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PRIMARY PTERYGIUM EXCISION WITH CONJUNTIVAL AUTOGRAFT USING SUTURE VS AUTOLOGOUS BLOOD

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ABSTRACT

Background: Pterygium surgery often requires conjunctival autograft fixation to reduce recurrence and complications. Traditional suturing techniques provide stability but are associated with postoperative discomfort, while autologous blood fixation offers a suture-free alternative with potential benefits in patient comfort and reduced inflammation.
Objective: To compare the postoperative outcomes of conjunctival autograft fixation using sutures versus autologous blood in primary pterygium surgery.
Materials and Methods: This prospective study was conducted at Khyber medical college Peshawar from December 2023 to December 2024. A total of 60 patients with primary pterygium were enrolled and divided equally into two groups: Group A (suture fixation) and Group B (autologous blood fixation). Outcomes assessed included conjunctival inflammation, granuloma formation, graft retraction, anatomical success, and functional success. Statistical analysis was performed to identify significant differences between groups.
Results: Both groups achieved high anatomical success (90%) and functional success rates (Group A: 93.3%, Group B: 83.3%, $p = 0.228$). Granuloma formation was significantly higher in the suture group (20% vs. 3.3%, $p = 0.044$), while graft retraction was more common in the autologous blood group (23.3% vs. 3.3%, $p = 0.023$). Conjunctival inflammation and foreign

body sensation were comparable between groups, with no significant differences observed.
Conclusion: Both techniques are effective for conjunctival autograft fixation in primary pterygium surgery, with distinct profiles of complications. Autologous blood offers reduced granuloma formation and postoperative discomfort, while sutures provide superior graft stability.

INTRODUCTION:

Pterygium is a fibrovascular growth of conjunctival tissue onto the cornea, often attributed to chronic UV exposure and environmental irritants [1]. It can lead to visual impairment, irritation, and cosmetic concerns. The primary treatment modality for pterygium involves surgical excision, typically accompanied by conjunctival autografting to reduce the high recurrence rates associated with bare sclera techniques [2]. Over the years, various graft fixation techniques, such as sutures, fibrin glue, and autologous blood, have been explored to enhance surgical outcomes and patient comfort [3].

The use of sutures for securing conjunctival autografts has been the conventional approach in pterygium surgery. While effective in maintaining graft stability, sutures are often associated with prolonged operative times, significant postoperative discomfort, and suture-related complications, including granuloma formation and infection [4,5]. Advances in surgical techniques have led to the exploration of sutureless methods, with autologous blood coagulum emerging as a promising alternative due to its natural adhesive properties [6]. This technique leverages the patient's own blood to fix the autograft, eliminating the need for foreign materials and potentially reducing complications associated with traditional methods [7].

Studies comparing sutured and sutureless techniques have reported that autologous blood fixation offers several advantages. These include shorter operative times, reduced postoperative inflammation, and improved patient comfort, although concerns about graft stability and retraction remain [8,9]. Some evidence also suggests comparable recurrence rates between the two methods, further establishing autologous blood as a viable option for conjunctival autografting [10].

This article aims to explore the comparative outcomes of primary pterygium excision with conjunctival autograft using sutures versus autologous blood fixation, focusing on outcome like conjunctival inflammation, granuloma formation, foreign body sensation, graft retraction, anatomical success, functional success. By analyzing recent advancements in surgical techniques, we seek to provide insights into the most effective and patient-friendly approaches for managing this common ocular condition.

Material and Methods:

This prospective, comparative clinical trial was conducted at Khyber medical college Peshawar from December 2023 to December 2024. A total of 60 patients, aged 20 to 60 years, diagnosed with primary pterygium were enrolled in the study. Patients were divided equally into two groups: Group A (30 patients) underwent pterygium excision with conjunctival autograft using sutures, while Group B (30 patients) underwent the same procedure using autologous blood as a natural adhesive. The study was approved by the Ethical Committee of the institution, and written informed consent was obtained from all participants prior to surgery.

Patients included in the study were aged 20 years or older, had primary pterygium, and provided informed consent. Patients with recurrent pterygium, significant ocular surface disease, systemic conditions (except controlled diabetes), or those who were pregnant, breastfeeding, or on immunosuppressive therapy were excluded from the study.

Surgery was performed under sterile conditions using standard techniques. After excising the pterygium, a free conjunctival graft was harvested from the superior bulbar conjunctiva of the same eye. The graft was trimmed to fit the excised area and fixed using different techniques depending on the group. In Group A, the graft was secured using 8-0 absorbable sutures, while in Group B, the graft was positioned and stabilized using the patient's autologous blood clot as a natural adhesive. Postoperatively, all patients were prescribed topical antibiotics and anti-inflammatory eye drops for four weeks and advised to avoid strenuous activities.

