up period of the present study, there were no recurrences in either of the groups.

In the present study, the average duration of surgery was 19.8 minutes in Group 1 and 28.13 minutes in Group 2. Mean duration of surgery in Group 2 was higher due to the additional time taken for suturing the graft. The time difference between both the groups was found to be statistically significant (p<0.001).

In the study by Rupali Venkumar Rangu et al., the mean surgical time was 16 minutes in sutureless and glue-free conjunctival autograft. In the study by Karalezl et al., the mean duration of surgery was 32.5 (± 7.5) minutes in the suture group. In the study by Ratnalingam et al., the mean duration of surgery in suture group was 29.84 (± 5.65) minutes.

On the post-operative day 1, pain was more in Group 2 than in Group 1, however the difference was not found to be statistically significant (p>0.05). Foreign body sensation was more in Group 2 than in Group 1, and the difference was found to be statistically significant (p<0.001). Graft oedema was more in Group 2 than in Group 1 and the difference was found to be statistically significant (p<0.05). Graft displacement was more in Group 1 than in Group 2, and the difference was not found to be statistically significant (p>0.05) At 1-week post-operative follow-up, pain was more in Group 2 than in Group 1 and the difference was found to be significant (p<0.001). Foreign body sensation was more in Group 2 than in Group 1 and the difference was found to be statistically significant (p<0.01). Graft oedema was more in Group 2 than in Group 1 and the difference was found to be statistically significant (p<0.001). Graft displacement was more in Group 1 than in Group 2 and the difference was not found to be statistically significant (p>0.05).

At 6 weeks postoperative follow up, pain was more in Group 2 than in Group 1 and the difference was found to be significant (p<0.001). Foreign body sensation was more in Group 2 than in Group 1 and the difference was found to be statistically significant (p<0.001). Graft oedema was more in Group 2 than in Group 1 and the difference was not found to be statistically significant (p>0.05). Graft retraction was more in Group 2 than in Group 1 and the difference was not found to be statistically significant (p>0.05).

At 12 weeks postoperative follow up, pain was more in Group 2 than in Group 1 and the difference was found to be significant (p<0.001). Foreign body sensation was more in Group 2 than in Group 1 and the difference was found to be statistically significant (p<0.001). Graft oedema was more in Group 2 than in Group 1 and the difference was not found to be statistically significant (p>0.05). Graft retraction was more in Group 2 than in Group 1 and the difference was not found to be statistically significant (p>0.05).

Sub-conjunctival haemorrhage of varying grade was present in most of the patients in both the groups. Most of them had resolved by the end of 12 weeks.

No complications such as recurrence, granuloma formation were observed in any of the cases during the period of study.

Vanita Ratnalingam study proved Fibrin adhesive is better than Sutures in Pterygium Surgery in areas of ease of surgery, duration of surgery, postoperative pain and recurrence. In a prospective study, done by Kavitha CV on 56 patients with primary pterygium, who underwent pterygium excision with conjunctival autograft transplantation sutured with 10-0 polyamide black sutures, patient discomfort was assessed using a 10 cm numeric Visual analogue scale. No patients had severe discomfort beyond day 1, 14.2% of patients had moderate discomfort till the 1st week, 25% of patients had mild discomfort till the 3rd week. All patients were comfortable at the end of 6 weeks post-operative follow-up period. So, the patient discomfort was not intolerable and gradually resolved over the follow-up period.

In the present study, initially, pain was more in Group 2 than in Group 1, however the difference was not found to be statistically significant (p>0.05) and at the end of follow up period, pain was more in Group 2 than in Group 1 and the difference was found to be significant (p<0.001). In the
present study, throughout the follow up period, foreign body sensation was more in group 2 than in group 1 and the difference was found to be statistically significant ($p<0.001$). Thus, pain and foreign body sensation were found to be lesser in patients who had grafts secured with autologous serum compared to patients who had grafts attached with sutures.

At the end of follow up period, graft oedema was more in Group 2 than in Group 1, but the difference was not found to be statistically significant ($p>0.05$).

Post-operatively, some amount of graft oedema was present in nearly all patients of both the groups, which gradually subsided over time. Trauma during surgery, postoperative inflammation cause stimulation of sub-conjunctival fibroblast and vascular proliferation and protein deposition leads to recurrence of pterygium. \cite{23}

Ti et al. showed that postoperative inflammation increases the risk of pterygium recurrence. \cite{24} Suzuki et al. reported that nylon sutures may cause conjunctival inflammation and Langerhans cell migration into the cornea. The postoperative inflammatory reaction around sutures caused by its foreign body nature have a significant effect on pain, discomfort and recurrence rate. \cite{25} However, during the period of the present study, no recurrences were observed in either of the groups.

At the end of period of the present study, graft retraction was more in group 2 than in group 1 and the difference was not found to be statistically significant ($p>0.05$). Graft retraction gradually disappeared by epithelialization and modulation of wound resulting in fine and smooth continuous surface.

Specifically, the risk of graft retraction as described by Tan appears to be no greater without suturing as long as meticulous dissection of sub-epithelial graft tissue is respected. \cite{26}

Rupali V Ranguet et al. postulated that even tension across the whole of the graft interface and no direct tension on the free graft edges reduces the stimulus for sub-conjunctival scar tissue formation in sutureless and glue-free graft. \cite{19} Hall et al. found Conjunctival autograft with fibrin glue in pterygium surgery decreased surgical time and resulted in less postoperative pain in the first 48 hours but had a higher complication rate. \cite{27} An Egyptian study by Shaaban A.M Elwan echoed the view that Conjunctival autograft without glue and sutures and done with autoserum is safe, effective, has less adverse effects has acceptable recurrence compared to conjunctival autograft suturing in primary pterygium surgery. \cite{28}

Summary

In summary, both autografting with autologous serum and with sutures, are safe and effective methods for graft adhesion in pterygium surgery. Autologous serum procedure can shorten the duration of surgery. Other complications like post-operative discomfort due to suture irritation are decreased. Grafts secured with autologous serum are better tolerated than grafts secured with suture material in terms of postoperative symptoms and wound healing. In our study there was no evidence of scar tissue formation in any of the cases in either of the groups. Sutureless conjunctival autograft technique with autoserum is easy, safe, effective, prevents potential adverse reactions encountered with the use of foreign material when compared to other conventional techniques.

CONCLUSION

The usage of autologous serum as an adhesive modality in pterygium surgery, is less time consuming with less postoperative complications and is equally effective compared to suturing of the autograft with no suture related complications.

Acknowledgements

The authors acknowledge the services of the staff and postgraduate students from the department of Ophthalmology, Katuri Medical College and Sanjeevani Hospital, Guntur, Andhra Pradesh.

REFERENCES


