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Original Article

Comparison of Conjunctival Autograft Using Autologous Serum Versus Suturing Technique in Primary Pterygium

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ABSTRACT

Pterygium is characterized by degeneration of the subconjunctival tissue, which proliferates as vascularized granulation tissue that invades the cornea, particularly affecting the superficial layers of the stroma and bowman's membrane. **Objective:** To compare the conjunctival autografts using autologous serum versus suturing techniques in primary pterygium. **Methods:** This randomized controlled study was conducted at the ophthalmology department of Bahawal Victoria Hospital, Bahawalpur, Pakistan, from September 2023 to February 2024. Patients of either gender aged between 18-70 years with primary pterygium (either nasal or temporal) were included. Patients in Suturing group (n=16) consisted of patients receiving the traditional suturing technique, while in autologous serum group (n=16) had surgeries performed using autologous serum as tissue adhesive. **Results:** In a total of 32 patients, there were 25 (78.1%) males while overall mean age was 45.4 ± 12.6 year. The mean duration of surgery was 35.6 ± 4.8 minutes in suturing group versus 26.4 ± 2.9 minutes in autologous group (p<0.000). Evaluation of post-surgery ocular discomfort showed that significantly better results were obtained among patients of autologous serum group (p=0.024). Significantly better satisfaction scores were recorded among patients of autologous serum group when compared to patients undergoing suturing technique (p=0.001). Post-surgery complications were assessed in both study groups and no statistically significant differences were observed among patients of both study groups (p>0.05). **Conclusions:** When considering efficacy, both techniques demonstrated comparable outcomes. In terms of postoperative discomfort and surgical duration, the autologous serum method showed significant advantages by presenting reduced discomfort and shorter surgical times.

INTRODUCTION

The term "pterygium" finds its roots in the Greek word "pterygose," meaning 'wing' [1]. It appears as a wing-shaped growth of subconjunctival fibrovascular tissue that is mostly located in the interpalpebral fissure and is encroaching on the cornea. This condition is characterized by degeneration of the subconjunctival tissue, which proliferates as vascularized granulation tissue that invades the cornea, particularly affecting the superficial layers of the stroma and bowman's membrane [2]. Sunlight exposure stands as a significant modifiable risk factor for pterygium while there exists a correlation between ultraviolet light exposure and the development of pterygium, which may damage limbal stem cells and activate matrix metalloproteinase [3]. Heat, dust, and wind also contribute to its occurrence if exposed to them too much [4]. While often asymptomatic, pterygium encroaches on the visual axis, leading to vision impairment and can induce astigmatism in advanced stages [5]. Apart from visual disturbances, complications of pterygium may include recurrent inflammation, issues with contact lens fitting, and cosmetic concerns. Most cases with no symptoms require no medical attention [6]. However, surgical excision, followed by a conjunctival autograft to cover the exposed sclera, is the best mode if necessitated [7]. Various techniques are used to keep the graft in position; using a nylon 10-0 or Vicryl 8-0 suture is

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considered standard. Alternatively, tissue adhesives like fibrin glue or autologous serum can secure the graft [8]. Suturing the conjunctival graft, although effective, presents complications such as prolonged surgery time, pain throughout the healing process, infection, the development of granuloma, and chronic inflammation [9]. The use of fibrin glue decreases surgery times, lessens related problems, and enhances subsequent satisfaction. However, the use of fibrin glue derived from human plasma can potentially transmit the disease and increase surgical costs. A recent popular method involves using autologous serum as a tissue adhesive, eliminating suture-related complications and disease transmission risks and proving to be cost-effective [10]. A study found post-surgery discomfort among 73.3% patients undergoing suturing technique versus 20% among autologous serum patients with primary pterygium [11].

The current research objective was to compare conjunctival autografts using autologous serum versus suturing techniques in primary pterygium. This research would be able to add significant information to the current data by comparing two techniques of securing conjunctival autografts suturing and utilizing autologous serum in treating pterygium in terms of their effectiveness, safety, patient comfort, complications, and surgical time.

