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RESEARCH ARTICLE

CORNEAL TOPOGRAPHIC CHANGES AFTER PTERYGIUM EXCISION WITH CONJUNCTIVAL AUTOGRAFTING USING SUTURES VERSUS FIBRIN GLUE: A COMPARATIVE STUDY

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Abstract

Aim: To compare the corneal topographic changes after pterygium excision with conjunctivalautografting using sutures versus fibrin glue.

Materials 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 underwent complete eye examination along with preoperative corneal topography where corneal astigmatism at central 3mm and total mean refractive power of cornea were noted.50 patients underwent pterygium excision with conjunctivalautografting using 10-0 nylon sutures (Group S) and other 50 underwent same procedure using fibrin glue (Group FG). Corneal topography was again repeated postoperatively in both groups at 2nd week, 1st month, 3rd month and 6th month of follow up and results were noted.

Results: The mean age of study patients in suture group was41.7±8.64 years and in fibrin glue group was39.5±9.58 years. The mean corneal astigmatism at central 3mm significantly decreased from 1.95D preoperatively to 0.61D at postoperative 6thmonth following pterygium excision (p-value 0.003) in suture group. The mean preoperative corneal astigmatism in patients in fibrin glue group also decreased from 2.03D preoperatively to 0.62D at 6thmonth postoperative follow up(p value<0.001).The total mean refractive power of cornea increased significantly from 43.17D preoperatively to 44.59 D postoperatively at 6th month of follow up (p value <0.001) in suture group and in fibrin glue group it significantly increased from 43.23D preoperatively to 44.69D at 6thmonth of postoperative follow up (p value < 0.001).However no significant difference was seen in the postoperative corneal astigmatism at central 3mm or total mean refractive power of cornea between the two groups at any follow up.

Conclusion: Pterygiumexcision with conjunctiva autografting causes reversal of corneal topographic changes induced by pterygium irrespective of whether fibrin glue or sutures are used for autografting.

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Introduction:-

Pterygium is a wing shaped common ocular surface disorder that can hinder vision and affect cosmetic appearance.It is a benign, degenerative and proliferative condition of conjunctiva and subconjunctival tissuethat can distort the corneal topography, cause astigmatism and in advanced cases obscure the optical center of the cornea[1]. The indications for pterygium surgery are (a) visual impairment; (b) recurrent inflammation; (c) motility restriction; (d) cosmetic disfigurement [2].

Corneal topography provides us with a detailed description of variouscurvature and shape characteristics of the cornea.This information is very helpful for the illustration of corneal astigmatism due to pterygium.It is currently accepted that the effect of the pterygium on corneal astigmatism is to increase with the-rule astigmatism (WTRA)[3].

Treatment options vary from medical management to surgical excision, most popular being conjunctivalautografting.Traditionally, the graft would be fixed using sutures, but trial of tissue adhesives like fibringlue have proven to be better alternatives. Tisseel fibrin glue (Baxter, USA) is a two-component fibrin sealer, which when combined has haemostatic, adhesive, sealant and wound-support properties. This study was carried out to compare and evaluate the effects of pterygium excision with conjunctivalautografting using sutures versus fibrin glue on corneal topography.

Patients and Methods:-

100 eyes of 100 patients were used for this prospective observational study conducted at Post Graduate Department of Ophthalmology, Government Medical CollegeSrinagar 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 conjunctivalautografting 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 visual acuity (logMAR), refraction, IOP measurement, schirmer's test, slit-lamp examination and dilated fundus examination was done.Corneal topography using ATLAS (Ziess) Model 9000 CornealTopography System, from Carl Zeiss MeditecInc (USA)was performed preoperatively on all patients.

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 and started on steroid antibiotic eye drops 6 times a day which were tapered over 4 to 6 weeks. Postoperatively corneal topography was again performed at 2^{nd} week, 1^{st} month, 3^{rd} month and 6^{th} month of follow up respectively. The parameters observed during preoperative and postoperative corneal topography were corneal astigmatism at central 3mm and total mean refractive power of cornea.

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.

Results:-

The mean age distribution of study patients in two groups was comparable with mean age of patients in fibrin glue group**(FG)** being 39.5±9.58 and suture group **(S)**being 41.7±8.64years.In our study,as shown in **table 1**, there was a

significant decrease in mean preoperative corneal astigmatism from 2.03 diopters in FG group to 0.92D postoperatively at week 2 and 1 month, 0.87D at 3rd month and 0.62D at 6th month with an average decrease of 1.41D pre and 6 month postoperatively (p value<0.001). Similar trend was observed in suture group as well with preoperative corneal astigmatism significantly decreasing from 1.95D to 0.94D postoperatively at 2nd week, 0.88D at 1 month, 0.76D at 3rd month and 0.61D at postoperative 6thmonth with an average decrease of 1.34D pre and 6 month postoperatively (p value 0.003). However no significant difference was observed between FG and suture groups in terms of topographic astigmatism at any interval of time (6thmonth postoperative p value 0.910).

