Comparative study of fibrin glue vs suturing technique for fixing conjunctival autograft in pterygium excision surgery.

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Abstract

Aim of the study: Aim of the study is to find a better alternative surgical technique in pterygium excision surgery with conjunctival autograft.

Objective of the study: Objective of the study was to find out the efficacy of fibrin glue material when compared to suturing technique in pterygium excision surgery with conjunctival autograft in a group of patients presenting with pterygium to a tertiary care hospital.

Materials and methods: This is a prospective, interventional type of study conducted in ophthalmology department of a tertiary care hospital. The time period of the study was from February 2015 to September 2016. Eighty (80) patients who presented with nasal/temporal pterygium were taken up for the study. The patients were divided into two groups: BBGROUP 1 underwent pterygium excision with conjunctival autograft fixation using 10-0 ethilon sutures. Fourty (40 patients) and group 2 underwent pterygium excision with conjunctival autograft fixation using fibrin glue (40 patients).

Results and conclusion: The time taken for surgery using fibrin glue was relatively less when compared to conjunctival suture group with the P value-0.016 (<0.05). Graft oedema was found to be less in fibrin glue group with a value of 2.8% when analyzed by Chi Square test with a significant P value of 0.000 (<0.05) Graft loss was found to be nil in fibrin glue group with a P value-0.007. Graft recession in suture group was found to be statistically significant when analyzed using Chi Square test with a P value 0.001 (<0.005).

Keywords: Fibrin glue, Pterygium, Ocular comorbidities, P value.

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Introduction

Pterygium was recognised 3000 yrs ago, described by Susrutha way back in 1000 B.C. in India. Pterygium literally means "wing" and is an encroachment of the conjunctiva on the cornea, most often on the nasal side and is found in areas of high ultraviolet radiation, dry, hot, windy, dusty, and smoky environments [1].

The invasion of the corneal surface can lead to significant visual morbidity due to irritation of the ocular surface, irregular astigmatism, obstruction of the visual axis, and loss of corneal transparency [2].

The indications for surgery are reduced visual acuity due to encroachment upon the visual axis and irregular astigmatism and other causes are due to chronic irritation and recurrent inflammation, and cosmesis [3].

Treatment for pterygium is excision of the tissue and current surgical methods are mainly aimed to prevent pterygium recurrence by conjunctival autograft, limbal and limbal–conjunctival transplant, conjunctival flap and conjunctival rotation autograft surgery and amniotic membrane transplant, cultivated conjunctival transplant, lamellar keratoplasty [4]. The graft is secured either by sutures or fibrin glue or homologous serum.

The purpose of this study is to compare the more recent and relevant techniques on surgical treatment of pterygium which involves the patients own conjunctival tissue (autograft) as the graft material and to prove that fibrin glue will be a better alternative when compared to suture material.

Materials and Methods

This is a prospective, interventional type of study conducted in Ophthalmology department of Saveetha Medical College and Hospital Thandalam.

The time period of the study was from February 2015 to September 2016.

Sample size

Eighty (80) patients who presented with Nasal/Temporal Pterygium to Saveetha Medical College were taken up for the study. (Sample proportion=0.95%, Power%=80, Alpha error =5%, Sided=2, Sample size derived =80).

After explaining the procedure and obtaining the willingness and written consent, all the patients were divided into two groups and operated by a single surgeon randomly by systematic random sampling method:

Group 1 Pterygium excision with conjunctival autograft fixation using 10-0 ethilon sutures (40 patients).

Group 2 Pterygium excision with conjunctival autograft fixation using fibrin glue (40 patients). The patient was subjected to the following ocular and routine systemic investigations

Ocular examination

- Uncorrected visual acuity
- Best corrected visual acuity
- Slit lamp examination, photographs
- Keratometry readings of the cornea
- Schirmers test
- Fundus examination
- Extraocular movements

Inclusion criteria

1. Patients presenting with primary nasal/temporal pterygium encroaching the cornea.
2. Male and female patients in the age group of 21-70 yrs.

Exclusion criteria

1. Secondary/recurrent pterygium.
2. Ocular comorbidities (dry eyes, blepharitis, trichiasis).

Surgical technique

Peribulbar block of xylocaine 2% was given and the superior rectus muscle was secured using bridles suture. The fleshy tissue of pterygium was identified and resected with the help of Lim s forceps and conjunctival scissors. The region from where the pterygium was resected was cauterized using wet field cautery in case of any bleeding vessels. The limbal autograft was taken from superotemporal region of the bulbar conjunctiva as per the Starck et al. technique.

The ocular area from where the pterygium was excised was measured with a caliper and the fibrin glue was applied using Duplo jet injector over the ocular surface and the autograft of appropriate size was well spread and placed over the bare area. After ensuring the adherence of the graft surgery was completed and dressing was done. In case of suturing technique 4 to 5 sutures were applied using 10~0 ethilon sutures to fix the autograft.

