Research Article

# Clinical study of coparision of pterygium surgery with and without Mitomycin-C on bare sclera technique

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## Abstract

**Introduction:** A pterygium is a triangular wedge of fibro-vascular conjunctival tissue that appears on the epibulbar conjunctiva, which can be removed by various methods. Recurrence of Pterygium after exicision is a very common problem encountered by ophthalmologist. Several methods have been suggested to avoid these recurrences. We studied the recurrence rate of pterygium after application of intraoperative mitomycin C (0.04%). **Method:** This is a retrospective study of fifty eyes in fifty patients who underwent pterygium excision by the same surgeon using intraoperative topical mitomycin C (25 patients) and without using mitomycin c(25 patients) during September 20014—September 2015 in the ophthalmology department at Jhalawar medical college, Jhalawar, Rajasthan. 0.04% Mitomycin applied to bare sclera after excision for two minutes by swab sticks. Postoperative follow up period was 6 months. Outcomes measured in the form of recurrence and complications were analyzed. **Results:** In Group A with use of mitomycin C there was no recurrence after 6 months follow-up while in Group B recurrence was seen in 5 patients within 3-6 months, however in group A 1 patient had scleral thinning. **Conclusion:** Intraoperative administration of mitomycin C 0.04% is safe and effective to prevent pterygium recurrences.

**Keywords:** Bare Sclera, Mitomycin C, Pterygium, Recurrence.

## Introduction

A pterygium is a wing-shaped growth of fibrovascular subconjunctival tissue onto the cornea. Several hypotheses have been ascribed to its etiology. Prevalence rates range from 0.7-31% in various populations around the world and the condition is more common in warm, dry climates. Ultraviolet radiation exposure is a major risk factor for its development [1, 2].

Some findings suggest that an immunologic dysfunction plays a role in the pathogenesis of pterygium, and recent studies have shown that pterygia have increased levels of proangiogenic growth factors such as basic fibroblast growth factor (FGF) and vascular endothelial growth factor (VEGF) [3,4].

Manuscript received: 15th Nov 2015
Reviewed: 1st Dec 2015
Author Corrected: 4th Dec 2015
Accepted for Publication: 10th Dec 2015

Pterygium is a worldwide condition with a ‘‘pterygium belt’’ between the latitudes 30˚north and south of the equator [5,6] it is more common in sub- tropical and tropical areas [7]. Pterygium is prevalent in Hong Kong, situated 22˚north of the equator [2]. Ultraviolet radiation exposure is a major risk factor for its development [1,3].

The first line of treatment for primary pterygium is surgical excision [1]. In pterygium surgery a variety of surgical procedures are in use. The bare sclera technique is still common because of its simplicity. There are overwhelming evidences that the sole use of the bare sclera technique is associated with a high risk of local recurrence. Adjunctive therapies, as beta-irradiation and antimetabolic drugs, like mitomycin C (MMC) are used to decrease the recurrence rate [8].

Simple excision carries a high recurrence rate ranging from 24%–89% [2, 7]. Recurrent pterygia are more difficult to treat and various other treatment modalities are usually indicated i.e. Conjunctival autograft trans-plantation and triethylene-thiophosphor- amide (Thio-tepa), an antimitotic, Mitomycin C [7].

To prevent recurrence, two major adjunctive therapies are usually performed: (1) the application of antimetabolites, and (2) conjunctival or limbal autograft. Although many other therapeutic modalities have been proposed, it requires extensive studies of efficiency and safety before a new procedure can be considered as ideal [6]. Addition of MMC at various concentrations has been reported to be effective in preventing recurrence [2]. Mitomycin C is an antibiotic-antineoplastic agent. It is a metabolic inhibitor extracted from Streptomyces caespitosus that inhibits DNA synthesis [1] resulting in an inhibition of the cellular proliferation for a long time [8] which selectively inhibits the synthesis of DNA, cellular RNA, and protein [7]. The mechanism of action seems to be inhibition of fibroblast proliferation at the level of the episclera. However, MMC may cause devastating complications such as scleral necrosis and microbial infections [2].

