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A Prospective Study to Analyse the Post-Operative Outcome of Sutureless and Glueless Pterygium Autograft Surgery

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Background: The present study was conducted to study the incidence of recurrence after pterygium excision followed by glueless and sutureless implantation of conjunctival autograft and to study the outcome of surgery in terms of graft positioning. **Material and Methods:** This study was conducted as a prospective study on 47 patients presenting with pterygium at a tertiary care centre during the study period of 2 years. Detailed ocular and systemic examinations were done. Patients were then subjected to pterygium excision followed by glueless and sutureless implantation of conjunctival autograft. The patients were followed up at 48 hrs after the surgery, then at the first week, the first month, third-month sixth month to assess the positioning of the graft, signs of recurrence if any (neovascularization, formation of early pterygium tissue). **Results:** The study was conducted on a total of 47 patients with pterygium with a mean age of 46.51±15.28 years. The majority of patients belonged to 51 to 60 years of age (31.9%). Male predominance for pterygium with a male: female ratio of 1.6:1 was observed. Majority of patients presented with grade 3 pterygium. Recurrence of pterygium and neovascularisation was observed in 8.5% of patients. Graft displacement was observed in 17% of patients. **Conclusion:** Sutureless glueless pterygium autograft surgery is a safe procedure with less operative time and postoperative complications. The recurrence rate and risk of neovascularization are low but the incidence of graft failure is one of the major drawbacks of this procedure.

Keywords: Pterygium, Sutureless, Glueless, Excision, Central India, Recurrence, Displacement

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Introduction

Pterygium is a degenerative ocular surface disorder that is characterized by a wing-shaped fibrovascular growth consisting of conjunctival epithelium and hypertrophied sub-conjunctival connective tissue. [1,2]. The growth is triangular that occurs in the interpalpebral fissure nasally or temporally and encroaches on to the cornea. The risk factor associated with pterygium includes advancing age; male gender; a dry, dusty and warm climate; exposure to ultraviolet radiation and population engaged in agriculture.[3]. The exact pathogenesis of pterygium is still controversial but elastic degeneration of subepithelial connective tissue due to prolonged exposure to ultraviolet radiation and genetic alteration leading to altered cytokine expression are implicated in its pathogenesis. [4,5]. Surgical excision is the mainstay of treatment of the pterygium but there is no consensus on the type of surgical procedure. The rate of recurrence is high (24% to 89%) following surgical excision.[6]. The type of surgical procedure is an important determinant of recurrence following pterygium excision.[7].

Conventional surgical techniques such as simple excision, bare sclera technique, conjunctival autograft technique, amniotic membrane transplantation etc. require sutures or glue for stabilization of graft. [8,9]. Thus, these surgical procedures are associated with certain complications such as postoperative discomfort, infection, chronic inflammation and granuloma formation. The use of glue instead of sutures has certain advantages in terms of short operating time and low risk of infection but as the glue is derived from plasma or fibrin, it has been linked with prion disease transmission and rarely anaphylaxis. [10,11]. To overcome the complications of sutures or glue**,** a new technique has been introduced recently in which instead of sutures or glue, a patient's blood present at the graft bed is used to fix the graft.[12]. The utility of sutureless grafting has been demonstrated successfully in gingival grafts[13]. but its utility following pterygium excision is yet to be established. Hence, the present study was conducted to study the incidence of recurrence after pterygium excision followed by glueless and sutureless implantation of conjunctival autograft and to study the outcome of surgery in terms of graft positioning.

Material and Methods

This study was conducted as a prospective study on 47 patients presenting with pterygium at the department of ophthalmology of tertiary care centre of central India during the study period of 2 years i.e. from April 2019 to March 2021. All the patients with grade 2, 3 or 4 pterygium scheduled for pterygium excision were included whereas patients not willing for surgery, patients with coagulation disorder, ocular infections, ocular surface disorders and co-morbid conditions (diabetes, hypertension) were excluded from the study. Written consent was obtained from all the participants after explaining the nature and purpose of the study.

After obtaining ethical clearance from the institute's ethical committee, all the patients fulfilling inclusion criteria were enrolled. A detailed history was obtained regarding sociodemographic variables, mode of presentation and duration of illness. Detailed ocular examination was done including visual acuity on Snellen's chart, keratometry, slit lamp examination and fundus examination. All the patients were subjected to routine investigations (CBC, RBS, RFT, LFT, coagulation profile). Following this, fitness for surgery for each patient was obtained from a physician. Patients were then subjected to pterygium excision followed by glueless and sutureless implantation of conjunctival autograft.

Operative technique: Peribulbar anaesthesia was administered (2.5ml bupivacaine and 2.5 ml lignocaine), lignocaine was infiltrated into the pterygium tissue. Pterygium tissue was separated from the rest of the conjunctiva and the head of the pterygium was detached from the cornea. The residual pterygium tissue was scraped off from the cornea with a 15 no. blade. Dimensions of the bare area left after scraping of the pterygium was measured with the help of Vernier callipers. Conjunctival autograft was taken from the superior quadrant with its base towards the limbus. The graft was then repositioned and reposited with its base aligning with the limbus. Firm pressure with the help of a bud or closed blunt forceps was applied over the graft for about a minute. Antibiotic ointment was applied and bandaging was done for 48 hours.