Table 1:- Comparison based on corneal astigmatism at central 3 mm (Dioptres) in two groups at various intervals of time.

Time Interval	Group S		Group FG		P-value
	Mean	SD	Mean	SD	
Preoperative	1.95	1.520	2.03	1.364	0.782
2 Week postoperative	0.94	0.849	0.92	0.936	0.911
1 Month postoperative	0.88	1.127	0.92	0.786	0.827
3 Month postoperative	0.76	0.312	0.87	0.608	0.258
6 Month postoperative	0.61	0.367	0.62	0.246	0.910

(S: Suture; FG: Fibrin Glue)

Group S: Preopvs 6 Months Postoperative (P-value=0.003), Group FG: Preopvs 6 Months Postoperative(P-value<0.001)

In present study as shown in **table 2** we found that the mean total refractive power of cornea increased significantly from 43.23D preoperatively in FG group to 43.66D at post op 2nd week, 44.28D at 1 month, 44.47D at 3rdmonth and 44.69D at 6thmonth (p value < 0.001). Similarly, the total mean refractive power of cornea increased significantly from 43.17D preoperatively in suture group to 43.61D at postoperative 2nd week, 44.09D at 1 month, 44.38D at 3rd month and 44.59 D at 6thmonth postoperatively (p value <0.001). However no significant difference was seen in the postoperative total mean refractive power of cornea between the two groups at any followup (p value 0.746 at postoperative 6 month).

Table 2:- Comparison based on total mean refractive power of cornea (Dioptres) in two groups at various intervals of time.

Time Interval	Group S		Group FG		P-value
	Mean	SD	Mean	SD	
Preoperative	43.17	1.895	43.23	1.683	0.867
2 Week postoperative	43.61	1.791	43.66	1.537	0.881
1 Month postoperative	44.09	1.967	44.28	1.522	0.591
3 Month postoperative	44.38	1.747	44.47	1.417	0.778
6 Month postoperative	44.59	1.653	44.69	1.422	0.746

(S: Suture; FG: Fibrin Glue)**Group S: Preopvs 6 Months Postop (P-value<0.001) Group FG: Preopvs 6 Months Postop (P-value<0.001)**

Discussion:-

Pteryguim causes corneal refractive changes that 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.Inour study, corneal topography using Atlas Model 9000 Carl Zeiss was done in all the patients to evaluate pre and postoperative corneal topographic changes.

Many studies have established that pterygium can cause flattening of the central cornea, often resulting in with-the-rule astigmatism andsurgery decreases the pterygium-induced corneal astigmatism at 3 mm[4]. In our study too there was a significant decrease in mean corneal astigmatism at central 3mm over a period of 6 months which reducedfrom 2.03 diopters preoperativelyin fibrin glue group to 0.62D at 6th month postoperative follow up with an average decrease of 1.41D pre and 6 month postoperatively (p value<0.001).In suture group too the corneal astigmatism at central 3mm reduced from1.95D preoperatively to 0.61D postoperatively at 6th month of follow up (p-value 0.003), with an average decrease of 1.34D over a period of 6 months. However we observed no significant

difference between fibrin glue and suture groups in terms of topographic astigmatism at any interval of time (6th month postoperative p value 0.910).On similar lines **Maheshwari S**[5] in their study observed that the mean preoperative topographic astigmatism significantly reduced from 4.40± 3.64D to 1.55±1.63D postoperatively (p value<0.001). **Koc H et al**[6] in their study observed that in the postoperative 1st month, there is a decrease of 3.2 D (avg.) in topographic corneal astigmatism in the suture group and a decrease of 4.3 D (avg.) in the group in which fibrin glue has been used (p value < 0.01). However they did not observe anysignificant difference between the two groups in terms of postoperative corneal topographic astigmatism(p=0.93) which is in conformity with our study.

In present study we found that the mean total refractive power of cornea increased significantly from 43.23D preoperatively in fibrin glue group to 44.69D at 6th month of postoperative follow up (p value < 0.001). Similarly, the total mean refractive power of cornea increased significantly from 43.17D preoperatively in suture group to 44.59 D at 6th month postoperative followup (p value <0.001). However no significant difference was seen in the total mean refractive power of cornea postoperatively between the two groups at any follow up (p value 0.746 at postoperative 6th month).**Maheshwari S**[5] whose studyshowed that the mean Average Corneal Power increased from 42.91±2.20 diopter (D) to 44.25±1.77D (P value < 0.001) after 1 month of pterygium excision.**Errais K et al**[7] intheir study also observed that the mean spherical power of cornea increased from 41.65±3.29 D preoperatively to 44.58±1.55D (p=0.04) after 3 months postoperatively which is in conformity with our study.

Conclusion:-

From our study we concluded that pterygiumexcision with conjunctivalautografting causes reversal of corneal topographic changes induced by pterygium irrespective of whether fibrin glue or sutures are used for autografting.

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