Evaluation of the Effectiveness of Rotational Conjunctival Flap Compared to Free Autografting for Ocular Surface **Reconstruction after Surgical Removal of Primary Pterygium**

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ABSTRACT

Background: pterygium is a fibrovasular lesion of the ocular surface that can display an aggressive clinical behavior and occasionally, threatens the vision. Although there is no consensus on its pathogenesis, recent evidence suggests that is a prolifrative rather than degenerative condition, strongly correlated with exposure to ultraviolet radiation of solar light. **Objictive:** the purpose of this study was to compare the surgical outcomes when using the technique of conjunctival autograft versus conjunctival rotational flap for reconstruction of ocular surface following primary pterygium excision. **Patients and Methds:** this study included 20 eyes of 20 patients with primary pterygia attending at the National Eye Center, Rod El Afarag Hospital. Operated eyes were divided into 2 groups, 10 eyes each Group A: included 10 eyes managed by pterygium excision followed by ocular surface reconstruction using rotational conjunctival flap technique. Group B: included 10 eyes managed by pterygium excision followed by ocular surface reconstruction using free conjunctival autograft technique. **Results:** The better result wase in cases treated by conjunctival autograft group with 10 % recuurence while the higher recurrence rate 20% was seen in cases by rotational conjunctival flap group. Other minor complications were found such as flap retraction in 2 cases of group, buttonhole of the graft in one case in group B, flap edema was in lower incidence than graft edema and no suture granuloma happened in both groups.

Conclusion: free conjunctival autograft and rotational conjuctiavl flap showed comparable results, in reducing recurrence rate; they are safe and effective methods of pterygium surgery that produces only few complications.

Keywords: Conjunctival, Autografting for Ocular Surface Reconstruction, Pterygium

INTRODUCTION

Pterygium is a fibrovascular proliferation that grows at the inter-palpebral conjunctival area, it can occur on either side of the cornea, but the nasal limbus is much more commonly involved ⁽¹⁾.

Its growth can cause also irregular astigmatism, corneal scarring, restriction of ocular motility and chronic ocular surface inflammation ⁽¹⁾.

Pterygium may be active (red and thickened) and grow over months to years, or inactive (white and flat) and remain stable for years (2).

Although the pathogenesis of a pterygium remains an enigma, several risk factors were reported for the occurrence of pterygium such as ultra-violet (UV) light, repeated micro-trauma by dust, chronic conjunctival inflammation, genetic predisposition and ocular dryness have all been reported to be involved in the development of ptervgium, indicating a multifactorial pathogenesis ⁽¹⁾. Existing reports indicate that sunlight exposure is the main factor in pterygium occurrence by inducing growth factor production or chronic inflammation or Deoxyribonucleic acid (DNA) damage ⁽³⁾.Multiple procedures have been advocated in the treatment of pterygium. These range from simple surgical excision, the 'bare sclera technique', it is an easy and common procedure used to manage pterygium ⁽⁴⁾. However, this procedure is associated with a recurrence rate as high as 80%. Application of MMC (MMC), beta-radiation, amniotic membrane and conjunctival transplant have been used in conjunction with simple surgical excision to reduce recurrence (5, 6).

Conjunctival tissue, either as rotation flap or free autograft has been used in conjunction with simple surgical excision to reduce the recurrence and avoid the side effects associated with the use of MMC⁽⁷⁾.

AIM OF THE STUDY

The purpose of this study was to compare the surgical outcomes when using the technique of conjunctival autograft versus conjunctival rotational flap for reconstruction of ocular surface following primary pterygium excision.

PATIENTS AND METHODS

This prospective interventional comparative study included a total of 20 eyes of 20 patients with primary pterygia that warrant surgical removal, attending at the National Eye Center, Rod El Afarag Hospital. Written informed consent from all the subjects were obtained. This study was conducted between (Mention the duration e.g. January 2016, and December 2017). Approval of the ethical committee was obtained. Operated eves were divided into 2 groups of 10 eves each:

- Group A: using the rotational conjunctival flap technique.
- Group B: using free conjunctival autograft technique.

