

Original Research Article

Outcome of pterygium surgery by using conjunctival autograft attachment with fibrin glue: a prospective study

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Received: 30 September 2020

Revised: 04 December 2020

Accepted: 05 December 2020

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ABSTRACT

Background: Pterygium is a degenerative condition of sub conjunctival tissues that proliferates as vascularised granulation tissue to invade cornea. Treatment modalities may be medical or surgical. Objectives were to assess results of pterygium surgery in patients with pterygium, in terms of operative time, post-operative symptoms, overall graft success and post-operative complications conducted at government medical college, hospital, Jammu during one year.

Methods: Prospective study conducted on 25 patients by using fibrin glue over a period of one year in upgraded department of ophthalmology at GMC Jammu.

Results: Mean operating time was 23.20 minutes by using fibrin glue, severity of post-operative symptoms were less. Graft successfully attached in all cases.

Conclusions: Present study concluded that use of fibrin glue associated with less operating time and less post-operative discomfort in terms of severity and duration

Keywords: Pterygium, Fibrin glue, Conjunctival autograft

INTRODUCTION

Pterygium is a degenerative condition of subconjunctival tissues that proliferates as vascularized granulation tissue to invade cornea, destroying Bowman's layer and superficial layers of stroma, the whole being covered by conjunctival epithelium. Derived from the Greek word that means "wing" in English, it denotes a peculiar fan-shape structure, commonly affected population in tropical and subtropical areas.¹ Various theories have been put forth from time to time regarding the aetiology of pterygium.

Various predisposing factors include-UV radiations, chronic inflammations,^{2,3} microtrauma due to pathological hairs on the caruncle or in the inner canthus and rarely due to concretions of meibomian glands, granulomas, meibomian cysts, and warts.^{2,3} Mackle propounded the hypothesis that pterygium is caused by

localized discontinuity of precorneal tear film due to abnormal blinking reflexes. Various other hypotheses in the pathogenesis of pterygium are, type-I hypersensitivity reaction, T-cell mediated type-IV hypersensitivity responses accelerated fibroblast proliferation chronic inflammation elastodysplasia and elastodystrophy, stem cell aplasia, p53 tumor suppressor gene overexpression in the epithelium of the pterygium coupled with the disruption of the normal process of apoptosis in the conjunctiva. However, the most widely accepted explanation implicates UV ray's exposure as the major causative factor. Austin described a highly characteristic histological appearance of pterygium in which four features predominate.⁴

Hyalinization of sub-epithelial tissue of substantia propria, diffuse or lobular collection of eosinophilic granular material and increased number of fibroblasts and other cells, an increased amount of thickened and

tortuous fibers that stain strongly with elastin stains adjacent to or beneath the hyalinising region and concretions within the hyalinised and granular areas that may show either eosinophilia or basophilia.

Clinically pterygium can be divided into four parts cap, head, neck and body. The Head is triangular in shape which is firmly adherent to the cornea. The body is the fan shaped expansion from the neck, consisting of epithelium, connective tissue, and blood vessels. The clinical appearance of pterygium differs according to stage and degree of activity of process that leads to its formation.⁵ In the active stage, it is hyperaemic with dilated and congested blood vessels with a halo of greyish white opacity and looks thickened and opaque. In the atrophic stage, it is seen with the cicatrized look and with decreased engorgement of blood vessels, having no halo of opacity. Generally, it is asymptomatic except for cosmetic blemish. However, as it advances it may encroach the pupillary area causing a decrease in visual acuity. Large nasal pterygium may cause diplopia due to the limitation of abduction from the traction of the conjunctiva. Moreover, it may disturb the corneal tear film leading to dryness and punctate keratitis with symptoms of irritation. Other symptoms include photophobia, tearing, foreign body sensation and corneal astigmatism.

Treatment modalities may be medical or surgical.⁶⁻¹⁰ From earliest times medical treatments have been tried and found unsatisfactory such as application of solid choline chloride, the topical use of steroids and subconjunctival injection of hyaluronidase. The report of surgical treatment of pterygium dates to or before 1000 B.C. Initially, excision with simple closure of the wound was done. Some thought it was crucial to cover the exposed peribulbar defect with normal conjunctiva. Some designed various rotating conjunctival flaps to accomplish this. Some favoured the use of free graft. Some favoured the use of bulbar conjunctiva to cover the defect from the same or opposite eyes.⁷ The bare sclera technique has been practiced worldwide as the most basic and simple technique for pterygium removal. Pterygium surgery is marred by its high recurrence rate.

Conjunctival autografting after pterygium excision is associated with a lower recurrence rate of 2-9% and relatively few sight-threatening complications. Conjunctival auto grafting is recognized as a procedure of choice for pterygium surgery. It involves obtaining a graft from supero-temporal limbal conjunctiva in case of nasal pterygium and placing the graft over the bare sclera after pterygium excision. Stem cells from the limbal conjunctiva act as a barrier to the conjunctival cells migrating on to the corneal surface.^{2,3} The current method of attaching conjunctival autograft is by means of fibrin glue. The attachment of graft by use of suture material is associated with several disadvantages, including prolonged operating time, post-operative discomfort and potential for suture related complications such as button

hole, suture abscesses, granuloma formation, tissue necrosis, and giant papillary conjunctivitis. To prevent these complication ophthalmic surgeons are switching to suture less surgery by using fibrin glue. A cross-sectional study also describes a successful outcome with a suture less conjunctival autograft by using fibrin glue. Therefore, this study was undertaken to study overall success rate of the conjunctival autograft by using fibrin glue in terms of operating time, postoperative symptoms and graft success.