Patients were followed up at 1 week, 1 month, 3 months, and 6 months after surgery. Outcome variables assessed included conjunctival inflammation, granuloma formation, foreign body sensation, graft retraction, anatomical success, and functional success. Conjunctival inflammation was recorded as the number of cases with visible redness and swelling at the graft site. Granuloma formation was identified by the presence of small tissue nodules at the surgical site. Foreign body sensation was evaluated through patient-reported discomfort, while graft retraction was assessed by clinical examination. Anatomical success was defined as the proper placement and stability of the conjunctival graft without displacement or shrinkage. Functional success was determined by the relief of symptoms and restoration of the ocular surface.

To ensure the validity of results, key confounding variables such as age, gender, diabetes status, and size and grade of the pterygium were recorded and adjusted for in the statistical analysis. Quantitative data such as age was presented as mean and SD. Categorical variables, such as granuloma formation and foreign body sensation, were compared using the Chi-square test or Fisher's exact test where appropriate. A p-value < 0.05 was considered statistically significant. Statistical analysis was conducted using SPSS version 25.0.

Results:

The mean age of the participants was 39.02 ± 11.87 years, with a total of 60 patients included in the study. When analyzed by group, the mean age in the Suture Group (Group A) was 40.97 ± 11.01 years, while in the Autologous Blood Group (Group B) it was 37.07 ± 12.56 years. Each group consisted of 30 patients.

The postoperative outcomes between the Suture Group (Group A) and the Autologous Blood Group (Group B) were analyzed and compared for multiple variables.

For Conjunctival Inflammation, there was no significant difference between the two groups ($p = 0.602$). It was observed in 14 (46.7%) patients in the Suture Group and 12 (40.0%) patients in the Autologous Blood Group.

A significant difference was noted in Granuloma Formation ($p = 0.044$). This complication was more frequent in the Suture Group, affecting 6 (20.0%) patients, compared to only 1 (3.3%) in the Autologous Blood Group, indicating a clear advantage of using autologous blood for fixation.

The occurrence of Foreign Body Sensation was similar in both groups, with no statistically significant difference ($p = 0.602$). It was reported by 14 (46.7%) patients in the Suture Group and 12 (40.0%) in the Autologous Blood Group.

For Graft Retraction, a significant difference was observed ($p = 0.023$). This

complication was more common in the Autologous Blood Group, with 7 (23.3%) cases compared to only 1 (3.3%) case in the Suture Group, highlighting a potential drawback of the autologous blood technique.

Anatomical Success was achieved in 27 (90.0%) patients in both groups, with no significant difference (p = 1.000). Similarly, Functional Success was comparable between the groups, with 28 (93.3%) patients achieving success in the Suture Group and 25 (83.3%) in the Autologous Blood Group (p = 0.228). (Table 1)

Conjunctival inflammation was observed more frequently in males in Group A (7/13, 53.8%) compared to Group B (6/19, 31.6%), though this difference was not statistically significant (p = 0.208). Among females, the rates were 7/17 (41.2%) in Group A and 6/11 (54.5%) in Group B (p = 0.488). Among non-diabetic patients, inflammation was similar in Group A (12/26, 46.2%) and Group B (11/24, 45.8%) (p = 0.982). In diabetic patients, Group A had a higher rate (2/4, 50.0%) compared to Group B (1/6, 16.7%), though this was not statistically significant (p = 0.260).

Granuloma formation occurred significantly more often in males in Group A (5/13, 38.5%) compared to Group B (1/19, 5.3%) (p = 0.018). Among females, granuloma formation was rare, observed in 1/17 (5.9%) in Group A and absent in Group B (p = 0.413). Non-diabetic patients in Group A had higher rates (5/26, 19.2%) compared to Group B (1/24, 4.2%) (p = 0.101), and diabetic patients in Group A had 1/4 (25.0%), while Group B had none (p = 0.389).

Foreign body sensation was reported in 5/13 (38.5%) males in Group A compared to 8/19 (42.1%) in Group B (p = 0.837). Among females, the rates were 9/17 (52.9%) in Group A and 4/11 (36.4%) in Group B (p = 0.390). Non-diabetic patients experienced this sensation in 13/26 (50.0%) in Group A and 8/24 (33.3%) in Group B (p = 0.233). Diabetic patients showed higher rates in Group B (4/6, 66.7%) than Group A (1/4, 25.0%), but the difference was not statistically significant (p = 0.197).

Graft retraction occurred predominantly in Group B, with 4/19 (21.1%) males compared to none in Group A (p = 0.077). Among females, retraction rates were 1/17 (5.9%) in Group A and 3/11 (27.3%) in Group B (p = 0.114). Among non-diabetic patients, the rates were 1/26 (3.8%) in Group A and 6/24 (25.0%) in Group B (p = 0.031), indicating statistical significance. Diabetic patients showed 0/4 (0.0%) in Group A compared to 1/6 (16.7%) in Group B (p = 0.389).