All patients were subjected to the following: **Pre-operative assessment**

- History taking and complete ocular examination.
- Ocular examination including refraction and assessment of best corrected visual acuity, slit

lamp biomicroscopy examination and digital anterior segment photography.

Grading of pterygium for all cases by using Anbesse *et al.* ⁽⁸⁾ system:

- **Grade 1:** extends less than 2 mm onto the cornea. A deposit of iron (Stocker line) may be seen in the corneal epithelium anterior to the advancing head of the pterygium.
- **Grade 2:** involves up to 4 mm of the cornea and may be primary or recurrent following surgery.
- **Grade 3:** encroaches onto more than 4 mm of the cornea and involves the visual axis.

Laboratory assessment of plasma glucose levels, bleeding time and clotting time to detect and exclude patients with abnormal results, which may impair healing.

Operative procedure:

All procedures were done with standard ophthalmologic sterile preparation, using operating microscope. Topical surface anesthesia in the form of surface anesthesia in the form of benoxate Hydrochloride 0.4% was instilled first then pribulbar anesthesia with 2% lignocaine and 0.5% bupivacaine in 1: 1 ratio was injected.

The eye was draped, lid speculum was inserted then the size of the pterygium was measured from the limbus to the pterygium apex using a surgical caliper.

The pterygium head was separated from the cornea by blunt and sharp dissection and the conjunctiva with underlying Tenon's capsule was excised, down to the bare sclera. Only the thickened portion of conjunctiva and the immediate adjacent and subjacent Tenon's capsule showing tortuous vasculature were excised. Large hemorrhage stopped with direct compression while cautery was avoided as possible.

In group A, the flap was made by U shaped incision in the upper bulbar conjunctiva to inferonasal edge is made adjacent to the wound to form a tongue of conjunctiva, the flap was thinly dissected from Tenon's capsule then was rotated in the place of bare sclera. The flap was placed at least 1mm of bare sclera adjacent to the cornea-scleral then sutured by 8/0 polyglycolic acid interrupted sutures (fig. 1).



Fig. (1): Intra operative photo of patient after fixation of CRF by 0.8 vicryl suture.

In group B, the graft was approximately 1-2 mm greater than bare sclera size and was taken from Superior temporal bulbar conjunctiva. Conjunctival graft was dissected from the Tenon for obtaining the thinnest possible conjunctiva then placed on the bare sclera. Care was taken to ensure proper orientation of the graft with the epithelial side up and limbal side toward the limbus, then the graft was sutured by 8/0 polyglycolic acid interrupted sutures. (fig. 2)



Fig. (2): Intraoperative view of patient after fixation of CAG by vicryl 0.8.

Topical antibiotic and steroid combination eye drops were administered 4 times a day for 10 a days and tapered over the next week. Lubricant eye drops were administered 3 times a day for 1 month. The patients were followed up post operatively after 24 hours, 1weeks, 6 weeks and then at 3 to 6 months.

Post-Operative assessment

- 1. Slit lamp examination and digital anterior segment photography was done to assess for complications and pterygium recurrence.
- 2. The subjective symptoms of patients including stitching pain, foreign body sensation and lacrimation were questioned at every follow up.
- 3. Recurrence of the pterygium was defined as the presence of fibrovascular tissue regrowth extending onto clear cornea within the follow-up period using caliper.
- 4. Refraction was performed in the 6th week.

Primary outcomes: To determine the incidence of dislocation or retraction in the graft or the flap and the rate of pterygium recurrence in both techniques.

Secondary outcome: To assess the intra operative complication such as Graft or flap buttonhole and postoperative complications such as sub conjunctival hemorrhage, edema and granuloma formation.

Statistical analysis

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

- Independent-samples t-test of significance was used when comparing between two means.
- Chi-square (x²) test of significance was used in order to compare proportions between two qualitative parameters.

- The confidence interval was set to 95% and the margin of error accepted was set to 5%. The p-value was considered significant as the following:
- Probability (P-value)
- P-value <0.05 was considered significant.
- P-value < 0.001 was considered as highly significant.
- P-value >0.05 was considered insignificant.

The study included 20 eyes of 20 patients; 12 female and 8 male with mean age 46.40 ys in group A and 46.50 ys in group B. all cases of The pterygium were primary in both groups, the complain of patients and degree of encroachment shown in Table (1).

