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Comparison of efficacy of conjunctival autografts using sutures and fibrin glue in patients undergoing pterygium excision surgery

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Abstract

Background: Pterygium is a wing-shaped ocular surface lesion traditionally described as an encroachment of bulbar conjunctiva onto the cornea. Hence; the present study was undertaken for comparing the efficacy of conjunctival autografts using sutures and fibrin glue in patients undergoing pterygium excision surgery.

Materials & Methods: 40 patients presenting with the pterygia of various types were enrolled. Patients were divided into 2 groups with 20 patients in each group, for applying sutures and fibrin glue to one group each. Each eye of the patient was considered as one case. Screening of the patient by brief history and general physical examination was done. Diffuse torch light examination for details of the pterygium and to rule out any other gross ocular pathology. Follow-up was done and postoperative findings were compared.

Results: Mean duration of surgery of the suture group and the glue group were 31.5 minutes and 18.4 minutes respectively. Significant results were obtained while comparing the mean duration of surgery. Patient discomfort was significantly less in the glue group in comparison to the suture group.

Conclusion: From the above results, the authors concluded that the use of fibrin glue to attach the free conjunctival autograft in pterygium surgery produces shorter operating time and less post-operative discomfort as compared to sutures.

Keywords: autograft, fibrin glue, pterygium

Introduction

Pterygium is a wing-shaped ocular surface lesion traditionally described as an encroachment of bulbar conjunctiva onto the cornea. Despite advances in understanding of its pathogenesis, pterygium remains an ophthalmic enigma. Intriguingly, pterygia have a predilection for the nasal limbus and affect only humans, possibly reflecting the unique ocular morphology of humans, compared with nonhuman primates and other animals. A healthy corneal surface is maintained by self-renewing, lineage-specific stem cells (SCs) that reside in the limbus, a narrow annular transition zone that circumscribes the cornea. This regenerative capacity is regulated by exquisite programs that govern stem cell quiescence, proliferation, migration, and differentiation. Failure to maintain a normal microenvironment as a result of extrinsic (eg, UV radiation) or intrinsic (eg, cytokines) signals can result in the development of ocular disorders [1-3].

On histological examination, the lesion shows several characteristics features: inflammatory cells, neovascularization; remodeling of the extracellular matrix; and a leading edge (head) of altered limbal epithelial cells, followed by squamous metaplastic epithelium showing hyperplasia of the goblet cells and an underlying stroma of activated, proliferating fibroblasts. These histological features allow pterygia to be classified in to three types: proliferative, fibromatous, and atrophic sclerotic. Its clinical evaluation can be quantified by size, including invasion of the cornea and width at the base, as well as morphological features [4-6].

The treatment of pterygia is surgical; however, because of the high rate of recurrence, careful consideration of the risks and benefits for surgery is necessary before primary excision is undertaken. Indications for treatment include any one or more of the following: vision loss secondary to astigmatism or progressive encroachment on the visual axis, restriction of

ocular movement, or discomfort and irritation. Current management options for pterygium include excision, conjunctival autografting, and the use of adjuvant therapies including mitomycin C, 5-fluorouracil, anti-vascular endothelial growth factor (anti-VEGF) agents, and β -irradiation.

Amongst all the methods of excising the pterygium, the excision of the pterygium with conjunctival autografting is considered to be the procedure of choice in terms of efficacy and long term stability, it is reported that the rates of recurrences are much lower than in case of primary closure or amniotic membrane grafting. This is the base of using conjunctival autografting as our surgical protocol. Fibrin glue is a blood derived product which consists of a fibrinogen component and a thrombin component [6-8] Hence; the present study was undertaken for comparing the efficacy of conjunctival autografts using sutures and fibrin glue in patients undergoing pterygium excision surgery.

Materials & Methods

The present study was undertaken for comparing the efficacy of conjunctival autografts using sutures and fibrin glue in patients undergoing pterygium excision surgery. 40 patients presenting with the pterygia of various types were enrolled. Patients were divided into 2 groups with 20 patients in each group, for applying sutures and fibrin glue to one group each. Each eye of the patient was considered as one case. Screening of the patient by brief history and general physical examination was done. Diffuse torch light examination for details of the pterygium and to rule out any other gross ocular pathology. The fibrin glue was prepared according to the manufacturer's directions to the fibrin glue group. In brief, freeze dried protein concentrate and thrombin was reconstituted in fibrinolysis inhibitor solution and calcium chloride solution respectively and was warmed for several minutes in a patented fibrinotherm device. Then each solution was withdrawn in to a separate disposable syringe. Both syringes were placed in a dual injectable system, in which their contents were mixed in appropriate proportions. Suture was placed on suture group. Follow-up was done. Then the results of the procedures were compared in the two groups. Statistical analysis was done by surging SPSS software. Chi square test, independent t-test and paired t-test were used for assessment of level of significance.