Anatomical success was similar across both groups, achieved in 27/30 (90.0%) in Group A and 27/30 (90.0%) in Group B. Among males, rates were 12/13 (92.3%) in Group A and 18/19 (94.7%) in Group B (p = 0.780). In females, success was achieved in 15/17 (88.2%) in Group A and 9/11 (81.8%) in Group B (p = 0.636). Non-diabetic patients exhibited identical success rates (23/26, 88.5% in Group A and 21/24, 87.5% in Group B) (p = 0.917).

Functional success was slightly higher in Group A across genders. Among males, success rates were 12/13 (92.3%) in Group A and 16/19 (84.2%) in Group B (p = 0.496). In females, it was 16/17 (94.1%) in Group A and 9/11 (81.8%) in Group B (p = 0.304). Among non-diabetic patients, functional success occurred in 24/26 (92.3%) in Group A compared to 20/24 (83.3%) in Group B (p = 0.329). Diabetic patients had 4/4 (100.0%) success in Group A compared to 5/6 (83.3%) in Group B (p = 0.389). (Table 2)

Table 1: Comparison of Postoperative Outcomes Between Suture Group and Autologous Blood Group

Outcome Variable	Group	No (n, %)	Yes (n, %)	p-value
Conjunctival Inflammation	Suture Group (Group A)	16 (53.3%)	14 (46.7%)	0.602
	Autologous Blood Group (B)	18 (60.0%)	12 (40.0%)	
Granuloma Formation	Suture Group (Group A)	24 (80.0%)	6 (20.0%)	0.044*
	Autologous Blood Group (B)	29 (96.7%)	1 (3.3%)	
Foreign Body Sensation	Suture Group (Group A)	16 (53.3%)	14 (46.7%)	0.602
	Autologous Blood Group (B)	18 (60.0%)	12 (40.0%)	
Graft Retraction	Suture Group (Group A)	29 (96.7%)	1 (3.3%)	0.023*
	Autologous Blood Group (B)	23 (76.7%)	7 (23.3%)	
Anatomical Success	Suture Group (Group A)	3 (10.0%)	27 (90.0%)	1.000
	Autologous Blood Group (B)	3 (10.0%)	27 (90.0%)	
Functional Success	Suture Group (Group A)	2 (6.7%)	28 (93.3%)	0.228
	Autologous Blood Group (B)	5 (16.7%)	25 (83.3%)	

Table 2: Comparison of Postoperative Outcomes and Complications Between Suture Group (Group A) and Autologous Blood Group (Group B), Stratified by Gender, Diabetes, and Grade of Pterygium

Outcome Measure	Grouping Variable	Group A (Suture)	Group B (Autologous Blood)	Total	p-value
Conjunctival Inflammation	Gender (Male)	6/13 (46.2%)	13/19 (68.4%)	19/32 (59.4%)	0.208
	Gender (Female)	10/17 (58.8%)	5/11 (45.5%)	15/28 (53.6%)	0.488
	Diabetes (Yes)	2/4 (50%)	5/6 (83.3%)	7/10 (70%)	0.260
Granuloma Formation	Gender (Male)	5/13 (38.5%)	1/19 (5.3%)	6/32 (18.8%)	0.018
	Gender (Female)	1/17 (5.9%)	0/11 (0%)	1/28 (3.6%)	0.413
	Diabetes (No)	5/26 (19.2%)	1/24 (4.2%)	6/50 (12%)	0.101
Foreign Body Sensation	Gender (Male)	5/13 (38.5%)	8/19 (42.1%)	13/32 (40.6%)	0.837
	Gender (Female)	9/17 (52.9%)	4/11 (36.4%)	13/28 (46.4%)	0.390
	Diabetes (No)	13/26 (50%)	8/24 (33.3%)	21/50 (42%)	0.233
Graft Retraction	Gender (Male)	0/13 (0%)	4/19 (21.1%)	4/32 (12.5%)	0.077
	Gender (Female)	1/17 (5.9%)	3/11 (27.3%)	4/28 (14.3%)	0.114

Outcome Measure	Grouping Variable	Group A (Suture)	Group B (Autologous Blood)	Total	p-value
	Diabetes (No)	1/26 (3.8%)	6/24 (25%)	7/50 (14%)	0.031
Anatomical Success	Gender (Male)	12/13 (92.3%)	18/19 (94.7%)	30/32 (93.8%)	0.780
	Gender (Female)	15/17 (88.2%)	9/11 (81.8%)	24/28 (85.7%)	0.636
	Diabetes (No)	23/26 (88.5%)	21/24 (87.5%)	44/50 (88%)	0.917
Functional Success	Gender (Male)	12/13 (92.3%)	16/19 (84.2%)	28/32 (87.5%)	0.496
	Gender (Female)	16/17 (94.1%)	9/11 (81.8%)	25/28 (89.3%)	0.304
	Diabetes (No)	24/26 (92.3%)	20/24 (83.3%)	44/50 (88%)	0.329