METHODS

This randomized controlled study was conducted at the ophthalmology department, Bahawal Victoria Hospital, Bahawalpur, Pakistan, from September 2023 to February 2024. A prior approval from the "Institutional Ethical Committee" was obtained (Letter No.: 2350/DME/QAMC /Bahawalpur). Informed and written consents were sought from study participants. A sample size of 32 (16 in each group) was calculated taking two sided significance level as 95%, power 80%, proportion of post-surgery discomfort in suturing technique and autologous serum techniques in patients with primary pterygium as 73.3% and 20.0% respectively [11]. Inclusion criteria were patients of either gender aged between 18 and 70 years with primary pterygium (either nasal or temporal). All included patients had recurrent inflammation, induced astigmatism, encroachment over the pupillary margin, rapid pterygium growth, and cosmetic concerns. The exclusion criteria were conditions like atrophic pterygium, pseudopterygium, recurrent or double-headed pterygium, prior ocular surgery, or patients on anticoagulants. Those with known bleeding or coagulation disorders were also note included. All of the necessary demographic and clinical aspects of the patients were noted. Patients underwent a comprehensive ocular examination, including visual acuity, refraction, slit-lamp biomicroscopy, ocular movement, intraocular pressure measurement, lacrimal passage irrigation, and dilated fundoscopy, and then were distributed randomly into two study groups. Patients in Suturing group (n=16) consisted of patients receiving the traditional suturing technique, while in autologous serum group (n=16) had surgeries performed using autologous serum as tissue adhesive. The procedure involved a peribulbar block using 2% xylocaine and adrenaline. A bridle suture was inserted under the muscle known as the superior rectus. It was followed by injecting a balanced salt solution under the pterygium to create separation from the sclera. Subsequently, excision of the pterygium was performed, and the bare scleral bed was measured. In the same eye, a conjunctival graft from the superior quadrant was prepared, somewhat bigger than the recipient bed. The graft was gently slide over the recipient bed, maintaining the limbal edge aligned with the limbus and the epithelial side up. After the procedure, various factors, such as graft edema, sub-graft hemorrhage, displacement or retraction of the graft, pterygium recurrence, formation of granulomas or cysts, and signs of infection, were observed under a slit lamp on a regular basis. Patients were interviewed post-surgery for grading pain, foreign body sensation, photophobia, hyperemia, and chemosis according to intensity. The score was graded from 0 to 3 as 0 for nothing, 1 as mild, 2 as moderate, and 3 as severe. Overall satisfaction with the procedure was also recorded after 1-month post-surgery. For overall satisfaction, 0 described unsatisfied, 1 as low satisfaction, 2 as moderate satisfaction, and 3 as highly satisfied. A specifically pre-designed proforma was used to collect all of the relevant information. The collected data were analyzed using the "IBM-SPSS Statistics", version 26.0. The qualitative data were presented as frequency and percentages. Quantitative variables were given representation through mean and standard deviation. Chi-square was employed to compare categorical data whereas independent sample t-test was performed to compare numeric data. A p-value<0.05 was considered significant.

RESULTS

In a total of 32 patients, there were 25 (78.1%) males while overall mean age was 45.4 ± 12.6 years. In the comparison of demographic and clinical characteristics between the suturing (n=16) and autologous serum (n=16) groups, the gender distribution showed 12 (75.0%) males and 4 (25.0%) females in the suturing group, while the autologous serum group exhibited 13 (81.3%) males and 3 (18.7%) females (p=0.668). The mean age were 46.8 ± 11.5 years and 44.3 ± 13.5 years in the suturing and autologous serum groups, respectively (p=0.577). Pterygium was predominantly located nasally in both groups, with 14 (87.5%) in the suturing group and 13 (81.3%) in the autologous serum group (p=0.626). Laterality distribution did not demonstrate any significant differences in between study groups (n=0.723). The mean size of the pterygium was relatively similar in both groups (p=0.709). The details about

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the demographic and clinical characteristics as shown in table 1.

Table 1: Demographic and Clinical Characteristics of Patients in Both Study Groups(N=32)

Demographic and Clinical Characteristics	Groups		p-Value
	Suturing	Autologous Serum	
Gender N (%)			
Male	12 (75.0%)	13 (81.3%)	0.668
Female	4 (25.0%)	3 (18.7%)	
Residence N (%)			
Rural	11 (68.8%)	9 (56.2%)	0.465
Urban	5 (31.2%)	7 (43.8%)	
Location N (%)			
Nasal	14 (87.5%)	13 (81.3%)	0.626
Temporal	2 (12.5%)	3 (18.7%)	
Laterality N (%)			
Left	7 (43.8%)	8 (50.0%)	0.723
Right	9 (56.2%)	8 (50.0%)	
Age (Mean ± SD)			
Age (Years)	46.8 ± 11.5	44.3 ± 13.5	0.577
Size (Mean ± SD)			
Size of Pterygium in mm^2	22.2 ± 1.6	22.4 ± 1.4	0.709

The mean duration of surgery was 35.6 ± 4.8 minutes in suturing group versus 26.4 ± 2.9 minutes in autologous group (p<0.000). Evaluation of post-surgery ocular discomfort showed that significantly better results were obtained among patients of autologous serum group (p=0.024) and the details about the distribution as shown in figure 1.

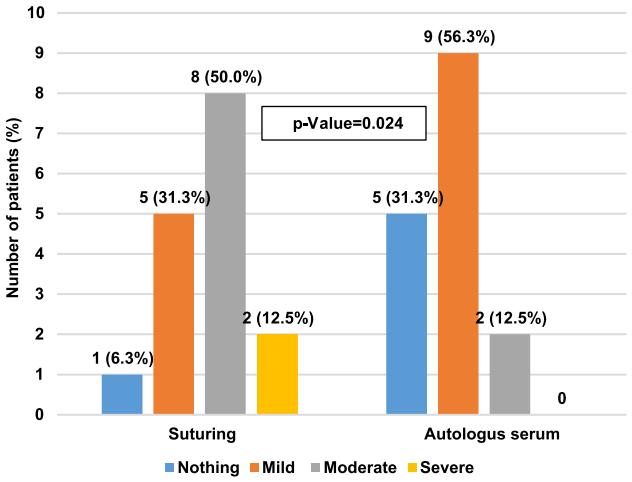

Figure 1: Comparison of Post-Surgery Ocular Discomfort Score (n=32)

Significantly better satisfaction scores were recorded among patients of autologous serum group when compared to patients undergoing suturing technique (p=0.001) and the detailed distribution as shown in figure 2.