Table (1): Comparison between rotational flap group and auto graft group regarding demographic data, complain and degree of encroachment of the studied cases

RESULTS

		Rotational flap group	Auto graft group	Test	Dualua	C: a
		No. = 10	No. = 10	Test value	P-value	51g.
Condor	Females	6 (60.0%)	6 (60.0%)	0.000	1 000	NC
Gender	Males	4 (40.0%)	4 (40.0%)	0.000	1.000	IND
Age (years)	Mean±SD	46.40 ± 10.00	46.50 ± 7.43	0.025	0.080	NS
	Range	29 - 60	32 - 54	0.025	0.980	
Complain	Cosmetic	3 (30.0%)	4 (40.0%)	0.220	0.620	NC
Complain	Visual	7 (70.0%)	6 (60.0%)	0.220	0.039	IND
	Mild (< 2mm)	2 (20.0%)	1 (10.0%)			
Degree of encroachment	Moderate (2-3mm)	4 (40.0%)	6 (60.0%)	0.876	0.645	NS
	Severe (>3 mm)	4 (40.0%)	3 (30.0%)			

P > 0.05: Non significant (NS); P < 0.05: Significant (S); P < 0.01: Highly significant (HS).*: Chi-square test; •: Independent t-test

Operative data of the studied groups:

Intra operative:

No intra operative graft or flap buttonhole was noted in group A but 2 patients in group B. Table (2) shows the difference between group A and group B. However, There was a statistically non significant difference in the graft or flap buttonhole occurrence between the two groups with (P value= 0.136).

 Table (2): Comparison between rotational flap and auto graft group group regarding graft or flap buttonhole

Graf or flap	Rotational flap group		Auto graf	ft group	Test volue	D voluo	Sig
button hole	No.	%	No.	%	Test value	r-value	Sig.
No	10	100.0%	8	80.0%		0.136	NS
Yes	0	0.0%	2	20.0%	2.222*		
Total	10	100.0%	10	100.0%			

*: Chi-square test

Postoperative data of the studied groups:

The patients were asked to subjectively note the following complications stitching pain, excessive lacrimation and foreign body sensation on post operative first day post operative, week post operative, first month and three to six months.

Postoperative stitching pain represented in Table (3)

Table (3): Shows the difference in postoperative stitching pain between group A and group B

		Group A	Group A		B	Test	Dualua	C:~
		No.	%	No.	%	value*	P-value	51g.
Postop.	No	0	0.0%	0	0.0%	0.000	1.000	NG
Stitching pain	Yes	10	100.0%	10	100.0%	0.000	1.000	1ND
1 day	No	0	0.0%	0	0.0%	0.000	1.000	NG
	Yes	10	100.0%	10	100.0%	0.000		IND
7 day	No	2	20.0%	2	20.0%	0.000	1.000	NG
/ day	Yes	8	80.0%	8	80.0%	0.000		IND
1 months	No	7	70.0%	8	80.0%	0.267	0.000	NC
1 monuis	Yes	3	30.0%	2	20.0%	0.207	0.000	IND
2 months	No	10	100.0%	10	100.0%	0.000	1.000	NG
3 months	Yes	0	0.0%	0	0.0%	0.000	1.000	IND
6 months	No	10	100.0%	10	100.0%	0.000	1.000	NG
	Yes	0	0.0%	0	0.0%	0.000	1.000	IN2

*: Chi-square test

All patients experienced stitching pain in first day post operatively but, after one week, there was a statistically non significant difference in postoperative stitching pain between the two groups, with decrease in stitching pain noted by patients in group B more than group A. Pain sensation declined markedly by the end of the first month and was not detected by the end of follow up.P value (1.000).

Post operative excessive lacrimation:

Post-operative excessive lacrimation noted by patients is summarized in **Table (4)**. **Table (4)**: Shows difference in postoperative lacrimation in post operative first day post operative, week post operative, first month and three to six months.

