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A COMPARISON IN REFRACTIVE OUTCOME BETWEEN PTERYGIUM EXCISION WITH CONJUNCTIVAL AUTO GRAFT AND SUB - CONJUNCTIVAL PTERYGIUM EXCISION WITH REPOSITION OF CONJUNCTIVA USING AUTOLOGOUS BLOOD.

Ophthalmology

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ABSTRACT

Aim: To evaluate the change in keratometric reading and cylindrical power in the immediate post-operative period and at the end of one month in the two groups evaluated. [group 1 – subconjunctival excision of pterygium with reposition of conjunctiva using autologous blood, group 2- pterygium excision with limbal conjunctival auto graft using 10-0 ethilon sutures.]

Method: The study involved 22 patients in group 1 and 19 patients in group 2. All the patients in group 1 were operated by surgeon 1 and group 2 patients were operated by surgeon 2. The keratometric reading was documented pre- operatively, on the first post- operative day and at the end of one month in all the patients. The patients were followed up for a period of 9 months. The data was analysed using Two Way Annova and repeated measures Annova test. Univariate analysis was done using student's test and paired t test. Multivariate analysis was done using repeated measures ANOVA.

Result: The mean (+SD) age of the study patients was 45.09 (+9.86) years. There was female preponderance with 29 females and 12 males. The two groups were well matched with no statistically significant difference in the age, gender, baseline cylindrical power and keratometric reading in the two principal meridia of the two groups.

There was a statistically significant reduction in the cylindrical power of the eyes across the whole follow-up period across the groups (p<0,001). There was also a significant reduction from baseline to first follow-up at the end of 1week (p=0,002), baseline to 2nd follow-up at 1month (p<0.001) and between 1st and 2nd follow-up (p=0.004), Table 2. Change in cylinder across study period was very significant with F value 25.8 and p value<0.001.

There was statistically significant change in the Keratometric readings of both the principal meridian, with the change in Keratometric readings greater in the horizontal meridian than the vertical meridian, (p<0.001 and p=0.03 respectively. First post-operative visit cylinder value (C2) between the groups was very significant with t-5.7 and p value<0.001. Second post-operative visit (C3) between the groups was significant with t-2.2 and p value 0.03.

Conclusion : Patients who underwent subconjunctival dissection and excision of pterygium with conjunctival reposition using autologous blood had a stable k reading within the first post op day as compared to patients who underwent pterygium excision with limbal autograft transplantation. At the end of one month both the groups had a similar stabilisation of the keratometric readings.

KEYWORDS

pterygium, cataract, limbal autograft, corneal curvature, keratometry.

INTRODUCTION :

Pterygium is a clinical condition consisting of wing shaped ocular surface lesion extending from the bulbar conjunctiva onto the cornea, most commonly on the nasal side.[1]

On histological examination, the lesions show several characteristic features: inflammatory cells, neovascularization; remodelling 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 into three types: proliferative, fibromatous, and atrophic sclerotic.[2]It has also been speculated that a pterygium may represent an area of localized limbal stem cell deficiency which results in invasion of the adjacent cornea by the conjunctiva. [3] Its clinical evaluation can be quantified by size, including invasion of the cornea and width at the base, as well as morphologic features.

The prevalence in India ranges from 9.5%[4] to 13%[5] and is more common in the rural parts of the country. Pterygium can impair vision by number of mechanisms like altered tear film, photophobia, epiphora and binocular diplopia due to contraction of the tenon's capsule but the most common and utmost important cause of reduced vision is pterygium induced astigmatism[6]. Pterygium induced astigmatism can be the cause of subjective visual complaints, including decreased visual acuity, glare sensitivity and monocular diplopia.

The earliest described surgical approach for pterygium was simple excision leaving a bare sclera which had a recurrence rate as high as 80%. Since then various modifications in technique have been reported. Conjunctival limbal autograft has been the most commonly recommended treatment since the first in depth study reported in the early 1980s. It has the significant benefit of reducing the recurrence rate to 15%; however, it is significantly more difficult and time consuming than simple excision.

Extended removal of pterygium plus adjunctive amniotic membrane transplantation has gained increased popularity over the past 10 years. Simple excision with adjunctive radiotherapy with strontium 90 plaque or with mitomycin C is a fast and easy surgery which reduces the recurrence rate to 15%. However, radiotherapy and chemotherapeutic agents have severe complications like scleritis, infectious sclerokeratitis and scleromalacia.