Postoperative follow up

The patients from both the groups were reviewed post operatively on the 1st day, 1st week, 1st month, 3 month to assess:

- Visual acuity
- Extraocular movements
- Patients Discomfort level
- Subconjunctival hemorrhage
- Slit lamp examination
- Corneal epithelial damage
- Corneal perforation
- Graft oedema (Figure 1)
- Graft recession
- Graft loss
- Pterygium recurrence.
- Post-operative keratometry readings at every visit
- Dropout rates were estimated accordingly.

Statistical Analysis

Time taken for surgery was analyzed using Independent t test and with the P value-0.016 (<0.05) proving it as significant. The time taken for surgery using fibrin glue was relatively less when compared to conjunctival suture group depicted by the bar diagram below (Figure 2). The pre-operative and postoperative keratometry values in both the groups were found to be similar with no significant (P value-0.222).

Graft oedema was found to be relatively less in fibrin glue group with a value of 2.8% (1 patient) when compared to suture group which had 75% (27 patients) with graft oedema when analyzed by Chi Square test with a significant P value of 0.000 (Figure 3). Graft loss was found to be nil in fibrin glue group when compared to suture group in which 1 patient (2.7%) had graft loss, which was significant with a P value-0.007. Graft recession in suture group was found to be statistically significant when analyzed using Chi Square test with a P value 0.001 (<0.005).

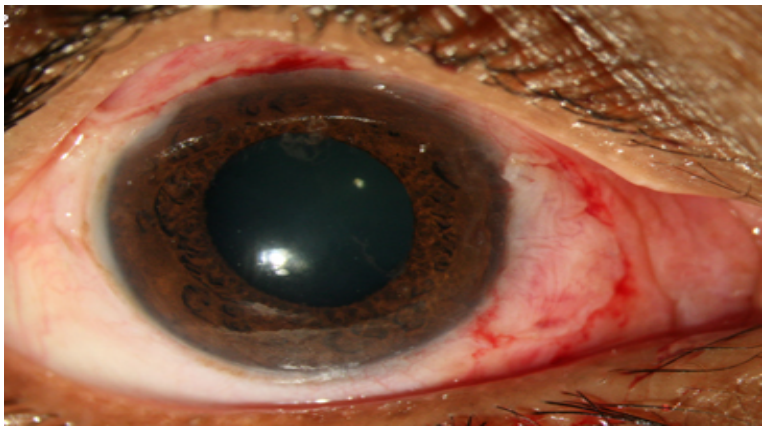

Figure 1. *Graft oedema.*

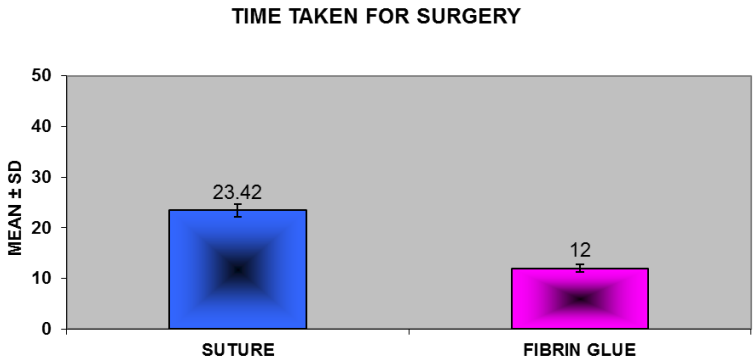

Figure 2. *Time taken for surgery using fibrin glue and conjunctival suture.*

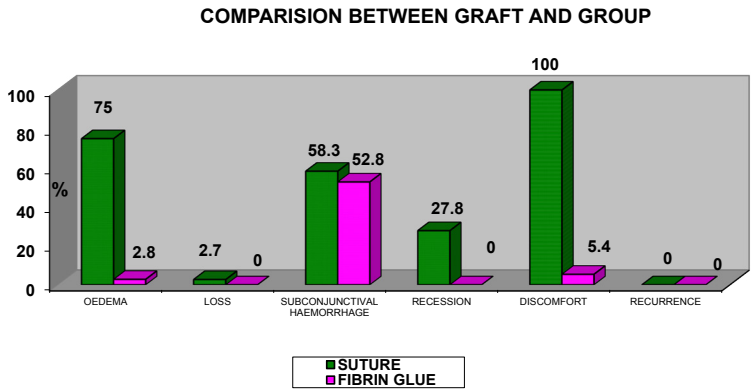

Figure 3. *Comparison between graft and group by Chi Square test with a significant P value of 0.000.*

Symptoms such as foreign body sensation, irritation felt by the patient were considered as discomfort level postoperatively. In group 1% to 100% (36 patients) complaint of discomfort when compared to group 2 in which only 5.4% (2 patient) experienced discomfort resulting in a significant P value -0.00 (<0.005) when analyzed using Chi square test. There was no recurrence of pterygium in both the groups at the end of postoperative third month.