The outcome measures were studied in terms of operative time, postoperative symptoms, overall graft success and post-operative complications.

METHODS

Setting

It was a prospective study conducted on 25 patients over a period of one year in upgraded department of ophthalmology at GMC Jammu.

Duration and type of study

This study was conducted over a period of one year from November 2016 to November 2017 and this was prospective study conducted on 25 patients.

Permission was taken from institutional ethical committee. Written informed consent was taken from all patients after explaining the examination, benefits and risks of surgical procedure.

Inclusion criteria

Inclusion criteria included patients in age group 21 to 60 years of age of both sexes.

Exclusion criteria

Exclusion criteria excluded known hypersensitivity to fibrin glue, ocular surface disorders, history of ocular surgery or trauma in past and glaucoma suspect.

Preoperative assessment

Detailed medical and ophthalmological history was taken, uncorrected and best corrected visual acuity recorded with Snellen's chart, slit lamp examination, fundoscopy, non-contact tonometry, keratometry, bleeding time, clotting time, prothrombin time, PTI and fasting blood sugar were done.

Operative procedure

Topical antibiotics four times a day were instilled one day prior to surgery. Topical xylocaine 4% eye drops four times before surgery at the interval of five mins) were

instilled. Peribulbar anaesthesia with 5 ml of 2% lignocaine and 0.5% bupivacaine was given. After preparing and draping the selected eye, both eyelids were retracted by inserting eye speculum. With the help of 26-gauge needle 0.5 ml of 2% xylocaine was injected just underneath the body of pterygium. After holding the pterygium with fixation forceps, a small incision was given in conjunctiva just medial to head of pterygium to separate conjunctiva from body of pterygium with Westcott scissors. The pterygium was removed from conjunctiva by avulsion. Haemostasis was achieved spontaneously. Defect size was measured with calliper. 2% lignocaine was injected into supero-temporal conjunctiva to balloon the area and separate it from tenon's capsule. The graft was measured with calliper and excised starting from forniceal end reaching up to limbal area using forceps and Westcott scissors. The graft was placed on bare sclera in such a way so as to maintain the original orientation of the limbal borders towards cornea. The graft was smoothened at its bed taking care to avoid folding of edges. Limbal side of graft was affixed to limbal area and sides of the graft was attached to surrounding conjunctiva 2-3 drops of fibrin glue were placed on bare sclera and spread with needle cannula.

The fibrin glue was prepared from fibrin sealant kit. Fibrin sealant kit contained sealer protein concentrate (human), fibrinolysis inhibitor solution (synthetic), thrombin (human) and calcium chloride solution in four separate vials. Freeze dried sealer protein concentrate and Thrombin were reconstituted in fibrinolysis inhibitor solution and calcium chloride solution respectively. The sealer protein solution and thrombin solution were then combined using the Duploject preparation and application system to the fibrin sealant. Separate syringes are used for reconstituting sealer protein and thrombin solution and for application to prevent premature clotting. since Fibrinotherm device was not available, reconstitution was done using a water bath. The thrombin and fibrinogen reacted to seal the graft to bare sclera. The limbus-to-limbus orientation is to be maintained and sides of the graft were opposed to edges of recipient conjunctiva. The drying period is 5 mins. The lid retractors were removed and the patient was asked to blink several times to test graft mobility and adherence. Eyes were patched and bandaged for 24 hours. After the removal of pad and bandage the patient was prescribed topical antibiotic-steroid combination eye drops two hourly for two weeks and then tapered off in two weeks.

The operating time was measured starting from placement of lid retractors to its removal at the end of surgery.

Follow up was done at 1st postoperative day, 1st postoperative week, 1st postoperative month and 6th postoperative month.

At each visit patients were evaluated for pain, foreign body sensation, watering and discomfort. A slit lamp

examination was performed at every visit to monitor autograft integrity and development of complications, corneal defects, symblepharon, granuloma formation and contact dermatitis. Data was analyzed using SPSS code version twenty-two and MedCalc code version fifteen. Information were understood as percentage and proportion.

RESULTS

The present study conducted at government medical college, hospital, Jammu over a period of one year from November 2016 to November 2017. It was a prospective study conducted on 25 patients by using fibrin glue over a period of one year in upgraded department of ophthalmology at GMC Jammu.

Mean age of this population in present study found to be 41.37 ± 11.75 years. Mean operating time was 23.20 minutes by using fibrin glue, severity of post-operative symptoms was less. Post-operative complications including conjunctival hyperaemia seen in 76% of patients that was resolved later on. Graft successfully attached in all cases.

Table 1: Pre-operative characteristics.