## Material and Method

A prospective, comparative clinical study was conducted from September 2014 until September 2015 in the department. Of ophthalmology at Jhalawar medical college, Jhalawar. Fifty eyes of 50 patients with primary pterygium were included in the study. Informed consent was obtained from all patients before recruitment. All patients underwent full ophthalmologic examination before and after surgery, including visual acuity, slit-lamp examination, fundoscopy On slit lamp examination grading of Pterygium was done based on extent of corneal involvement: Grade I – crossing limbus, Grade II – midway between limbus and pupil, Grade III – reaching up to pupillary margin, Grade IV – crossing pupillary margin.

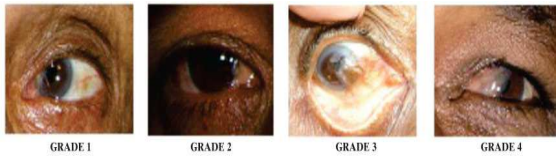


Figure 1: Pterygium grading severity (1-4): a) grade 1- at the conjunctiva (to the limbus); b) grade 2 - 1-2mm across the cornea; c) grade 3 - to the pupil; d) grade 4 - half way across the pupil

## Grades of Pterygium

**Exclusion criteria**

1. Collagen vascular disease or other
2. Autoimmune disease,
3. Pregnancy,
4. Ocular surface pathology or infection, and
5. Previous limbal surgery,
6. Diabetes mellitus,
7. Recurrent pterygium, Pseudo Pterygium,
8. Lime injury associated symblephron,
9. History of ocular injuries,
10. Corneal opacities and degeneration were excluded.

All 50 patients divided in two groups 25 in each:
Group A in which 0.04% mitomycin c was used.
Group B: without mitomycin c use.

All surgeries were done by single surgeon. Steps of surgery (1) eye was anesthesised by instillation of proparacaine hydrochloride 0.5% eyedrops in conjunctival sac two-to-three times every one-to-two minute's (2) eye was paint by butadiene and draped after that wire speculum was applied.(3) Pterygium was excised by 11 number bard - parker blade and separated from underlines sclera. The remaining sub-conjunctival degenerative part of Pterygium was excised with wescott scissor. The conjuctival and corneal surfaces were smoothened by scraping with a bared – parker blade and bleeding vessels were cauterized by electric cautery. (4) In patients of Group A, 0.04% percent of mitomycin C applied on bare sclera by cotton swab for two minutes and after that sclera is irrigated by 50 ml of normal saline.(5) In group B, sclera was left as such without mitomycin C application. (6) Eye was patched with antibiotic ointment for 24 hours.

On Postoperatively 0.3% tobramycin sulphate eye drop applied six times a day for 15 days, 1% predinsolone acetate eye drop four times a day for one week, followed by tapering dose for subsequent three weeks and 0.5% carboxymethylcelloose eye drop four times a day for one month were given. Patients were asked to follow up on 1-day, 7-day, 1-month, 3-month and every

6-monthly regarded complications and recurrence of Pterygium.

The main postoperative outcomes were recurrence of Pterygium and complication of mitomycin C. Recurrence was defined as fibro-vascular proliferation invading the cornea more than 1.5 mm at the site of previously excised Pterygium. The complications were in terms of postoperative corneal complication and complications of mitomycin C i.e. puncate keratopathy, corneal melting, scleral necrosis, corneal perforation, cataract and secondary glaucoma.

## Results

Fifty eyes of fifty patients were operated for Pterygium surgery in which 25 patients were included in Group A, in which mitomycin C was applied and rest 25 patients were included in Group B and they left with bare sclera. All patients were followed up for 6 months.

**In Group A:** Mean Age of surgically managed patients was 46.08± 9.11 (range 30 - 60 yrs) out of which 60% were males (15) and 40% were females (10), 20 Patients have nasal Pterygium and 5 patients have bilateral Pterygium. 5 patients were having Grade IV Pterygium, 15 patients were having Grade III Pterygium, 3 patients were having Grade II Pterygium and 2 patients were having Grade I Pterygium.

