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Effect of Pterygium Excision with Conjunctival Autografting on Visual Acuity and Refraction using Sutures Versus Fibrin Glue

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Abstract:
Background: *Pterygium is a degenerative ocular surface disorder which can alter vision with its progressive growth. In this study we aim to evaluate the effect of surgical excision of a progressive pterygium using conjuctival autografting by two different methods (sutures and fibrin glue) on vision and refraction of patients.*
Material and Methods: *A prospective study was conducted on 100 eyes of 100 patients visiting the outpatient Department of Ophthalmology, Government Medical College Srinagar over a period of two years. Patients were randomly allocated in two groups (Group S and Group FG) and preoperative assessment including uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), spherical error and cylindrical error were noted. 50 patients underwent pterygium excision with conjunctival autografting using 10-0 nylon sutures (**Group S**) and other 50 underwent same procedure using fibrin glue (**Group FG**). Follow up visits were carried at 1st week, 2nd week, 1st month, 3rd month and 6th month on which UCVA and BCVA were noted on each visit. Cylindrical and spherical error was noted preoperatively and at the end of six months postoperatively.*
Results: *The mean uncorrected visual acuity and best corrected visual acuity (logMAR) in the two study groups was comparable preoperatively as well as postoperatively on all follow ups. However the mean uncorrected visual acuity (logMAR) significantly improved in both groups after 6 months of follow up postoperatively (p value 0.034 in suture group and 0.027 in fibrin glue group). The mean best corrected visual acuity (logMAR) also significantly improved in both groups after 6 months postoperatively (p value 0.047 in suture group and 0.039 in fibrin glue group). The mean cylindrical error and spherical error in the two study groups was comparable preoperatively as well as 6 months postoperatively. However the mean cylindrical error significantly decreased in both groups after 6 months postoperatively (p value 0.019 in suture group and 0.012 in fibrin glue group) while the mean spherical error also significantly decreased in both groups after 6 months postoperatively (p value 0.044 in suture group and 0.031 in fibrin glue group).*
Conclusion: *Pterygium excision with conjunctival autografting results in significant improvement in both uncorrected and best corrected visual acuity (UCVA and BCVA) and a significant decrease in both cylindrical and spherical error irrespective of whether sutures or fibrin glue was employed for the procedure.*
Keywords: *Pterygium, UCVA, BCVA, cylindrical error, spherical error, conjuctival autografting,*

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I. Introduction

Pterygium is characterized by a triangular portion of the bulbar conjunctiva encroaching onto the cornea, usually within the intrapalpebral fissure and most often from the nasal side[1]. Pteryguim is commonly seen in India, a part of the .pterygium belt. described by Cameron. The indications for pterygium surgery are (a) visual impairment; (b) recurrent inflammation; (c) motility restriction; (d) cosmetic disfigurement [2]. The studies indicate that pterygium commonly generates corneal flattening and with-the-rule astigmatism. Additionally, it is found out that the size of pterygium is related to the spherical power and astigmatism. Pterygium excision with conjunctival autograft method that is used most commonly now can enable recovery on the postoperative sphero- cylindrical power and astigmatism[3,4,5]. In this study pre and post operative visual acuities (UCVA and BCVA) along with spherical and cylindrical errors were evaluated in two groups undergoing pterygium excision with comjunctival autografting using sutures and fibrin glue.

II. Materials and Methods

100 eyes of 100 patients were used for this prospective study conducted at Post Graduate Department of Ophthalmology, SMHS Hospital, Srinagar over a period of two years from October 2017 to October 2019. After randomly allocating the patients in two groups, 50 patients underwent pterygium excision with conjunctival autografting using 10-0 nylon sutures (**Group S**) and other 50 underwent the same procedure using fibrin glue (**Group FG**) operated upon by a single senior surgeon. Patients above 18 years of age, cases of primary progressive nasal pterygium with reduced visual acuity , ocular discomfort and patients who agreed to complete a minimum of 6 months postoperative follow up were included in the study. Patients with recurrent pterygium and any ocular surface infection were excluded. Before surgery a complete eye examination including un-aided visual acuity (logMAR), best corrected visual acuity using spectacles, refraction using auto-refractometer and cycloplegic refraction to accurately detect sphero-cylindrical errors, , slit-lamp examination and dilated fundus examination was done.