		Rotational	flap group	Auto graft group		Test	D voluo	Sia
		No.	%	No.	%	value*	P-value	Sig.
Postop. excessive	No	0	0.0%	1	10.0%	1.052	0.205	NG
lacrimation	Yes	10	100.0%	9	90.0%	1.055	0.303	IND .
1 day	No	0	0.0%	3	30.0%	2 520	0.060	NS
	Yes	10	100.0%	7	70.0%	5.529		IND
7 day	No	7	70.0%	8	80.0%	0.837	0.360	NS
7 day	Yes	3	30.0%	2	20.%	0.837		
1 months	No	10	100.0%	10	100.0%	0.000	1.000	NS
1 monus	Yes	0	0.0%	0	0.0%	0.000	1.000	
2 months	No	10	100.0%	10	100.0%	0.000	1.000	NG
3 months	Yes	0	0.0%	0	0.0%	0.000	1.000	INS
6 months	No	10	100.0%	10	100.0%	0.000	1.000	NS
o monuis	Yes	0	0.0%	0	0.0%	0.000	1.000	

*: Chi-square test

There was no statistically insignificant difference in postoperative lacrimation between the two groups on from first day post operative through out the follow up period

Post operative foreign body sensation:

Post-operative foreign body sensation was noted by patients in both groups as represented in Table (5). **Table (5):** Shows difference in postoperative foreign body (F.B.) sensation between two groups

		Rotation	al flap group	Auto g	graft group	Test	Dualua	C:~
		No.	%	No.	%	value*	P-value	51g.
Postop. foreign	No	0	0.0%	0	0.0%	0.000	1 000	NC
body sensation	Yes	10	100.0%	10	100.0%	0.000	1.000	IND.
1 day	No	0	0.0%	0	0.0%	0.000	1.000	NC
1 uay	Yes	10	100.0%	10	100.0%	0.000		IND
7 day	No	6	60.0%	7	70.0%	0.220	0.639	NC
/ day	Yes	4	40.0%	3	30.0%	0.220		IND
1 months	No	7	70.0%	9	90.0%	1.25	0.262	NC
1 monuis	Yes	3	30.0%	1	10.0%	1.23	0.203	IND.
2 months	No	9	90.0%	10	100.0%	1.052	0.204	NC
3 months	Yes	1	10.0%	0	0.0%	1.055	0.304	IND
6 months	No	10	100.0%	10	100.0%	0.000	1 000	NC
	Yes	0	0.0%	0	0.0%	0.000	1.000	NS

*: Chi-square test

There was a statistically non significant difference in postoperative foreign body (F.B.) sensation between both groups from day 1,day 7 (p value=1.00) and still statistically non significant in the first month (p value=0.639) and follow up 3 months there was statistically also non significant difference with (p value=0.304) with F.B sensation much greater in group A, then on 6 months this complain disappeared in both groups (table 5).

Visual acuity and astigmatism:

Visual acuity was measured preoperatively and one month post-operatively for each patient in both groups. The distribution of different visual acuities in both groups is shown in Table (6), improvement of vision was noted in 8 patients in group A versus 6 patients in group B and the rest o f patients were the same visual acuity. However, the difference between 2 groups was statistically insignificant in preoperative (P value=0.785) and post operative (P value=1.000), but each group show significant improvement of visual acuity on log mar chart (Table 6).

		Rotational flap group	Auto graft group	Test value	P-value	Sig.
		No. = 10	No. = 10			
Preop. visual acuity	Mean±SD	0.55 ± 0.17	0.56 ± 0.15	0.277.	0.795	NC
	Range	0.3 - 0.8	0.3 - 0.8	0.277•	0.785	IND
Desten visual aquity	Mean±SD	0.65 ± 0.12	0.65 ± 0.14	0.000	1.000	NS
Postop. Visual acuity	Range	0.5 - 0.8	0.4 - 0.8	0.000•	1.000	IND
Paired t-test	Т	3.714	2.862			
	p-value	0.010 (S)	0.019 (S)			

Table (6): Preoperative and post-operative visual acuity in both groups

•: Independent t-test

Post-operative complications:

The recurrence was considered when fibrovascular growth had occurred at the site of previously excised pterygium crossing the limbus and extending onto the cornea.