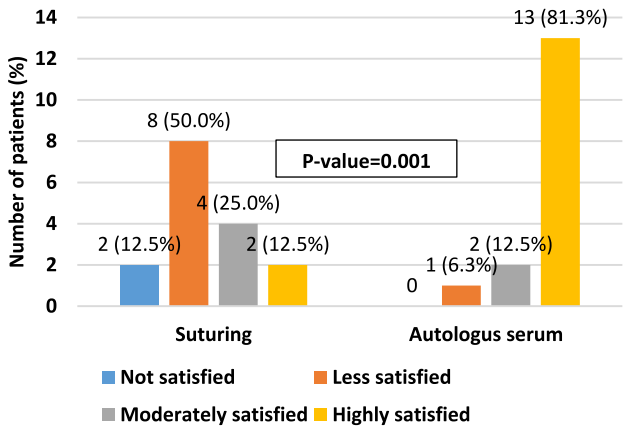

Figure 2: Satisfaction Score(n=32)

Post-surgery complications were assessed in both study groups and no statistically significant differences were observed among patients of both study groups (p>0.05), as shown in table 2.

Table 2: Post-Surgery Complications in Both Study Groups

Demographic and Clinical Characteristics	Groups		p-Value
	Suturing N (%)	Autologous Serum N (%)	
Graft Edema	6 (37.5%)	3 (18.8%)	0.238
Graft Retraction	2 (12.5%)	3 (18.8%)	0.626
Sub-Graft Hematoma	2 (12.5%)	1 (6.3%)	0.544
Graft Loss	-	1 (6.3%)	0.309
Infection	1 (6.3%)	-	0.309

DISCUSSION

The main objectives of pterygium surgery are to remove the fibrovascular membrane and prevent its recurrence. Removing the pterygium and replacing the exposed sclera with a conjunctival autograft that contains limbal stem cells is a suitable method that can effectively prevent pterygium from reoccurring [12, 13]. By acting as a barrier, these limbal stem cells inhibit the migration of conjunctival cells onto the corneal surface. In the current study, two techniques for fixing the conjunctival graft were compared. In a group of patients, the traditional suturing method was employed, whereas autologous serum as tissue adhesive was used in other patients. It was observed that, with suturing the autologous serum technique took significantly less time to complete the surgery (35.6 ± 4.8 vs. 26.4 ± 2.9 minutes, p<0.000). Suturing, while effective, increase operating time and required greater skill to carry on with it. These observations align with the findings of Elwan SA and Ti SE et al [13, 14]. Postoperative discomfort was notably lower in autologous serum patients, consistent with studies by Sharma A et al., and Khedr et al., [15, 16]. Recurrence, a major concern post-surgery, was absent in both groups in our study, mirroring findings by De Wit et al., although other studies reported recurrence rates of 4.7%-6% in sutured or sutureless methods [9, 17, 18]. Graft loss, another critical complication, was observed in

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6.3% of cases in autologous group versus none in the suturing group. The primary reasons for graft dehiscence and loss were identified to be greater severity and vascular pterygium, insufficient blood supply for graft adhesion, and thicker grafts, including Tenon's capsule. Post-surgery graft edema was more frequent in suturing groups versus autologous group (37.5% vs. 18.8%, p=0.238) but typically resolved within 7-10 days post-surgery. Similar trends were noted in studies by Sharma A et al [15]. Patients treated with autologous serum showed a higher rate of graft retraction and remained stationary, not resulting in graft dehiscence, as noted in studies by Elwan SA [13]. Some other researchers have found pyogenic granuloma, although uncommon, at the edge of the conjunctival graft [11]. It may result from Tenon's reaction to sutures, localized graft loss emerged only in 1 patient from autologous serum patients. Strategies to potentially circumvent graft loss involve creating a thick film of blood over the recipient bed before graft placement and ensuring the use of thin and uniform grafts without the inclusion of Tenon's capsule [19, 20]. These modifications can enhance graft adherence and minimize the risk of graft dehiscence or loss, thus potentially mitigating this complication in the autologous serum method. Being a single center study conducted on a relatively small size were some of the limitations of this study. Studies evaluating long term outcomes of the studied approaches should be conducted to evaluate the long-term effectiveness and safety of these techniques.

CONCLUSIONS

When considering efficacy, both techniques demonstrated comparable outcomes. However, in terms of postoperative discomfort and surgical duration, the autologous serum method showed significant advantages by presenting reduced discomfort and shorter surgical times.

Authors Contribution

Conceptualization: ZA, SF, MK
Methodology: ZA, NN, SAM, MJK
Formal analysis: ZA, NN, MK, SAM, MJK
Writing, review and editing: ZA, NN, SF, MK, SAM, MJK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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