Postoperative follow-up: The patients have followed up 48 hrs after the surgery,

Then at the first week, the first month, third-month sixth month. At each follow-up; visual acuity was tested on the Snellen's chart, slit lamp biomicroscopic examination was done to assess the positioning of the graft, signs of recurrence if any (neovascularization, formation of early pterygium tissue).

Statistical analysis: Data was compiled using MS Excel and analyzed using IBM SPSS software version 20. Categorical data were expressed as frequency and proportion whereas numerical data were expressed as mean and standard deviation. All the patients were followed up for assessment of graft positioning, neovascularization and formation of pterygium tissue. Association of grading of pterygium with the outcome was assessed using the chi-square test. A P-value less than 0.05 was considered statistically significant.

Results

The study was conducted on a total of 47 patients with pterygium with a mean age of 46.51±15.28 years (Range- 18 to 75 years). The findings of our study are described as under.

The majority of patients belonged to 51 to 60 years of age (31.9%) whereas only 17% of patients belonged to the elderly age group. Male predominance for pterygium with a male: female ratio of 1.6:1 was observed in our study. Majority of patients presented with grade 3 pterygium.

Recurrence of pterygium was observed in 4 (8.5%) patients, of them, recurrence was seen in 2 patients at 3 months follow up and in the remaining 2 patients recurrence was observed at 6 months follow up.

Graft displacement was observed in 17% of patients at 48 hrs follow up and it remained displaced. We observed no statistically significant association of grade of pterygium with graft displacement at any follow up (p>0.05).

Neovascularisation was observed in 6.4% of patients at the third month of follow-up, thereafter one more patient developed neovascularization at 6 months follow up. All the cases of neovascularization were observed in patients with grade 3 pterygium. However, we observed no significant association of grade of pterygium with neovascularisation (p>0.05).

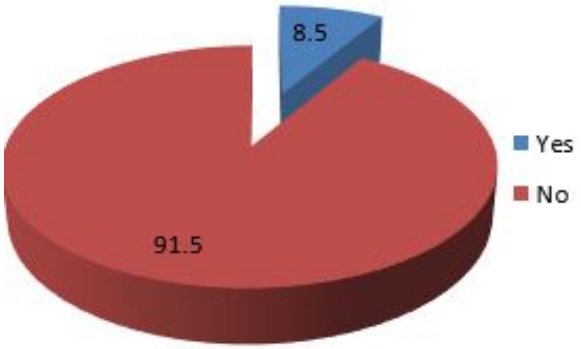

Figure 1 - Recurrence of Pterygiu.

Table 1: Distribution according to baseline variables.

Baseline variables		Frequency (n=47)	Percentage
Age	≤30	9	19.1
	31-40	9	19.1
	41-50	6	12.8
	51-60	15	31.9
	>60	8	17
Gender	Male	29	61.7
	Female	18	38.3
Grade of pterygium	Grade 2	14	29.8
	Grade 3	20	42.6
	Grade 4	13	27.7

Table 2: Association of grading of pterygium with graft position at various follow-up.

Follow up	Graft position	Grade 2 (n=14)	Grade 3 (n=20)	Grade 4 (n=13)	Total	P value
48 hours	At place	11 (78.6%)	16 (80%)	12 (92.3%)	39 (83%)	0.57
	Displaced	3 (21.4%)	4 (20%)	1 (7.7%)	8 (17%)	
1 week	At place	11 (78.6%)	16 (80%)	12 (92.3%)	39 (83%)	0.57
	Displaced	3 (21.4%)	4 (20%)	1 (7.7%)	8 (17%)	
1 month	At place	11 (78.6%)	16 (80%)	12 (92.3%)	39 (83%)	0.57
	Displaced	3 (21.4%)	4 (20%)	1 (7.7%)	8 (17%)	
3 month	At place	11 (78.6%)	16 (80%)	12 (92.3%)	39 (83%)	0.57
	Displaced	3 (21.4%)	4 (20%)	1 (7.7%)	8 (17%)	
6 month	At place	11 (78.6%)	16 (80%)	12 (92.3%)	39 (83%)	0.57
	Displaced	3 (21.4%)	4 (20%)	1 (7.7%)	8 (17%)	

Table 3: Association of grading of pterygium with neovascularisation at various follow-up.

Follow up	Neovascularization	Grade 2 (n=14)	Grade 3 (n=20)	Grade 4 (n=13)	Total	P value
48 hours	Absent	14 (100%)	20 (100%)	13 (100%)	47 (100%)	NA
	Present	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
1 week	Absent	14 (100%)	20 (100%)	13 (100%)	47 (100%)	NA
	Present	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
1 month	Absent	14 (100%)	20 (100%)	13 (100%)	47 (100%)	NA
	Present	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3 month	Absent	14 (100%)	17 (85%)	13 (100%)	44 (93.6%)	0.12
	Present	0 (0%)	3 (15%)	0 (0%)	3 (6.4%)	
6 month	Absent	14 (100%)	16 (80%)	13 (100%)	43 (91.5%)	0.06
	Present	0 (0%)	4 (20%)	0 (0%)	4 (8.5%)	

Table 4: Association of grading of pterygium with pterygium recurrence at various follow-up.