Each patient in both groups was examined for post-operative complications such as graft or flap loss or retraction, graft or flap injection, recurrence, granuloma formation and sub conjunctival hemorrhage on first day, week, one month and three months post operatively, Table (7).

Table	(7):	Post	operative	comp	lications
	(-)-		- r		

		Rotational flap group		Auto grou	graft)	Test value*	P-value	Sig.
		No.	% No. %				0	
Postop. Recurrence	No	8	80.0%	9	90.0%	0.202	0.521	NC
	Yes	2	20.0%	1	10.0%	0.392	0.331	GNT
Postop. flab	No	10	100.0%	10	100.0%	0.000	1.000	NS
graft loss	Yes	0	0.0%	0	0.0%	0.000	1.000	
Postop. flab	No	7	70.0%	10	100.0%	2 520	0.060	NC
graft retract	Yes	3	30.0%	0	0.0%	5.529	0.000	IND
	No	10	100.0%	10	100.0%			
Postop. Granuloma	Yes	0	0.0%	0	0.0%	0.000	1.000	NS
	Yes	0	0.0%	0	0.0%			

*: Chi-square test

<u>Post-operative recurrence:</u> One cases developed recurrence of pterygium after three months in group A (20%) and one case in group B (20%),The difference between the two groups was statistically insignificant (p value=0.329) (Table 7).

<u>Post-operative graft or flap loss</u> There was no reported graft or flap loss in either of the studied groups (0.0 %) (Table 7).

Post-operative graft or flap retaction: Three patients had flap retraction in group A (30.0%) one of them in day 1 and 2 of them in day 7 of the follow up with no graft retraction in group B but it was statistically non

significant difference (P-value 0.060) between the both groups (Table 7).

Post-operative granuloma: There was no reported granuloma in either of the studied groups (Table 7).

Post -operative sub conjunctival hemorrhage:

There was a statistically non significant difference in occurrence of postoperative subconjunctival hemorrhage between the two groups on day 1 and day 7, being higher in the rotational flap group and complete resolution at 1 month follow up in both groups as shown in (Table 8)

		Rotati group	Rotational flap group		Auto graft group		P-value	Sig.
		No.	%	No.	%	value*		U
Postop. sub conjunctival	No	7	70.0%	3	30.0%	2 200	0.074	NC
hemorrhage	Yes	3	30.0%	7	70.0%	5.200		IND
1 day	No	7	70.0%	3	30.0%	2 200	0.074	NC
1 day	Yes	3	30.0%	7	70.0%	5.200		IND
7 day	No	7	70.0%	3	30.0%	2 200	0.074	NG
7 day	Yes	3	30.0%	7	70.0%	5.200	0.074	IND
1 months	No	10	100.0%	10	100.0%	0.000	1 000	NC
1 months	Yes	0	0.0%	0	0.0%	0.000	1.000	NS

Table (8): Shows postoperative subconjunctival hemorrhage in both groups

*: Chi-square test

Post-operative graft or flap edema within one weak.

In the first week follow up we noticed flap edema in only 2 eyes in group a (20%) and 4 cases of graft edema in group b (40%) then all resolved within the first month follow up.

 Table (9): Postoperative graft edema

		Rotation group	nal flap	Auto g group	graft	Test	P-value	Sig.
		No.	%	No.	%	value*		
Postop. graft edemaNo(chemosis) withinYes		8	80.0%	6	60.0%		0.329	NS
		2	20.0%	4	40.0%	0.952		

*: Chi-square test

CASE PRESNTATION



Preoperative



After 7 day



Intraoperative



After 1 months



After 6 months







After 1 month



After one week



After 6 months

Fig. (4): Patients of group B.

DISCUSSION

Group A study: In our study conjunctival rotational flap transplantation technique has been applied on 10 cases (Group A) out of 20 cases (50%), whose age ranged from 29 to 60 years with mean 46.40 ± 10.00 , there were 4 males (40%) and 6 females (60%), where 7 cases (70%) complaining from visual disturbance and 3 cases (30%) complaining from cosmetic annoyance. All cases had unilateral and primary pterygium, severity of pterygium was graded from mild pterygium (2 cases, 20%), moderate pterygium (4 cases, 40%) and severe pterygium (4 cases, 40%).