METHODS:

The study involved 22 patients in group 1 and 19 patients in group 2. Ethical Committee clearance was obtained from the institute and written informed consent was taken from all the patients who participated in the study. All the patients in group 1 were operated by surgeon 1 and group 2 patients were operated by surgeon 2. The keratometric reading was documented pre- operatively, on the first post- operative day and at the end of one month in all the patients. The patients were followed up for a period of 9 months. The data was analysed using Two Way Annova and repeated measures Annova test. Univariate analysis was done using student's test and paired t test. Multivariate analysis was done using repeated measures ANOVA. Group 1 patients were operated using the following technique – the neck of the pterygium was undermined and excised at the limbus. The

head of the pterygium was then peeled off the cornea and the debri scraped off the corneal surface. The conjunctiva was separated from the subconjunctival tissue by injecting saline with 26 gauge needle between conjunctiva and subconjunctival tissue. The subconjunctival tissue was completely dissected upto the caruncle and excised taking care not to touch any of the recti muscle fibres.[fig 1] The conjunctiva was then reposited using autologous blood. [fig 1] Subconjunctival injection of gentamycin and dexamethasone was given. All the cases in group 1 was operated by a single surgeon.

Group 2 patients were done by surgeon 2 wherein the pterygium was excised in toto and an autologous limbal conjunctival graft was sutured in place.[fig 2] Subconjunctival injection of dexamethasone and gentamycin was given.

All the patients were followed up for a minimum period of 9 months. The maximum follow up was 2 years duration. Both the groups had one recurrence each who were treated with excision and mitomycin C with limbal autograft.

RESULTS:

The two groups were comparable, they were age and sex matched. The univariate analysis was done using students test and paired t test. Multivariate analysis was done using repeated measures ANOVA (R-ANOVA).

The horizontal corneal curvature (K1) across the study period was significant with F value 8.6 and p value 0.006.[table 1.] Between the groups the K1 was not significant with p value 0.88 and F value 0.01. The vertical corneal curvature (K2) across the study period was significant with F value 17.05, p value<0.001.[table 2] Between the groups the K2 was not significant with p value 0.27 and F value 1.28. Change in cylinder across study period was very significant with F value 25.8 and p value<0.001. Between the groups showed a trend towards significance with F value 3.6 and p value<0.06.[table 3] Pre-operative cylinder values (C1) between the groups were comparable with no selection bias, t-0.35 and p value 0.72.

First post-operative visit cylinder value (C2) between the groups was very significant with t-5.7 and p value<0.001.[table 4] Second post-operative visit (C3) between the groups was significant with t-2.2 and p value 0.03. All the patients were followed up for a minimum period of nine months and a maximum of eighteen months. Only one recurrence was noticed in each of the groups.

Table 1 The horizontal corneal curvature (K1) across the study period was significant with F value 8.6 and p value 0.006

Tests of Within-Subjects Contrasts						
Measure:MEASURE_1						
Source	K1	Type III Sum of Squares	df	Mean Square	F	Sig.
K1	Linear	14.546	1	14.546	8.624	.006
	Quadratic	1.698	1	1.698	2.032	.162
K1 * grp	Linear	.015	1	.015	.009	.925
	Quadratic	1.765	1	1.765	2.113	.154
Error(K1)	Linear	64.094	38	1.687		
	Quadratic	31.750	38	.836		

Table 2 Tests of Within-Subjects Contrasts

Measure:MEASURE_1						
Source	K1	Type III Sum of Squares	df	Mean Square	F	Sig.
K1	Linear	13.656	1	13.656	17.054	.000
	Quadratic	.173	1	.173	.547	.464
K1 * grp	Linear	.027	1	.027	.034	.855
	Quadratic	.086	1	.086	.273	.604
Error(K1)	Linear	30.427	38	.801		
	Quadratic	12.020	38	.316		

The vertical corneal curvature (K2) across the study period was significant with F value 17.05, p value<0.001.

