



A STUDY TO COMPARE THE RECURRENCE RATE OF PTERYGIUM FOLLOWING PTERYGIUM EXCISION WITH TOPICAL MITOMYCIN-C (0.02%) APPLICATION ON BARE SCLERA VERSUS FREE CONJUNCTIVAL AUTOGRAFT.

Ophthalmology

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ABSTRACT

Purpose : To compare the recurrence rate of pterygium following pterygium excision with topical mitomycin-c (0.02%) application on bare sclera versus free conjunctival autograft during follow up period of 6 months.

Patients and methods: We studied recurrence rate of pterygium and post operative complications in 100 eyes. Patients were selected and divided into 2 groups. Group A (50) patients were subjected to CAG Group B (50) patients were subjected to topical MMC after pterygium excision.

Results: Out of 100 eyes 50 eyes underwent CAG technique and other 50 eyes were subjected to intra operative topical MMC (0.02%) for 2 minutes on bare sclera following pterygium excision. Mean age of patients was 45.44 ± 12 years. Out of 100 patients, recurrence was seen in 15 cases. Group A (CAG) had 8% recurrence. Group B (MMC) had 22% recurrence. Scleral thinning was observed in 15 cases of group B (MMC). Delayed epithelial healing was observed in 14 cases of group B (MMC). Sub graft hemorrhage was noted in 8% cases of group A (CAG).

Conclusion: We conclude that conjunctival autografting and intra operative MMC are equally effective methods in pterygium surgery. A conjunctival autograft is a very safe and effective surgical approach to the treatment of pterygium.

KEYWORDS

pterygium, mitomycin-C, conjunctival autograft.

Introduction :

Pterygium was first described in 1000 AD by Susruta, the first ophthalmic surgeon according to the literature. Surgery is indicated when the patient is feeling discomfort, despite lubricant eye drops, when there is restriction of ocular motility, growth on the visual axis and aesthetic complaints. Currently, conjunctival transplantation and amniotic membrane transplantation are used. Pterygium management has traditionally involved surgery, often enhanced by the use of antimetabolites. Therapeutic options for pterygium have been described based on the mechanisms that perpetuate its growth. At present, there are a wide variety of surgical methods but very few clinical guidelines on the optimal treatment of primary or recurrent pterygium.¹ The primary aim is to excise the pterygium and prevent its recurrence. As bare sclera excision is associated with a high recurrence rate, pterygium excision is often combined with conjunctival autograft, mitomycin C, beta-irradiation or other adjunctive therapies to reduce recurrence rates. Conjunctival autografting and mitomycin C application are the most commonly used methods for preventing recurrences. The ideal surgical technique should be one that effectively prevents recurrences without development of complications. Of the procedures used most often to treat recurrent or advanced pterygium, the one that comes closest to achieving this goal is, probably, the conjunctival autograft described by Kenyon et al.² This procedure reduces recurrence with minimal complications when compared with the use of β -radiation or MMC. High recurrence rate is a major problem in pterygium surgery. There are various techniques developed to minimize disease recurrence with CAU and MMC the two most commonly adopted adjuvants. The conjunctival auto grafting was first described by Kenyon et al. in 1985 and reported a recurrence rate of 5.3%.²

Aims and objectives:

To compare the recurrence rate of pterygium following pterygium excision with topical mitomycin-c (0.02%) application on bare sclera versus free conjunctival autograft during follow up period of 6 months.

Patients and population:

A prospective study was conducted from November 2015 to April 2017 in patients who were diagnosed to have pterygium. The study was conducted on patients who attended ophthalmology OPD at Alluri Sitarama Raju Academy of Medical Sciences, Eluru. A total of 100 patients were included in this study. Ethical clearance was obtained from institutional ethics committee. Informed consent was taken from each patient before including in the study. Patients were selected and divided into 2 groups. Group A and Group B. Group A patients were subjected to CAG. Group B patients were subjected to topical MMC after pterygium excision. Standard surgical techniques

were used. All surgeries were done in same hospital and same setup by different surgeons. Patients were followed up at POD-1, 1 week, 15 days, 1 month and 6 months. Maximum follow up was 6 months, in patients reported postoperatively from November 2015.

Surgical method:

Pterygium excision with conjunctival autograft technique or Pterygium excision with avulsion technique followed by application of topical mitomycin-c (0.02%) over bare sclera.

After obtaining informed consent, patients were taken for elective surgery

Preoperative Preparation: Peribulbar anesthesia given, eye to be operated is cleaned with 10% povidone and draped.

Intraoperative procedure: A wire speculum is used to separate the lids.