Surgical procedure was done after giving peribulbar block. Pterygium excision with auto conjunctival graft taken from the superior-temporal bulbar conjunctiva of the same eye was secured on bare area with 4 to 6 sutures using 10-0 nylon in suture group (S) while in patients of fibrin glue group the graft was fixed by placing 2 drops of fibrin sealant (using dual syringe system with common plunger) on bare sclera and a drop on backside of the graft. The graft was then flipped on to bare sclera and pressed gently. After 2 minutes graft adhesion was confirmed and eye was bandaged after injecting dexamethasone and gentamicin sub-conjunctivally away from the graft.

On first postoperative day, bandage was removed and patients were examined, unaided and aided visual acuities (using logMAR chart) were noted. Patients were started on steroid antibiotic eye drops 6 times a day which were tapered over 4 to 6 weeks. Post operative follow up visits were conducted at at 1st week, 2nd week, 1st month, 3rd month and 6th month on which respective unaided and aided visual acuities (UCVA and BCVA) were noted using logMAR chart. Refraction using auto-refractometer and cycloplegic refraction were performed at 6th month postoperatively to accurately detect sphero-cylindrical errors post pteryguim excision with conjunctival autografting.

Statiatical analysis:

Normally distributed continuous variables were compared using student's independent *t*-test, and non-normally distributed variables were analyzed using Mann-Whitney *U*-test. Chi-square test or Fisher's exact test, whichever appropriate, was employed for comparing categorical variables.

III. Results

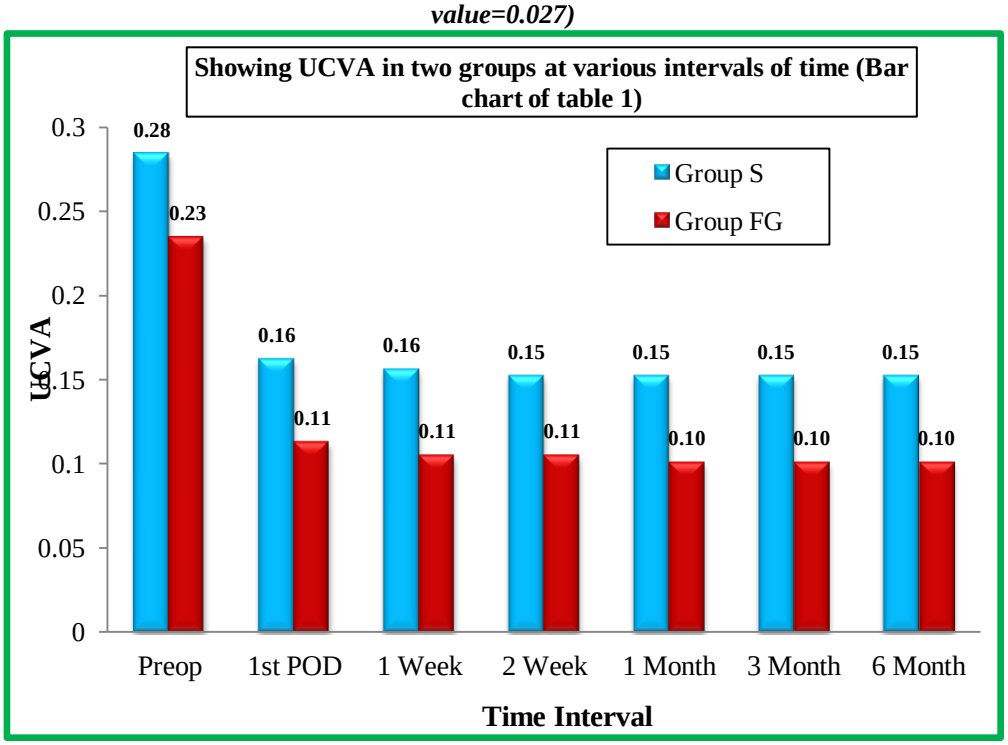
Suture group consisted of 50 patients with ages ranging from 34 to 54 years while fibrin glue group consisted of 50 patients with ages ranging from 34 to 52 years. The mean uncorrected visual acuity (logMAR) in the two study groups (as shown in **table 1**) was comparable preoperatively as well as postoperatively on all follow ups. However the mean uncorrected visual acuity (logMAR) significantly improved in both groups after 6 months of follow up postoperatively (p value 0.034 in suture group and 0.027 in fibrin glue group).