**In Group B:** Mean Age of surgically managed patients was 45.52± 9.90 (range 30 - 60 yrs) out of which 60% were males (15) and 40% were females (10), 15 Patients have nasal Pterygium and 10 patients have bilateral Pterygium. 7 patients were having Grade IV Pterygium, 10 patients were having Grade III Pterygium, 5 patients were having Grade II Pterygium and 3 patients were having Grade I Pterygium. In Group A, 1 patient developed thinning of sclera after six months and there is no recurrence after follow up. In Group B, 5 patients developed recurrence after six month follow up.

**Table No 1: Distribution of cases according to site of pterygium**

| Gender | Nasal | Nasal/temporal | Total |
|---|---|---|---|
| Male | 22 | 08 | 30 |
| Female | 13 | 07 | 20 |
| **Total** | **35** | **15** | **50** |

Chi sq=0.397,p value=0.529(ns)

**Table No 2: Comparison of visual acuity before surgery**

| Visual Acuity | Group A before Surgery | Group B before surgery |
|---|---|---|
| 6/6 | 11 | 11 |
| 6/9 | 02 | 02 |
| 6/12 | 12 | 12 |
| **Total** | **25** | **25** |

Chi sq=0.00,pvalue=1.00(ns)

**Table No. 3: Comparison of visual acuity after surgery**

| Visual acuity | Group A after surgery | Group B after surgery |
|---|---|---|
| 6/6 | 14 | 14 |
| 6/9 | 11 | 11 |
| 6/12 | 00 | 00 |
| **Total** | **25** | **25** |

Chi sq=0.00,p value=1.00(ns)

**Table No 4: Distribution of cases according to recurrence rate**

| Group A | Group B | Z value | P value | significance |
|---|---|---|---|---|
| 00/25 | 05/25 | 2.2704 | 0.0232 | significant |

**Table 5: Distribution of cases according to complication**

| Group A | Group B | Z value | P value | significance |
|---|---|---|---|---|
| 01/25 | 01/25 | 0.9947 | 0.3199 | Non significant |

## Discussion

There were no statistically significant differences observed in age, gender, laterality and visual acuity among the groups. All patients completely recovered, and no other abnormal ocular or systemic complications were observed during the six-month follow-up period except scleral thinning in one case in group A. our main outcome measure was recurrence rate Generally, pterygium recurrences occur during the first 6 months after surgery. A number of factors such as the type of pterygium, age of the patient, environmental agents, and surgical technique may be responsible [9] but No recurrence was observed up to one month after surgery in group A However, at three months, recurrence was observed in three eyes (12%) and at four months in two eyes (8%) in the group B. In Group A MMC were used intraoperatively at a concentration of 0.4 mg/ml over bare sclera for 3 min. The rate of recurrence was 00% in comparison with 38% reported by Chen *et al*.,[10] and 10.5% by Manning *et al*.,[11] with the application of 0.4 mg/ml for 3 min. This concurs with previous studies on intraoperative application of MMC with a rate of recurrence of 25% [12]. Various concentrations of MMC with different durations of application have been used, but the minimal safe and effective dosage and application time are still not certain [13].

Because recurrence rates differed significantly at three months ($p = 0.02372$) these observation had enough support by various study A L Young et al[5] Allan BDS et al[14].

One and only complication which was seen in group A was scleral thinning which was supported by Rubinfeld et al[15],Safianik B et al[16] Zhivov A et al[17], Peponis V et al[18].

The limitations of the study were the short follow-up period and the small size of the study groups. With a longer follow-up period, recurrence rates and side effects related to the adjunctive drugs could be analyzed more accurately. Larger sample sizes could make the statistical analyses stronger. Overall we can say that 0.04% mitomycin c is safe and effective to prevent recurrence after pterygium excision.[19]

## Conclusion

0.04% mitomycin c is effective to prevent recurrence after perygium surgery.

**Funding:** Nil, **Conflict of interest:** None.
**Permission of IRB:** Yes

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**How to cite this article?**

Gupta ML, Meena RK, Bhardwaj V. Clinical study of coparision of pterygium surgery with and without Mitomycin-C on bare sclera technique. *Int J Med Res Rev* 2016;4(1):33-37. doi: 10.17511/ijmrr.2016.i01.005.

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