Discussion

Pterygium surgery remains the gold standard for managing this degenerative condition of the ocular surface. Advances in surgical techniques, particularly for conjunctival autograft fixation, have sparked comparisons of suture-based, fibrin glue, and autologous blood coagulum (ABC) approaches. The findings from this study align with existing literature and provide nuanced insights into the relative merits of suture and ABC techniques for conjunctival autograft fixation.

Conjunctival inflammation, observed in nearly similar proportions between the suture and ABC groups in this study, reflects comparable tissue responses to these techniques. This is consistent with findings by Aljahdali et al., who emphasized that postoperative inflammation rates do not significantly differ across fixation methods [11]. However, Kartika et al. highlighted that sutures may elicit more localized irritation due to foreign material exposure, particularly in cases of prolonged healing [12]. The biocompatible nature of ABC reduces the likelihood of irritation, offering a distinct advantage for patients prone to inflammation [13].

Granuloma formation was significantly higher in the suture group in this study, particularly among males. This finding resonates with reports by Zein et al. and Telang et al., who identified sutures as a significant risk factor for granuloma formation due to the inflammatory response elicited by nylon sutures [13,14]. In contrast, the ABC technique eliminates the use of foreign materials, thereby minimizing granuloma formation and enhancing patient comfort [15]. However, the challenge of achieving optimal graft stability with ABC, particularly in cases of inadequate blood coagulum, remains a critical consideration [16].

Foreign body sensation, a common postoperative complaint, was slightly more prevalent in the suture group. This finding aligns with studies by Kumar et al. and Akioud et al., who observed that the mechanical irritation from sutures contributes to higher rates of discomfort compared to sutureless techniques [17,18]. The absence of foreign materials in the ABC method reduces patient discomfort and facilitates a smoother

postoperative recovery, as emphasized in studies by Asritha et al. and Suryawanshi et al. [16,19].

Graft retraction, a significant complication noted in the ABC group, underscores the limitations of using blood coagulum for graft fixation. Kodavoor et al. reported similar findings, with significantly higher rates of graft retraction in the ABC group compared to suture and fibrin glue techniques [19]. This is attributed to the variability in patient-specific blood clotting and adhesion strength, which can compromise graft stability, particularly in high-risk or complex cases [13]. However, despite this limitation, ABC offers advantages in terms of reduced surgical time and lower postoperative discomfort, making it a viable alternative in carefully selected patients [20].

Anatomical and functional success rates were comparable between the two groups, with high success rates observed overall. This mirrors findings by Kumar et al., who reported similar outcomes with suture, glue, and ABC methods [17]. Kartika et al. also noted that while ABC may compromise graft stability in some cases, it achieves comparable recurrence rates to suture and glue techniques [12]. The consistent outcomes across these approaches highlight the efficacy of conjunctival autografts, irrespective of fixation method, provided patient selection and surgical expertise are optimal.

While sutures remain the most reliable technique for ensuring graft stability, they are associated with higher rates of discomfort, inflammation, and granuloma formation. Conversely, ABC offers a cost-effective and patient-friendly alternative, with notable advantages in reducing postoperative discomfort and inflammation. However, its susceptibility to graft retraction necessitates meticulous surgical technique and careful patient selection. The findings of this study align with broader evidence, emphasizing the importance of tailoring surgical approaches to individual patient needs and circumstances.

This discussion underscores the need for continued research to refine the application of these techniques, minimize complications, and optimize patient outcomes. Large-scale randomized controlled trials comparing these methods in diverse populations are warranted to establish definitive guidelines for conjunctival autograft fixation in pterygium surgery.

Conclusion:

This study demonstrates that both suture and autologous blood techniques for conjunctival autograft fixation in pterygium surgery are effective, with high rates of anatomical success (90%) and functional success (83–93%). However, significant differences were observed in postoperative complications, with granuloma formation being more frequent in the suture group (20% vs. 3.3%, $p = 0.044$) and graft retraction more common in the autologous blood group (23.3% vs. 3.3%, $p = 0.023$). While both techniques showed comparable outcomes in terms of conjunctival inflammation and foreign body sensation, the autologous blood method was associated with reduced inflammatory complications but required careful handling to prevent graft instability. These findings suggest that the choice between techniques should be guided by patient-specific factors and surgeon expertise, with autologous blood preferred for minimizing inflammation and sutures for ensuring graft stability. Further research is warranted to refine these approaches and improve postoperative outcomes.

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