Table 1: Comparison based on UCVA in two groups at various intervals of time

Time Interval	Group S		Group FG		P-value
	Mean	SD	Mean	SD	
Preop	0.28	0.323	0.23	0.271	0.408
1st POD	0.16	0.259	0.11	0.186	0.278
1 Week	0.16	0.253	0.11	0.183	0.248
2 Week	0.15	0.255	0.11	0.183	0.456
1 Month	0.15	0.253	0.10	0.183	0.249
3 Month	0.15	0.253	0.10	0.183	0.249
6 Month	0.15	0.253	0.10	0.183	0.249

(UCVA : Uncorrected visual acuity; S: Suture; FG: Fibrin Glue; Preop: preoperative, POD: postoperative day)

Group S: Pre-op vs 6 Months Post-op (P-value=0.034); Group FG: Pre-op vs 6 Months Post-op (P-value=0.027)



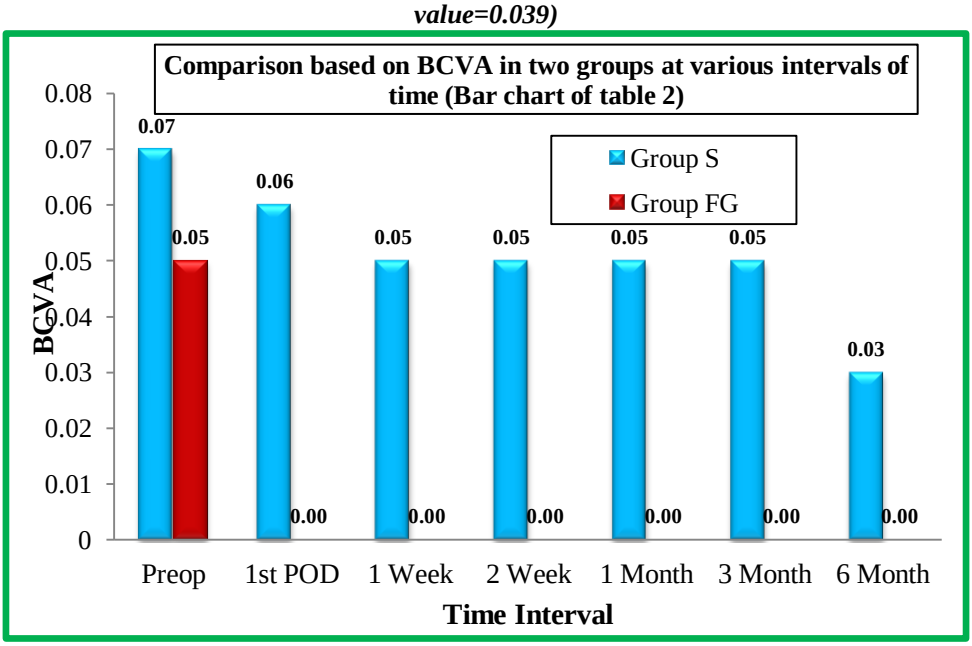
The mean best corrected visual acuity (logMAR) in the two study groups was comparable preoperatively as well as postoperatively on all follow ups. However the mean best corrected visual acuity (logMAR) significantly improved in both groups after 6 months postoperatively with p value 0.047 in suture group and 0.039 in fibrin glue group (**table 2**).

Table 2: Comparison based on BCVA in two groups at various intervals of time

Time Interval	Group S		Group FG		P-value
	Mean	SD	Mean	SD	
Preop	0.07	0.223	0.05	0.119	0.577
1st POD	0.06	0.240	0.00	0.00	0.081
1 Week	0.05	0.168	0.00	0.00	0.087
2 Week	0.05	0.168	0.00	0.00	0.087
1 Month	0.05	0.168	0.00	0.00	0.087
3 Month	0.05	0.168	0.00	0.00	0.087
6 Month	0.03	0.125	0.00	0.00	0.415

