

Comparison of conjunctival autograft and intrascleral Mitomycin C before bare sclera technique in pterygium surgery

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Abstract

Purpose: To compare the outcome and complications of conjunctival autograft and intrascleral Mitomycin C (MMC) before bare sclera technique in pterygium surgery.

Materials and Methods: This was a prospective cross sectional interventional study for 1 year after approval from the ethical committee. Patients of primary pterygium were randomly divided into two groups. Group I underwent pterygium excision with conjunctival autograft and group II underwent an intrascleral injection of MMC (0.02% of 0.05ml) in the head of pterygium one month before bare sclera surgery. Patients were followed up for minimum 6 months. Recurrence and complications in both the groups were noted.

Results: Out of 60 patients, 43.3% were males and 56.6% were females with a mean age of 43.54 years. There was no significant difference in the preoperative and postoperative best corrected visual acuity and keratometry at 6 months follow up in both the groups and between the groups. Complications seen in our study were foreign body sensation in all patients, graft edema in 7 patients, subgraft haematoma in one patient in Group I and Foreign body sensation in one patient, Haematoma in one patient and suture granuloma in one patient in Group II. No case of sclera thinning or recurrence was seen.

Conclusion: Recurrence can be safely reduced in bare sclera, with the use of MMC by this technique and can have comparable results with conjunctival autograft. Intrascleral injection in the head of the pterygium can be safer as compared to direct exposure of MMC to the sclera.

Keywords: Pterygium, Mitomycin C, Bare sclera technique, Conjunctival autograft

Introduction

Pterygium is the degeneration of the bulbar conjunctiva present as a subepithelial fibrovascular ingrowth encroaching the peripheral cornea.⁽¹⁾ The disease is present worldwide being more prevalent in tropical and subtropical countries.⁽²⁾ The etiology of pterygium is not known. However, sunlight exposure for a long time, especially the ultraviolet rays, chronic irritation of eye from dry, dusty conditions seem to play an important role.⁽³⁾ When pterygium is confined to the peripheral cornea, it has little effect on vision and patient may have only cosmetic concern. However, induced irregular astigmatism can cause decreased visual acuity as the pterygium advances.⁽⁴⁾ A variety of treatment modalities have been advocated for the removal of pterygia with significant recurrence rate requiring one or more repeat surgeries in almost all the methods.⁽⁵⁾ Simple Excision of pterygium with leaving the sclera bare has a very high recurrence rate of 24% to 89%.⁽⁶⁾ Various adjuvant strategies such as irradiation treatment, anti-metabolites, conjunctival autograft (CAG), limbal autograft and amniotic membrane graft has been employed over the years to reduce the recurrence rate.^(7,8) Conjunctival limbal autograft is one of the alternative adjuvant treatment for pterygium surgery having a recurrence rate of 2% to 33% in primary and recurrent pterygium but, it is time consuming and have a long learning curve.^(9,10) Lately, mitomycin C (MMC) an alkylating agent which inhibits

DNA synthesis is being used to prevent recurrences by possibly inhibiting fibroblast proliferation at the level of episclera.⁽¹¹⁾ The intraoperative use of MMC decreases the recurrence rate but serious complications have been reported like scleral melting.⁽¹²⁾ So our study is an attempt to see the recurrence rate in bare sclera technique with intrascleral application of MMC in the pterygium head to prevent direct exposure of MMC to the sclera and compare it with conjunctival autograft which have a lower recurrence as compared to other techniques.

Materials and Methods

The present study was a Prospective cross sectional interventional study conducted over a period of 1 year from 2014-2015 after approval from the Institutional ethical committee according to the tenets of the declaration of Helsinki. Patients with primary pterygium were included in our study after taking an informed consent. They were randomly divided in two groups based on the surgical intervention for pterygium excision with 30 patients in each group. Those patients with history of recurrent pterygium, ocular surface disorder, pseudopterygium or known collagen vascular disease were excluded from the study.

A detailed history and examination including anterior and posterior segment evaluation was done in all the patients including keratometry (K), best corrected visual acuity (BCVA) and Intraocular

pressure. Grading of the pterygium was done as per the encroachment of the pterygium onto the cornea.⁽¹³⁾ Grade I - head of pterygium between limbus and a point midway between limbus and pupillary margin. Grade II - head of the pterygium present between a point midway between limbus and pupillary margin and pupillary margin (nasal pupillary margin in case of nasal pterygium and temporal margin in case of temporal pterygium). Grade III – head of pterygium crossing pupillary margin. Anterior segment photography was done for documentation in all cases pre and post surgery.