Characteristics	Values
No. of eyes	25
Age in years (mean)	41.37 ± 11.75
Gender	
Male	15
Female	10
Eye involved	
Right	17
Left	8
Types of pterygium	
Atrophic	2
Non-inflamed	11
Inflamed	12

Statistically, preoperative characteristics features were found to be non-significant. Out of 25 eyes enrolled 17 eyes were right sided and 8 eyes were left sided. 12 eyes had inflamed type, 11 eyes had non-inflamed and 2 eyes had atrophic type of pterygium. Mean age in this study found to be 41.37 ± 11.75 years.

Table 2: Operating time.

Variables	Values
No. of patients	25
Mean operative time (min)	23.20

The mean operative time was found to be 23.20 minutes.

In this study, 20 patients had grade 2 discomfort and 5 patients have grade 3 discomfort. Grade 1 and grade 4

discomfort was not noticed in any patient. Maximum number of patients had grade 2 discomfort.

Table 3: Post-operative symptoms.

Operative procedure	No. of patients	Watering and post-op discomfort grade				Total
		1	2	3	4	
Attachment of graft by using fibrin glue	25	0	20	5	0	25
%		80		20		100

Table 4: Grading of postoperative symptoms.

Grade	Pain/discomfort	Watering
1	No pain	No
2	Minimal discomfort (pain tolerated)	Minimal
3	Moderate with some discomfort	Moderate
4	Severe discomfort (interfere sleep)	Severe

Maximum number of patients (80%) had grade 2 discomfort in this study. Out of 25 patients, 20 patients had grade 2 discomfort.

Table 5: Overall success rate (at 6th post-operative month).

Overall success rate	Number of eyes
Yes	25
No	0

The overall success rate was 100 percent concluded on sixth postoperative month.

Table 6: Post-operative complications in follow up.

Complications	No. of eyes	Percentage (%)
Conjunctival hyperaemia	19/25	76
Corneal defects	3/25	12
Pyogenic granuloma	0/25	0
Symblepharon	0/25	0
Conjunctival granuloma	0/25	0
Recurrence	0/25	0
Increase IOP	0/25	0 (n. s)

Out of 25 patients, 19 patients have conjunctival hyperaemia and 3 patients have corneal defects. Both of these complications resolved after first postoperative week by use of topical lubricating and antibiotic drops.

DISCUSSION

The high rate of recurrence after pterygium excision has been the main obstacle in its successful treatment. However, in its endeavour to minimize recurrence different techniques with different adjuncts were tried by various authors from time to time. Although pterygium excision is considered to be a minor procedure, it is still challenging for ophthalmic surgeons worldwide. Pterygium surgery will be successful only when it prevents its recurrence. Although many surgical modalities have been proposed to treat pterygium, none of them is yet an ideal one to accomplish the desired end result. Adjunctive treatments in the form of beta-radiations, argon laser photocoagulation, and thiotepa were introduced to reduce the rate of recurrence but none of them were without complications. The use of Mitomycin drops have also been used to prevent the recurrence of pterygium after its excision but mitomycin use is also associated with complication such as corneal scleral melting, cataract, uveitis, symblepharon, secondary glaucoma.

The bare sclera technique used for pterygium excision was also associated with a high recurrence rate. Kenyon et al popularized the conjunctival autograft transplantation technique.⁷ It re-establishes the barrier function of the limbus and hence significantly lowers the recurrence rate. The conjunctival autograft is either attached with sutures, autologous blood or fibrin glue. Attaching conjunctival autograft using autologous blood also known as suture and glue-free graft technique. Although conjunctival autografting is an effective method for the prevention of recurrence after pterygium surgery, suturing needs surgical experience and technical skills. Sutures also lead to patient discomfort, symblepharon or graft rupture. The average operating time for fibrin glue group was significantly shorter in present study similar to Kornay et al.¹¹ The average operating time was significantly shorter in present study similar to Harvey et al.¹⁰

Karazeli et al reported an operating time of 32.5 mins in the case of a suture group and 15.7 mins in the case of the fibrin glue group.¹² Less operative time that was similar to our present study.

In present study postoperative symptoms were less severe in fibrin glue group similar to Bahar et al study and Uy et al.^{13,14} Graft was successfully attached in present study. Similarly, grafts were successfully attached and intact after 2 months in Uy et al study.¹⁴

Limitations

Sample size of the study was small as less number of patients were enrolled. Follow-up was done for only six months.

What does this study contribute?

This study was conducted to do conjunctival autografting with fibrin glue, there are other methods of attaching conjunctival autograft like attachment of graft with sutures.

The surgical treatment of pterygium with conjunctival autograft by using fibrin glue without sutures is a very effective and easy technique with minimum surgical time, better postoperative comfort to the patient and very low recurrence rate. As still conventional methods of pterygium excision are practiced widely.

CONCLUSION

Present study concluded that attachment of conjunctival autograft by using fibrin glue is effective method associated with less operating time, less learning curve and less post-operative discomfort in terms of severity and duration.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kaur H, Maqbool B, Kaur M. Outcome of pterygium surgery by using conjunctival autograft attachment with fibrin glue: a prospective study. Int J Res Med Sci 2021;9:134-8.