(BCVA: Best corrected visual acuity; S: Suture; FG: Fibrin Glue; Preop: preoperative; POD: postoperative day)

Group S: Pre-op vs 6 Months Post-op (P-value=0.047); Group FG: Pre-op vs 6 Months Post-op (P-value=0.039)



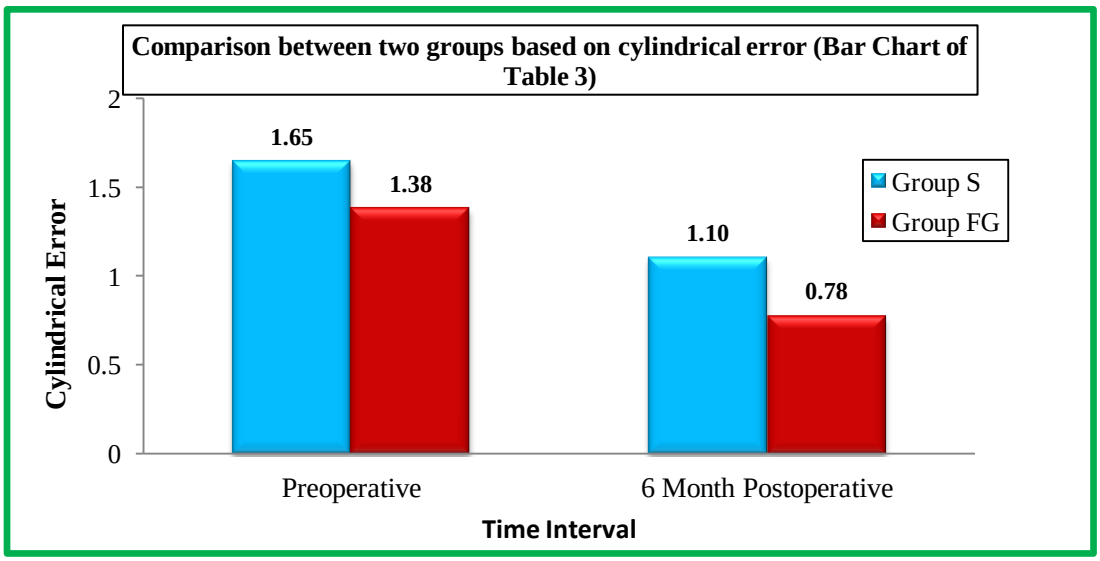
The mean cylindrical error in the two study groups was comparable preoperatively as well as 6 months postoperatively. However the mean cylindrical error significantly decreased in both groups after 6 months postoperatively with p value 0.019 in suture group and 0.012 in fibrin glue group (**table 3**).

Table 3: Comparison between two groups based on cylindrical error in diopters

Cylindrical Error	Group S		Group FG		P-value
	Mean	SD	Mean	SD	
Preoperative	1.65	1.661	1.38	1.115	0.421
6 Month Postoperative	1.10	1.269	0.78	0.714	0.177

(S: Suture; FG: Fibrin Glue)

Group S: Pre-op vs 6 Months Post-op (P-value=0.019)
Group FG: Pre-op vs 6 Months Post-op (P-value=0.012)