Group B study: Limbal conjunctival auto graft transplantation technique has been applied on 10 cases out of 20 cases (50%), whose age ranged from 32 to 54 years with mean 46.50, there were 4 males (40%) and 6 females (60%), where 6 cases (60%) complaining from

visual disturbance and 4 cases (40%) complaining from cosmetic annoyance. All cases had unilateral and primary pterygium, severity of pterygium was graded from mild pterygium (1 case, 10%), moderate pterygium (6 cases, 60%) and severe pterygium (3 cases, 30%).

The follow-up period was (3-6 months) for both groups and the recurrence was considered when fibrovascular growth had occurred at the site of previously excised pterygium crossing the limbus and extending onto the cornea.

<u>Regarding postoperative complication</u> 1. In group A study:

There was recurrence in 2 cases (20%), flap edema detected in 2 eyes (20%) in the first weak then complete disappeared after that and no reported cases of granuloma formation except for mild congestion and hemorrhage of the conjunctival flap but all of them disappeared within one month.

No reported cases of flap buttonhole or graft loss except for 1 case of flap retraction found in the first post-operative day due to rubbing of eyes causing disruption of the one stitch.

2. In group b study:

There were recurrence of one case (10%) as follow: 39 years, male patient, complaining of visual disturbance due to presence of moderate pterygium (2-3 mm corneal encroachment) which is unilateral and primary in origin graft edema in 4 cases (40%), 2 cases with buttonhole (20%), this happened during separation of the tenon from the conjunctival graft, no reported cases of post-operative graft retraction or graft loss, no reported cases of granuloma formation except for mild congestion and sub conjunctival hemorrhage in 7 cases (70%) during the first week post poreative but all of them disappeared within one month.

<u>Regarding the patient complaining of ocular pain,</u> <u>foreign body sensation and excessive lacrimation in</u> <u>both groups</u>

1. Regarding post operative stitching pain: All patients experienced stitching pain in first day post operatively but, after one week started to disappear, there was a statistically non-significant difference in postoperative stitching pain between the two groups, with decrease in stitching pain noted by patients in group B (20%) more than group A(30%) in the first month. Pain sensation declined markedly by the end of the first month and was not detected by the end of follow up, P value (1.000), in both groups.

2. Regarding post-operative foreign body sensation:

All cases in the rotational conjunctival flap experienced foreign body sensation but 9 eyes in autograft experienced foreign body sensation in the first postoperative day then disappeared this complain in both groups though the follow up peroid, statistically non significance between both groups with F.B sensation much greater in group A.

3. Regarding post-operative excessive lacrimation: Most of cases had excessive lacrimation but all of this improved during of follow up, and the rotational flap show more excessive lacrimation and more longer than autograft cases, the There was no statistically insignificant difference in postoperative lacrimation between the two groups on day1 (p value=0.305) and highly significant difference in one month (p value=0.019) follow up then This complaint disappeared in both groups afterwards.

Excessive lacrimation within the first weak was 2 cases (20%) in first month (autograft).

<u>Regarding the visual outcome and the astigmatic</u> <u>changes in both groups</u>

1. The visual acuity: In our study, in group A, 8 patients (80%) showed improvement of visual acuity and 6 patients (60%) in group B. and best corrected visual acuity showed significant improvement 0.54 ± 0.17 to 0.65 ± 0.12 in rotational flap and significant improvement in mean Log MAR visual acuity from 0.56 ± 0.15 to 0.65 ± 0.14 . in auto graft, the difference between 2 groups was statistically insignificant in preoperative (P value=0.785) and post-operative (P value=1.000),

2. Astigmatic changes: In our study there was decrease in astigmatism post operatively in both groups but this difference was not statistically significant in the postoperative astigmatism between the two groups (p value= 0.682).