Surgical procedure

Group 1: Pterygium excision with conjunctival autograft (CAG) was done in this group. The procedure included peribulbar anesthesia with 0.5% sensoricane and 2% xylocaine. The pterygium head was separated from the cornea using a crescent knife. The body of the pterygium was dissected and excised by conjunctival scissors. The area of the bare sclera was measured with calipers and a free conjunctival graft was dissected from the superior temporal quadrant around 1 mm oversize. The limbal flap was dissected taking care not to include tenon's and at the limbus dissection was done with crescent blade meticulously, to include the limbal tissue. The graft was sutured with 10-0 nylon first at the four corners and then in the center. Subconjunctival dexamethasone 0.5ml of 0.15% and gentamycin 0.5ml of 0.18% was given and eye was patched.

Group 2: Included patient undergoing pterygium excision with bare sclera technique. A preoperative MMC injection (0.02% of 0.5 ml) was given in all patients one month prior to surgery in the head of the pterygium under topical anesthesia with a 30 gauge needle, followed by immediate washing of ocular surface with 50 ml ringer lactate. Patient were sent on topical moxifloxacin 0.5% and prednisolone acetate

1% for one week. After 1 month the patient underwent surgery under topical anesthesia. Patient underwent pterygium excision in a similar manner as described above except dissection of limbal tissue and conjunctiva was cut with conjunctival scissors at the limbus. The sclera was kept bare post surgery and eye was patched with combination of antibiotic and steroid eye ointment (chlorochol-H 1%/0.5%).

After surgery, each patient was treated with a combination of topical prednisolone acetate 1% and moxifloxacin 0.5%, 4 times daily and topical lubricating drops 6 times daily for three weeks. In CAG group, the sutures were removed after 2 weeks of surgery. Patients had a follow up after surgery at 1 day, 1 month, 3 months and a minimum of 6 months. All patients were examined post operatively for recurrence and complications. Recurrence was defined as encroachment of fibrovascular tissue over the limbus onto the cornea at the previous site of pterygium excision.

Data Management & Statistical Analysis:

Interpretation and analysis of obtained results was carried out using IBM SPSS version 20; SPSS Inc Chicago, Illinois, U.S.A. for descriptive statistics. Association between different parameters was checked using chi square and ANNOVA test. Statistical significance of the data was checked at 5% level of significance, p value ($p < 0.05$) taken as statistically significant

Results

The present study included 60 eyes of 60 patients where 26(43.3%) were males and 34(56.6%) were females with a age range of 23-78yrs in both the groups. Both the groups were age ($p=0.132$) and sex($p=0.602$) matched.

Table 1: Demographic and clinical data of patients in Group 1 and Group 2

Parameters		Group 1		Group 2		P Value
Mean Age		44.73±14.48		42.36±15.3		0.1325
Sex	Male	12(40%)		14(46.66%)		0.602
	Female	18(60%)		16(53.33%)		
BCVA	Preop	Postop	Preop	Postop	0.598	
	1.64	0.8	1.76	1.156		
	p-0.8819		p-0.315			
Keratometry	Preop	Postop	Preop	Postop	0.995	
	43.79±1.37	44±1.4	43.54±1.60	43±1.5		
	p-0.999		p-1.00			
Grade	1	12(40%)		17(56.67%)		
	2	15(50%)		10(33.33%)		
	3	3(10%)		3(10%)		

An improvement in best corrected visual acuity (BCVA) in LogMAR was seen post-operatively at 6 months when compared to the pre-operative vision in both the groups, but this difference was not clinically significant in either group. (Table 1) There was no statistically significant difference in the BCVA among group I and group II at 6month follow up.($p=0.598$) Similarly there was no significant difference between post-operative 6 months mean

keratometry compared to pre-operative mean keratometry in both the groups and between the two groups.(Table 1) Out of 60 patients, maximum number of patients were in grade 1. There were only six patients which had pterygium beyond the pupillary margin who had a three line improvement in visual acuity.

Complications noted in our study group were foreign body sensation in all (100%) patients due to exposed sutures knots till suture removal, graft oedema in 7 (23.33%) patients, sub graft haematoma in 1(3.33%) patient in group I. In group II, foreign body sensation were seen only in 1 (3.33%) patient, hematoma in 2(6.67%) patients and granuloma in 1(3.33%) patient(Table 4).

There was a minimum follow up of 6 months of all the patients in both the groups and 14(46.66%) patients in the group I and 18 (60%) patients in group II completed one year follow up. We did not see any patient of scleral melt or thinning in our study. We also did not see any case of pterygium recurrence till the last follow up.