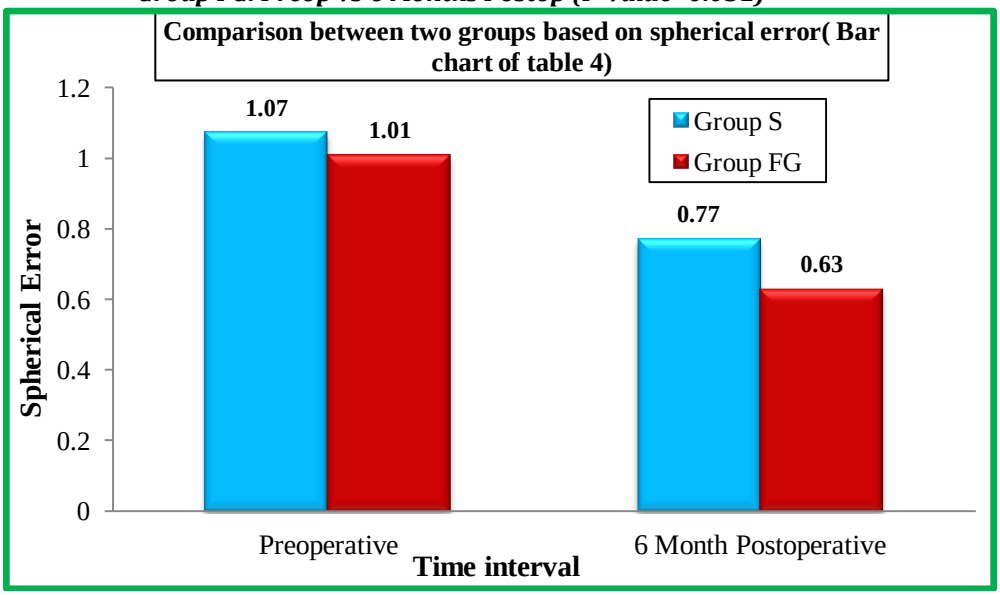
The mean spherical error in the two study groups was comparable preoperatively as well as 6 months post operatively. However the mean spherical error significantly decreased in both groups after 6 months post operatively with p value 0.044 in suture group and 0.031 in fibrin glue group (**table 4**).

Table 4: Comparison between two groups based on spherical error in diopters

Spherical Error	Group S		Group FG		P-value
	Mean	SD	Mean	SD	
Preoperative	1.07	0.974	1.01	0.693	0.781
6 Month Postoperative	0.77	0.817	0.63	0.553	0.458

(S: Suture; FG: Fibrin Glue)

Group S: Preop vs 6 Months Postop (P-value=0.044)
Group FG: Preop vs 6 Months Postop (P-value=0.031)



IV. Discussion

The impairment of vision caused by pteryguim can be attributed either to mechanical traction on the cornea or mechanical interference with regularity of ocular surface and tear film, or by direct invasion of the visual axis. **Maheshwari S**[6] found significant improvements in visual acuity after pterygium excision surgery in all the grades of pterygium ($P < 0.05$). Similarly **Garag P et al**[7] in their study observed that UCVA significantly improved from 0.56 ± 0.49(logMAR) pre operatively to 0.32 ± 0.29 postoperatively (at 3 months;$P<0.0001$) which correlates with our study as well. **Errais K et al**[5] in their study found that UCVA improved significantly from 0.31±0.33 preoperatively to 0.52±0. 32 postoperatively (p=0.04) and BCVA improved significantly from 0.73±0.20 preoperatively to 0.89±0.16 post operatively (p=0.008 using paired two-tailed t-test). **Koc H et al**[8] observed that mean BCVA improved from 0.05 and 0.06 logMAR preoperatively in FG and suture groups respectively to 0.01 logMAR in both groups postoperatively. In their study sutured conjunctival autograft and fibrin glue for pterygium surgery have similar results in terms of visual acuity and refractive changes All these observations are in conformity with our study.

In our study in FG group, the mean cylindrical error decreased from 1.38D preoperatively to 0.78D postoperatively at 6th month (p value 0.012) and mean spherical error reduced from 1.01D preoperatively to 0.63D postoperatively at 6th month (p value 0.031). Similarly in suture group the mean cylindrical error decreased from 1.65D preoperatively to 1.10D postoperatively at 6th month(p value 0.019) and mean spherical error reduced from 1.07D preoperatively to 0.77D postoperatively at 6th month follow up (p value 0.044) . However no significant difference was found between the two groups with regard to mean cylindrical or spherical error at any interval of time (6th month postoperative p value 0.177 for cylindrical and 0.458 for spherical error).**Maheshwari S**[9] observed that the refractive cylinder significantly reduced from 1.94±2.24D preoperatively to 0.78±1.07D postoperatively ($p<0.001$) and refractive sphere significantly reduced from 1.303±1.744 preoperatively to 0.708±1.273 postoperatively (p value < 0.001) which is consistent with our study.

Zaida HEA[10] however in his study found that spherical and cylindrical error changes preoperative and 6 month postoperatively were statistically insignificant.

V. Conclusion

Pteryguim excision with CAG results in significant improvement in visual acuity (both UCVAand BCVA) and reduction of cylindrical and spherical error irrespective of whether sutures or fibrin glue is used to secure the graft.

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