In **2014, Akhter** *et al.* ⁽⁵⁾ applied study about rotational conjunctival flap on 31 eyes (18 males & 13 females) with primary pterygium, they reported different complications with different percentages as graft edema in 3 eyes (9.3%) but in our study 2 eyes (20%) it was, granuloma formation in one eye (3.1%) but no cases in our study and they reported recurrence in 2 eyes out of 26 eyes (7.69%) but we reported two cases (20%) our higher perecentage was due to small number of the operated eyes

In **2013**, Aslan *et al.* ⁽⁹⁾ applied study of Wide Conjunctival Flap on 23 patients (13 males and 10 females), mean age 48.21 ± 15.13 years, postoperative recurrence was seen in three cases (13%) at 13.2 ± 3.8 months of follow-up period and our recuurence was 2 eyes (20%). Flap edema was not seen but, in our study, there were 2 cases (20%) ⁽⁹⁾.

Park et al. (10) applied study that include Effect of transverse conjunctival advancement flap surgery for primary pterygium as a new technique it was Retrospective, noncomparative, interventional caseseries analysis on 63 eyes of 63 patients with primary pterygium were treated with transverse conjunctival advancement flap technique, the patients were followed up for more than 6 months. The mean age of patients was 64.9 ± 8.7 years (range 43-85 years), and the mean follow-up period was 9.8 ± 3.9 months (range 6-18) months). During the follow-up period, recurrence of the pterygium occurred in 1 (1.5%) of the 63 cases, with recurrence only in the conjunctiva. There was no occurrence of serious complications such as formation of granuloma or conjunctival infection an it was near of our results except for lower incidence of recurrence than our study and may this because of the different technique of the conjunctival flap

Hong et al. ⁽¹¹⁾ applied study on 59 eyes in 59 patients with primary pterygium who were treated with pterygium excision and an inferior conjunctival transposition flap Patients. The mean patient age was 55.6 (ranging from 34 to 74) years. The mean follow-up period was 24.9 (ranging from 12 to 46) months. During the follow-up period, the pterygium recurred in one (1.7%) of the 59 eyes. There were no severe complications except for mild congestion and

hemorrhage of the conjunctival flap. But all of them disappeared within one month, and there were no serious complications so it has near results and low recurrence rate more than our study may this because small number of our study group and good technique to prevent recurrence.

In **2007, Baig** *et al.* ⁽¹²⁾ applied study of Sliding Conjunctival Flap Technique on 48 patients. Patients were followed up for 1 year post-surgically at regular intervals Results: It was found that at the end of 1 year, 3 (6.25%) developed recurrence.

In **2012, Chen et al.** ⁽¹³⁾ applied study To evaluate the long-term efficacy in eyes that had been treated with rotation conjunctival flap for pterygium, Totally 66 cases (71 eyes) of pterygium which had been operated by this way were followed up for an average of 3.85 years, the congestion situation in the location of the canthus wrinkles fold as well as eye movements to determine the effect of surgery. And they found during the follow-up of 14 months to 9 years, 58 eyes were cured, 12 eyes were basically cured, 1 eye recurred, surgical recurrence rate was 1.4%.

Kim *et al.* ⁽¹⁴⁾ applied study of anchored conjunctival rotation flap techniques on (35 eyes) of primary pterygium and were followed up postoperatively for a minimum period of 18 months. The recurrence rate was 8.6% in the anchored conjunctival rotational flap group However, the occurrence of flap or graft edema (14.3%). No granuloma formation was observed in either group.

Our patients' conditions were close to corresponding conditions of **Salman and Mansour**⁽¹⁵⁾ who applied free limbal conjunctival auto graft on 20 eyes with pterygium: 16 males (80%) and 4 females (20%), whose age ranged from 30 to 50 years old). Also, **Mejía** *et al.*⁽¹⁶⁾ applied free limbal conjunctival auto graft on 24 eyes with primary pterygia: the mean age of the study group was 42.5 years (range, 23-75).

On the other hand, the present study patients' conditions were inconsistent with **Pulte** *et al.* ⁽¹⁷⁾ who applied limbal conjunctival auto graft on 70 eyes, 62 eyes with primary pterygium and 8 eyes with recurrent pterygium, and **Mashhour and Al Fayez** ⁽¹⁸⁾ who applied free limbal conjunctival auto graft on 43 cases of primary and recurrent pterygia: 42 males and 1 female, as well.

Through follow-up period (3-6 months), the noticed complications are as following: excessive lacrimation within the first weak was 2 cases (20%) in first month and graft edema in 4 cases (40%), recurrence in one case (10%) as follow: 39 years, male patient, complaining of visual disturbance due to presence of moderate pterygium (2-3 mm corneal encroachment) which is unilateral and primary in origin.