Table 2: Post procedure complications

Complication	Group 1(n=30)	Group 2 (n=30)	Total
FB sensation	30(100%)	1(3.33%)	31(51.67%)
Hematoma	-	2(6.67%)	2(3.33%)
Graft oedema	7(23.33%)	-	7(11.67%)
Subgraft haematoma	1(3.33%)	-	1(1.67%)
Granuloma	-	1(3.33%)	1(1.67%)

Discussion

Recurrence after pterygium surgery is a major challenge which ophthalmologist face. Despite advent of various adjuvant procedure,⁽⁵⁾ the incidence of recurrence range upto 55%.⁽¹⁴⁾ Conjunctival autograft(CAG) is a good technique with low recurrence⁽¹⁵⁾ rate, but is time consuming and have a long surgical curve.⁽¹⁶⁾ Bare sclera technique is simple technique but with very high recurrence rate.⁽⁶⁾ MMC has been studied to decrease the recurrence rate but with many side effect increasing with the increase in the duration and concentration of MMC.⁽¹⁷⁾ So, our study is an attempt to decrease the recurrence rate in bare sclera technique with safe application of MMC to decrease its side effects and compare it with conjunctival autograft.

The average age of presentation in our study population was 44.54±14.89 years and had no significant difference in both the groups. In studies done in the Asian population a mean age of 43.36 years⁽¹⁸⁾ and 44.8years⁽¹⁶⁾ where seen, which is consistent with our study.

We had female preponderance (56.67%) in both the groups which was sex matched (p value = 0.602). A female preponderance was also seen in studies, conducted in California 55%⁽¹⁹⁾ and in India 76.25%.⁽²⁰⁾ In other studies, a male preponderance was noted.^(21,22)

We did not see any major complication in our study, foreign body sensation were seen in all (100%) patients, graft oedema in 7 (23.33%) patients and sub graft hematoma in 1 (3.33%) patient, in group I. Whereas, in group II, only 1 patient presented with foreign body sensation (3.33%), hematoma was seen in 2(6.67%) patients and granuloma was seen in 1(3.33%) patient. We did not see any patient of scleral thinning or necrosis in our study.

We included all the patients with a minimum of 6 month follow up wherein 14 patients in the group I and

18 patients in group II completed 1 year follow up .A study conducted by Hirst et al⁽²³⁾ showed that the chance for recurrence is of 50% at 4 months and 97% at 1 year after pterygium excision. We did not see any case of recurrence in our study in both the groups.

There are many studies comparing CAG with bare sclera technique with MMC as an adjuvant. Studies comparing CAG and bare sclera with post operative topical MMC drops in the bare sclera group of 0.02% for 5 days and a follow up period of around 1 year found comparable results between the two groups with slightly lower rate of recurrence in MMC group than the CAG group, but the difference was not significant.^(19,21)

Other studies comparing CAU with bare sclera with topical application of MMC of 0.02% for 2 to 3 min in the bare sclera group and follow up period of 6 months to 1 year found that both technique have comparable results with slightly higher recurrence with MMC group than CAG group but this difference was not statistically significant.^(16,20) A study by Koranyi et al⁽²⁵⁾ found a higher recurrence rate with bare sclera (32.6%) on topical application of MMC of 0.04% over 3 minutes with a follow up period of 1 year as compared to CAG(12.3%). One case of sclera thinning was noted in the MMC group.⁽¹⁶⁾ A study by Harpal et al compared CAG with bare sclera with MMC application of 0.02% for 5 min and found comparable results in both the groups. One case of sclera thinning was noted in the MMC group.⁽²⁶⁾

Wong et al compared conjunctival autograft with and without MMC application of 0.25mg/ml for 1 min for a mean follow up period of 1 year and found significantly lower recurrence rate in CAG with preoperative MMC group(7%) and higher in CAG group(26%) alone in higher grades(2 and 3) of pterygium. They did not see any significant complication in their study.⁽²⁷⁾

A study by Zaky et al compared bare sclera technique where MMC injection of 0.1ml of 0.15 mg, injected in the head of the pterygium 1 day before surgery and in other group MMC in the same concentration was applied over the bare sclera preoperatively for 3 mins. They found comparable results in both the group but one case of sclera thinning was noted in the MMC application group.⁽²⁸⁾

Avisar et al injected MMC injection of 0.1 ml of 0.15 mg/ml into the head of 27 patients 4 weeks before surgery and 12 patients did not receive any injection. All the patients underwent Cataract surgery with PCIOL implantation with a bare sclera technique of pterygium excision. Follow up period was for 12-23 months post surgery and they found no recurrence in the MMC injection group and 5 recurrences occurred in the non injection group. They did not see any case of sclera thinning.⁽²⁴⁾

So MMC definitely decreases the recurrence in pterygium surgery when used as an adjuvant but many complication can occur depending on the dose, duration of contact and mode of administration of MMC. So a long term prospective study should be done to access the safe dose and mode of administration of MMC. The drawback of our study is the small sample size and short duration of follow up.

Conclusion

Preoperative injection of MMC in the head of the pterygium can be an alternative technique to per operative or topical use of MMC and can be safer as compared to direct exposure to sclera or cornea. Complications like, scleral melting can also be prevented, as MMC given intrasclerally into the head of the pterygium prevents contact with the scleral bed. Also recurrence rate can be safely reduced in bare sclera technique. However a long term prospective study should be done to study the recurrence using this technique.

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