Table 3

Tests of Within-Subjects Effects						
Measure:MEASURE_1						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.
K1	Sphericity Assumed	66.172	2	33.086	19.967	.000
	Greenhouse-Geisser	66.172	1.157	57.216	19.967	.000
	Huynh-Feldt	66.172	1.201	55.082	19.967	.000
	Lower-bound	66.172	1.000	66.172	19.967	.000
K1 * grp	Sphericity Assumed	5.028	2	2.514	1.517	.226
	Greenhouse-Geisser	5.028	1.157	4.348	1.517	.228
	Huynh-Feldt	5.028	1.201	4.186	1.517	.228
	Lower-bound	5.028	1.000	5.028	1.517	.226
Error (K1)	Sphericity Assumed	125.936	76	1.657		
	Greenhouse-Geisser	125.936	43.948	2.866		
	Huynh-Feldt	125.936	45.650	2.759		
	Lower-bound	125.936	38.000	3.314		

Tests of Within-Subjects Contrasts						
Measure:MEASURE_1						
Source	K1	Type III Sum of Squares	df	Mean Square	F	Sig.
K1	Linear	63.931	1	63.931	25.809	.000
	Quadratic	2.241	1	2.241	2.678	.110
K1 * grp	Linear	.001	1	.001	.000	.983
	Quadratic	5.027	1	5.027	6.006	.019
Error(K1)	Linear	94.130	38	2.477		
	Quadratic	31.806	38	.837		

Tests of Between-Subjects Effects					
Measure:MEASURE_1 Transformed Variable:Average					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	169.400	1	169.400	80.585	.000
grp	7.630	1	7.630	3.630	.064
Error	79.881	38	2.102		

Change in cylinder across study period was very significant with F value 25.8 and p value<0.001

Between the groups showed a trend towards significance with F value 3.6 and p value<0.06.

Table 4

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
c2	Equal variances assumed	20.469	.000	-5.725	40	.000	-1.11809	.19530	-1.51280	-.72338
	Equal variances not assumed			-5.524	24.263	.000	-1.11809	.20242	-1.53563	-.70055
c1	Equal variances assumed	.201	.656	-.354	40	.725	-.23668	.66899	-1.58876	1.11539
	Equal variances not assumed			-.351	37.695	.727	-.23668	.67393	-1.60135	1.12798
c3	Equal variances assumed	1.374	.248	-2.215	38	.033	-.22263	.10051	-.42610	-.01917
	Equal variances not assumed			-2.171	30.728	.038	-.22263	.10255	-.43185	-.01341
k11	Equal variances assumed	.121	.729	-.408	40	.685	-.28268	.69276	-1.68279	1.11743
	Equal variances not assumed			-.407	39.255	.686	-.28268	.69412	-1.68637	1.12101
k12	Equal variances assumed	2.487	.123	.262	40	.794	.15514	.59158	-1.04049	1.35076
	Equal variances not assumed			.257	32.712	.798	.15514	.60270	-1.07148	1.38175
k13	Equal variances assumed	.845	.364	-.538	38	.593	-.26925	.50000	-1.28145	.74295

	Equal variances not assumed			-.536	36.550	.595	-.26925	.50250	-1.28782	.74933
k21	Equal variances assumed	.155	.696	-1.118	40	.270	-.67082	.59986	-1.88319	.54155
	Equal variances not assumed			-1.117	39.363	.271	-.67082	.60073	-1.88555	.54392
k22	Equal variances assumed	1.587	.215	-1.510	40	.139	-.82941	.54943	-1.93985	.28104
	Equal variances not assumed			-1.493	36.282	.144	-.82941	.55550	-1.95572	.29690
k23	Equal variances assumed	.169	.684	-1.026	38	.311	-.51875	.50537	-1.54181	.50432
	Equal variances not assumed			-1.023	37.061	.313	-.51875	.50684	-1.54565	.50815

Pre-operative cylinder values (C1) between the groups were comparable with no selection bias, t-0.35 and p value 0.72

1st post operative visit cylinder value (C2) between the groups was very significant with t-5.7 and p value<0.001

2nd post operative visit (C3) between the groups was significant with t-2.2 and p value 0.03.