Results and Discussion

In India, pterygium is a common problem encountered by ophthalmologists in their day to day practice. Though surgery is the treatment of choice, it is associated with a high recurrence rate. Several surgical techniques evolved over the years, indicating the difficulty in finding one 'ideal' procedure-from bare scleral techniques to the use of medical and surgical adjunctives. Pterygium surgery is commonly performed in our institution, using 10,0 ethilon sutures to secure the autograft. This technique requires a high level of surgical expertise, and also has several disadvantages such as prolonged surgery time, the possibility of suture-related complications, such as suture granulomas (mass of granulation tissue), abscess formation, tissue necrosis (cell death) giant papillary conjunctivitis; and importantly, the patient may complain postoperatively of ocular irritation including foreign body sensation, pain, redness and irritation.

An increase in the inflammatory response around sutures in the conjunctiva seems to be responsible for these adverse events [5]. Therefore, by replacing the sutures with fibrin glue; it would be expected that the graft would adhere, and the post-operative discomfort and other complications associated with the suture material could well be alleviated which we experienced in our study also.

In our study, graft edema was observed more commonly in suture group 27 patients (38.9%) and 1 patient (2.8%) in the fibrin glue group due to surgical manipulation. This subsided within one week with topical steroids. Graft edge recession was noticed in 27.8% of the suture group patients whereas in fibrin glue group none of the patients encountered graft recession. Discomfort was more common in suture group patients when compared to fibrin glue patients, almost 100% and 5.4% respectively.

Graft loss was encountered in 1 patients (2.7%) of suture group, similar to Uy et al. study [6] in which fibrin glue was found to be a safe and effective method for attaching autografts, as well as reducing surgical time and post-operative patient discomfort. There was no evidence of recurrence in neither of the groups in our study. The average surgical time for the fibrin glue group was 12 minutes, and 23 minutes for the suture group. This compares to Bahar et al. who in their study reported a mean operating time of 16 minutes in the fibrin-glue group and 20 minutes in the suture group. In both the fibrin glue group and suture groups, the size of the pterygium did not impact on the duration of the procedure similar to Bahar et al. study which showed no correlation between pterygium size and surgery time [7].

Pterygium is more common in men than women probably due to greater exposure to dust and environmental factors, but if the individuals are involved in the same kind of occupation, this sex difference disappears as reported by Hillgers [8]. In our study we found that 50% of the patients were males and 50% were females. 22.2% of our patients were outdoor labourers who

are more prone to UV radiations and dust particles, followed by housewives (16.7%) and cooks (15.3%) who gave history of prolonged exposure to smoke generated by fossil fuels. Farmers (12.5%) and traffic police (5.6%) also presented with pterygium. Hence occupation plays a major role in the aetiopathogenesis of pterygium. In the present study, pterygium was more common in persons engaged in outdoor occupations eg. labourers, farmers, cooks, vendors. This is in accordance with the findings of MacReynolds [9] who stated that pterygium is more common among farmers than those people employed in indoor occupations. Similar studies have been published by Hillgers [10], Anderson and Kerknezov [11].

Conclusion

Hence from our study we found that incidence of pterygium was found to be more in those engaged in outdoor occupation such as labourers and those exposed to smoke from fossil fuels such as cooks and housewives. The use of fibrin glue to attach the free conjunctival autograft in pterygium surgery produces shorter operating time, less post-operative discomfort and complications compared to 10-0 ethilon sutures. Shorter surgery time logically translates into lower infection risk and saves valuable operating theatre time. The patient stands to benefit on account of an earlier return to normal life due to greater postoperative comfort.

References

1. Rosenthal JW. Chronology of pterygium therapy. Am J Ophthalmol. 1953;36:1601-16.
2. Rong SS, Peng Y, Liang YB, Cao D, Jhanji V. Does cigarette smoking alter the risk of pterygium A systematic review and meta-analysis. Invest Ophthalmol Vis Sci. 2014;55:6235-43.
3. Adamis AP, Starck T, Kenyon KR. The management of pterygium. Ophthalmol Clin North Am. 1990.
4. Ang LP, Chua JL, Tan DT. Current concepts and techniques in pterygium treatment. Curr Opin Ophthalmol. 2007;18:308-13.
5. Hara T, Shoji E, Hara T, et al. Pterygium surgery using the principle of contact inhibition and a limbal transplanted pedicle conjunctival strip. Ophthalmic Surg. 1994;255:583-90.
6. Uy HS, Reyes JM, Flores JDG, et al. Comparison of fibrin glue and sutures for attaching conjunctival autografts after pterygium excision. Ophthalmology. 2005;112:667-71.
7. Bahar I, Weinberger D, Gaton DD, et al. Fibrin glue versus vicryl sutures for primary conjunctival closure in pterygium surgery: Long-term results. Curr Eye Res. 2007;32:399-405.
8. Hilgers JHC. Pterygium: incidence, heredity and etiology. Am J Ophthalmol. 1960.
9. McReynolds JO. The nature and treatment of pterygia. JAMA. 1902. pp. 296-99.
10. Hill JC, Maske D. Pathogenesis of pterygium. Eye. 1989;3:218-26.
11. Kerkenezov N. Trans. Ophthalmic Society. 1956;16:11.

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