Follow up	Pterygium recurrence	Grade 2 (n=14)	Grade 3 (n=20)	Grade 4 (n=13)	Total	P value
48 hours	Absent	14 (100%)	20 (100%)	13 (100%)	47 (100%)	NA
	Present	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
1 week	Absent	14 (100%)	20 (100%)	13 (100%)	47 (100%)	NA
	Present	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
1 month	Absent	14 (100%)	20 (100%)	13 (100%)	47 (100%)	NA
	Present	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
3 month	Absent	14 (100%)	18 (90%)	13 (100%)	45 (95.7%)	0.24
	Present	0 (0%)	2 (10%)	0 (0%)	2 (4.3%)	
6 month	Absent	14 (100%)	16 (80%)	13 (100%)	43 (91.5%)	0.06
	Present	0 (0%)	4 (20%)	0 (0%)	4 (8.5%)	

Recurrence of pterygium tissue was noticed in only 2 (4.3%) cases at third and sixth-month follow-up each. Though the recurrence was seen in patients with grade 3 pterygium but the observed association of grade of pterygium with recurrence was statistically insignificant ($p>0.05$).

Discussion

The primary concern following pterygium excision is the prevention of its recurrence. Currently, a conjunctival autograft is the most commonly used procedure as it acts as a barrier to conjunctival cells migrating to the surface of the cornea. For fixing this conjunctival graft suturing is frequently done but it has been associated with certain drawbacks such as prolonged operating time, risk of infection, discomfort, prolonged healing and fibrosis.[14]. Plasma-derived glue fibrin is an alternative method that may reduce the operative and avoid suture related complications but may cause hypersensitivity reactions and infection.[14]. We used a novel sutureless glueless technique for conjunctival autograft placement following pterygium excision in which the patient's blood available at the bed of excised area was utilized as a bioadhesive. Pterygium excision and glueless sutureless autograft placement were done in a total of 47 patients. Follow up was done at various intervals to assess the acceptance of graft, neovascularisation and recurrence of pterygium. The post-operative pain, discomfort as well as redness was minimal following surgery in all the patients. Overall recurrence was observed in 8.5% of patients at the end of 6 months follow up. The recurrence rate in a study by Singh et al was 10% following sutureless glueless pterygium autograft surgery at the end of 12 months.[15]. Similarly, Gupta et al documented a recurrence rate of 2.3% after 8 months of surgery [14]. In contrast, Rangu et al observed no recurrence at the end of 6 months. [16].

The sutureless glueless pterygium autograft surgery showed superior results in all grades of pterygium in our study. Graft displacement was an acute complication observed in 17% of patients within 48 hrs of surgery whereas neovascularisation, as well as recurrence, was a delayed complication observed after 3 months of surgery. Bhargava et al documented graft displacement in 7.69% of cases within 24 hrs of surgery.[17].

Malik et al however documented a displacement rate of 20.78% following the procedure. Also, the rate of displacement was significantly higher with unstable grafts as compared to stable grafts.[18].

The graft stability depends upon the size and shape of the graft obtained. Grafts with tapering ends are most unstable due to wrapping and peeling off of graft following irrigation whereas grafts with semi-spherical margins are most stable.[18]. The higher rate of graft displacement is the major drawback associated with this surgery as no suture or glue was used for stabilization of the graft. Sarkar et al also documented graft displacement as the major limitation of this procedure.[19]. The risk of displacement are significantly higher within 24 hours of surgery and beyond this, the graft is usually fixed.[20].

The study was done as a prospective study in a single cohort of patients however, a comparative study with another method of conjunctival grafting would have yielded better results. Also, follow up was done only for 6 months. Follow up for a prolonged duration would have documented the actual rate of long term complications.

Conclusion

Sutureless glueless pterygium autograft surgery is a safe procedure with less operative time and postoperative complications. The recurrence rate and risk of neovascularization are low but the incidence of graft failure is one of the major drawbacks of this procedure. Additionally it provides the benefits of more patient comfort since no external agent is being used to keep the graft in place. The authors have exhaustively performed surgeries and meticulously followed up the patients and objectively assessed and compared the post-surgical outcomes.

Author contribution:

Dr Kumar and Dr L Shrivastava contributed to collecting and analysing the data of the patient who presented at the camps conducted across Bhopal.

Dr P. Shrivastava participated and analysed in data collection and analysis of the patients presenting to the camps conducted across Jabalpur; she also analysed and observed significant correlations after the application of suitable statistical tests.

What does this study add to existing knowledge?

This study helped reach the conclusion that, a sutureless and glueless, pterygium autograft surgery is a successful and more affordable option as compared to the other variants of this surgery.

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