Results

Mean age of the patients of the suture group and glue group was 46.8 years and 44.2 years respectively. 64 percent of the patients of the suture group and 70 percent of the patients of the glue group were males. Mean duration of surgery of the suture group and the glue group were 31.5 minutes and 18.4 minutes respectively. Significant results were obtained while comparing the mean duration of surgery. Patient discomfort was significantly less in the glue group in comparison to the suture group.

Table 1: Demographic data

Variable	Suture group	Glue group
Mean age (years)	46.8	44.2
Males (%)	64	70
Females (%)	36	30

Table 2: Duration of surgery

Duration of surgery	Suture group	Glue Group	p- value
Mean	31.5	18.4	0.00 (Significant)
SD	5.8	4.7	

Table 3: Distribution of patients according to postoperative patient discomfort at day 10

Patient discomfort	Suture group		Glue Group		p- value
	N	%	N	%	
Absent	15	75	19	95	0.01 (Significant)
Present	5	25	1	5	

Discussion

The pathogenesis of the pterygium is multifactorial including inherited factors and environmental triggers in origin. Current evidence strongly suggests that the ultraviolet light (UV) is probably the single most important factor. Several molecular mechanisms are activated by UV exposure, including oxidative stress and growth factor (GF) receptor signaling; these lead to the production of various factors, such as pro inflammatory cytokines, GFs and matrix metalloproteinases that appear to promote pterygium growth. Infact both connective tissue growth factor and vascular endothelial growth factor (VEGF) are present in the epithelium of pterygia. The technique of excising a pterygium without repairing the remaining defect is called bare sclera excision. This technique is no longer recommended because of its high rate of recurrence, which ranges from 38% to 88%. This recurrence rate is higher than for any other treatment modality. Moreover, there are no advantages conferred by this technique except for its simplicity and short surgical time [7-9]. Hence; the present study was undertaken for comparing the efficacy of conjunctival autografts using sutures and fibrin glue in patients undergoing pterygium excision surgery.

In the present study, mean age of the patients of the suture group and glue group was 46.8 years and 44.2 years respectively. 64 percent of the patients of the suture group and 70 percent of the patients of the glue group were males. Patkar P *et al.* compared the outcome of conjunctival autograft (CAG) surgery for pterygium using autologous serum versus fibrin glue. A prospective, randomized controlled trial was carried out on 40 patients over a period of 2 years. Group I (20 eyes) underwent CAG with fibrin glue and Group II (20 eyes) underwent CAG with autologous serum. Postoperatively, the parameters noted in both the groups were the time taken for surgery in both the groups, postoperative outcomes such as redness and discomfort during blinking, outcome of the graft (graft edema, graft retraction, graft rejection, graft displacement, and graft loss), and recurrence of the pterygium. In Group I (autologous serum), the mean surgical time was 34.8 min (standard deviation [SD] = 3.664912), whereas in Group II (fibrin glue), the mean surgical time was 22.95 min (SD = 3.086047). The intensity of postoperative discomfort was greater in Group I (autologous serum) than Group II (fibrin glue) on postoperative visits. However, the difference was not statistically significant. Graft rejection was observed in one patient belonging to the fibrin glue group, after 1 month postoperatively, which eventually by the end of 3 months led to graft loss. We found decreased postoperative inflammation and decreased recurrence rate at both a 3- and

6-month time period with the use of fibrin glue compared with autologous serum. It was concluded that fibrin glue is generally considered safe; however, since it is made from human plasma, it carries the risk of transmitting infections.¹¹ In the present study, mean duration of surgery of the suture group and the glue group were 31.5 minutes and 18.4 minutes respectively. Significant results were obtained while comparing the mean duration of surgery. Patient discomfort was significantly less in the glue group in comparison to the suture group. Telang OJ *et al.* compared postoperative outcome using 2 different techniques of conjunctival autograft after pterygium excision with sutures vs. without sutures using autologous blood. The study included 50 eyes of 50 patients with primary pterygium. They were randomly divided into two groups- In group 1, 25 eyes underwent conjunctival autograft with patient's own blood followed by bandaging for 48 hours; in group 2, 25 eyes underwent conjunctival autograft with 10-0 monofilament nylon sutures followed by patching the eye for 24 hours. Patients were followed up postoperatively on 2nd day, at 1 week, 2 weeks and 4 weeks. All surgeries were done by same surgeon. Patient comfort, operating time, graft complications, pre and post-surgery visual acuity and astigmatism were studied. Postoperative symptoms were less in group 1 than group 2. The operative time was significantly less in group 1 (21-30 minutes) than group 2 (31-40 minutes). Complications like graft oedema, graft retraction and graft dehiscence were present in group 1, and however, the difference was not statistically significant. Also, change in astigmatism was noted postoperatively along with improvement in best corrected visual acuity. The patients need to be padded after surgery for 48 hours in group 1 compared to 24 hours in group 2. They concluded that autologous blood is a useful method for graft fixation in pterygium surgery with shorter operating time and less postoperative discomfort^[12].

Conclusion

From the above results, the authors concluded that the use of fibrin glue to attach the free conjunctival autograft in pterygium surgery produces shorter operating time and less post-operative discomfort as compared to sutures.

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