DISCUSSION

Pterygium has a causal relationship with exposure to UV – B radiation and there is a high incidence of cataract in tropical countries, hence many patients develop cataract and pterygium concomitantly. The susceptible population in tropical areas consists largely of daily wage earners without access to private hospitals or corporate set ups and loss of days of work on account of surgery as it amounts to loss of income. Small pterygia can be removed concurrently with the cataract in one sitting as it may not make a difference in the visual outcome. However large pterygia [figure 1] induce refractive astigmatism, which affects the outcome following cataract surgery, hence pterygia that interfere with keratometry readings should be removed before proceeding with cataract surgery.[9] Post-operative refractive surprises are prevented by ensuring accurate and stable keratometry. The K values used for IOL power calculation will not be the same following excision of visually significant pterygia.

Thus, when pterygium excision is combined with cataract surgery or performed after cataract surgery, the altered K values cause a refractive surprise. Astigmatism induced by pterygium is often reversible on excision unless it has caused scarring. As a rule, any pterygium of 3mm size or larger should be excised prior to cataract surgery and patients with small pterygia with regular mires on keratomery with low or absent astigmatism can have cataract surgery prior to pterygium excision. Following pterygium excision, one should wait 6 to 8 weeks for corneal curvature to stabilize before assessing the patient for cataract surgery.

Keratometry should be repeated 2 weeks later to ensure stability of the cornea before these measurements are used for biometry. Recurrence was defined as fibrovascular tissue of more than 1 mm over the cornea in the area of previous pterygium excision. The two techniques of management used in our study are ; 1] conjunctival limbal autograft following excision of the pterygium in toto along with the overlying conjunctiva. 2] subconjunctival dissection of pterygium and excision and leaving behind the same conjunctiva using autologous blood. In the first technique, under strict aseptic precautions and local anaesthesia, the belly of the pterygium was cut from the limbus about 4-5mm towards the canthus. The head of the pterygium was then avulsed from its corneal attachment by reverse stripping using slow and deliberate traction holding its free end parallel to the cornea.

The donor tissue was harvested from the same eye and transferred to the bare sclera without losing the limbal orientation. The four corners of the graft were then secured using 10-0 ethilon [figure 2]. In the second technique after cutting the pterygium at the limbus the subconjunctival tissue is thoroughly dissected up to the caruncle taking special care to prevent buttonholing of the conjunctiva and excised [figure 3]. The conjunctiva is then reposed using autologous blood, no cautery is used during the entire procedure. The K readings were recorded on the first post- operative day at the end of one month in all the patients.

The K readings stabilised on the first post-operative day itself in patients whom subconjunctival excision of pterygium was done with reposition of the conjunctiva as compared to the group of patients in whom autologous graft was used. The K values took about a month to stabilise in the group of patients in whom autograft was used. Hence for patients who might refuse cataract surgery due to difficulty in accessing hospital care for the same, subconjunctival excision of pterygium with reposition of conjunctiva and cataract surgery within the next 2 or 3 days would be a better option.

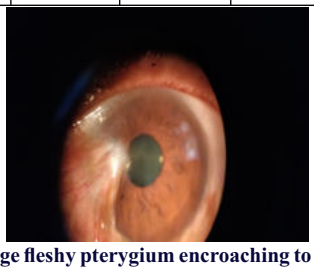

Figure 1 - large fleshy pterygium encroaching to the pupil margin and causing astigmatism

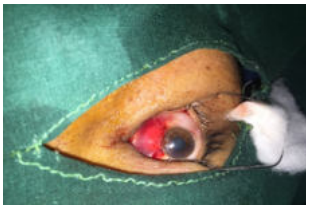

Figure 2 – autologous graft sutured in situ

Figure 3 – conjunctiva re apposed with autologous blood after dissection of sub conjunctival tissue

CONCLUSION :

Simultaneous pterygium and cataract surgery are necessary in patients who cannot easily access eye care facilities. In all other cases sequential surgery may be preferred. Pterygium surgery should be sequenced before cataract surgery when the pterygium is large enough to induce corneal curvature changes. For patients who come to us from interior areas and are not willing to come back for 2 surgeries this technique of subconjunctival resection of pterygium with conjunctival reposition using autologous blood is feasible as the k reading stabilises in the first post-operative day itself and consecutive cataract surgery can be planned over the next 2 or 3 days , thus reducing the period of stay and the need to revisit for surgery. As it is suture - less the comfort of the patient is also taken care for.

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