Regarding the recurrence These results are consistent with **Salman and Mansour** ⁽¹⁵⁾ who reported a recurrence in 2 eyes out of 20 eyes (10%) after follow up period of 6 to15 months, **Mejía** *et al.* ⁽¹⁶⁾ who reported a recurrence in one case out of 24 cases (4.1%) after

follow up period of 3 to 12 months, **Pulte** *et al.* ⁽¹⁷⁾, who reported a recurrence in 2 cases out of 70 cases (2.7%), **Mashhour and Al Fayez** ⁽¹⁸⁾ who reported no recurrences.

Yousuf ⁽¹⁹⁾ in his study of the role of pterygium excision in pterygium induced astigmatism which included 50 eyes by using autograft technique, found that mean refractive astigmatism improved from -4.3 ± 1.88 D preoperatively to -2.11 ± 1.9 D postoperatively which is also following the general agreement between researchers and BCVA significantly improved only in 40% of cases and remained the same in the remaining 60% which is close to our findings.

In the study of **Shelke** *et al.* ⁽²⁰⁾ using autograft technique, significant improvement in the visual acuity after pterygium excision seen in grade II and grade III pterygia (P < 0.001) but in grade IV, the visual acuity was improved but it was not statistically significant because of remnant corneal opacity in the visual axis. In our study we excluded any case with central corneal opacity which caused that difference in results.

Altan-Yaycioglu et al. (21) studied 240 eyes that underwent pterygium excision by 5 different types of surgeries: conjunctival autograft with sutures (N=115) or fibrin glue (N=53), conjunctival rotational flap (N=47), or amniotic membrane transplantation with either suture (N=15) or with glue (N=10). Following surgery, astigmatic values decreased from 3.47 \pm 2.50 D to 1.29 \pm 1.07 D (P < 0.001, paired t test). The changes in astigmatism was significantly related to the preoperative size of the pterygium ($\rho = 3.464$, P = 0.005). The postoperative astigmatism correlated with preoperative astigmatism ($\rho = 0.351$, P < 0.001, Spearman correlation analysis), finally it was found that Pterygium results in high corneal astigmatism, which decreases to an acceptable level following excision. According to our study, the type of grafting as CAG, CRF does not have a significant effect on the change in astigmatism degree.

For visual outcome in our study, the results were parallel the most of the previous discussed studies. In group A, 8 patients (80%) showed improvement of visual acuity and 6 patients (60%) in group B. and best corrected visual acuity showed significant improvement in mean Log MAR visual acuity from 0.56 ± 0.15 to 0.65 ± 0.14 . in auto graft and highly significant improvement 0.54 ± 0.17 to 0.65 ± 0.12 in rotational flap, the difference between 2 groups was statistically insignificant in preoperative (P value=0.785) and postoperative (P value=1.000), almost studies regarding visual acuity and refraction was done on auto graft techniques so we didn't have comparable studies for our rotational flap group except for Altan-Yaycioglu *et al.* ⁽²¹⁾.

In the current study, astigmatism was measured preoperatively and one month postoperatively for each patient in both groups and it significantly reduced in both groups. The degree of astigmatism was reduced in (6)patients in group A, compared to (7) patients in group B.There was no statistically significant difference in astigmatism pre operative or post operatively between the two groups.

Astigmatism was not analyzed in most of the other similar studies, except in 2013, Altan-Yaycioglu et al. ⁽²¹⁾.

CONCLUSION AND RECOMMENDATIONS

Free conjunctival auto graft and rotational conjuctiavl flap showed comparable results, in reducing recuurence rate, they are safe and effective methods of pterygium surgery that produces only few complications. They produce anatomic barrier and so effectively lower recuurence rate, cosmotic and surgical results ewre encouraging.

It is recommended to do further researches on large number of cases with longer follow up period and more analysis of post-operative signs such as graft edema, corneal scar and objective scoring system for post-operative symptoms. It is also recommend performing corneal topography before and after pterygium removal for more assessment of astigmatism changes.

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