Bare Sclera Technique with adjuvant 0.02% MMC topically:

A small incision is made in the conjunctiva just medial to the head of pterygium. Beginning here, the conjunctiva is progressively dissected from the body of the pterygium towards the caruncle using Westcott's Scissors. The pterygium head is easily avulsed using a combination of blunt dissection and traction. Residual fibrous tissue on the cornea removed by hook knife. A cotton bud was used to elevate the body of pterygium off the sclera. The body of the pterygium with involved Tenon's capsule and ciliary muscle was excised taking care not to damage the underlying rectus muscle. The abnormal tissue at the limbal end of pterygium was aggressively resected, extending 2-3 mm beyond the visible extent of pterygium to avoid leaving behind any scaffold for a later recurrence.

The drug (MMC) is available in a vial (2mg/ml). It is further reconstituted with normal saline in 10ml to make 0.2mg/ml. Surgical sponges soaked in 0.02% MMC is placed under cut edge of conjunctiva for 2 minutes and washed it carefully with normal saline. Eye was patched firmly. The following are preoperative image with nasal pterygium and postoperative image after topical MMC application. Figure - 1

Conjunctival Autograft Technique: After the pterygium was resected first as in Bare Sclera Technique. The size of conjunctival graft required to resurface the exposed scleral surface was determined using Castroviejo calipers in 3 directions – extend across the limbus, maximum circumferential extent of the bed, and maximum distance from the limbus. This enables the harvested graft to fit precisely in the

bed. Using a Piers-Hoskins forceps and Wescott's scissors the graft was excised starting at the fornical end. Care taken to obtain a graft as thin



Figure - 1

as possible without button-holing. Once limbus is reached the graft was flipped over onto the cornea and tenon's attachment at the limbus was meticulously dissected. The flap was then excised using Vanna's Scissors, taking care to include the limbal tissue.

After excision, the conjunctival limbal autograft was slid on to the cornea. Without lifting the tissue off the cornea, it was rotated and moved onto its sclera bed with fine non-toothed forceps. A limbus-limbus orientation was maintained. This helped to avoid inadvertent

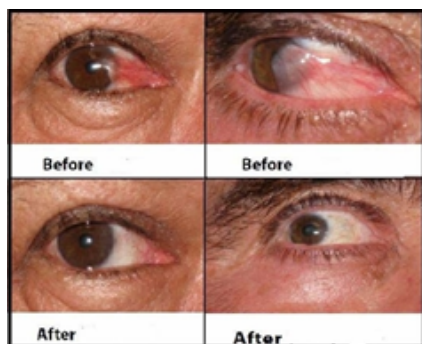


Figure - 2

scrolling of the graft. The graft was smoothened out in its bed. The eye was again abducted and the position of the graft was secured. No sutures were placed. 0.5cc dexamethasone with 0.5c.c (40mg/ml) gentamicin was injected subconjunctivally at the conclusion of the procedure and the eye was patched firmly with antibiotic eye ointment.

Postoperative: Postoperatively topical antibiotic steroid eye drops were used every 2 hours for first postoperative week and then tapered over next 5-6 weeks. Antibiotic ointment was used 3 times daily for first 2 weeks. The following images show pre and post operative images of patients who have undergone CAG. Figure- 2

Postoperative follow up: Patients were followed up on post operative day 1, 1 week, 15th day, 1st month and 6 months. All eyes were examined with slit lamp for any complications.

Statistical analysis: Sample size calculation was done using the formula

$$n = (Z_{\alpha/2} + Z_{\beta})^2 \cdot [p_1(1-p_1) + p_2(1-p_2)] / (p_1 - p_2)^2$$
, where $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), Z_{β} is the critical value of the Normal distribution at β (e.g. for a power of 80%, β is 0.2 and the critical value is 0.84) and p_1 and p_2 are the expected sample proportions of the two groups.

Sample size $n = 71.86$, Statistical analysis is done using SPSS 20 Trial version. Chi-square test was done.

Observation and Results: Total 100 patients were included in the present study, of which 50 patients underwent CAG technique and other 50 patients were subjected to topical MMC (0.02%) following pterygium excision. Mean age of patients was 45.44 ± 12.3077 years. Standard deviation was ± 12.3077 , range was 22-72 years. 56% of females and 44% of males were subjected to CAG technique. 66% of females and 34% of males were subjected to MMC following pterygium excision. Out of 100 patients, recurrence was seen in 15 cases. Group A patients that were subjected to CAG technique had 8% recurrence. Group B patients that were subjected to MMC following pterygium excision had 22% recurrence

Table-1 : Distribution of patients with pterygium according to recurrence rate and technique of management.

Recurrence	CAG (group A)		MMC (group B)		Total	
	No.	%	No.	%	No.	%
No	46	92.0%	39	78.0%	85	85.0%
Yes	4	8.0%	11	22.0%	15	15.0%
Total	50	100.0%	50	100.0%	100	100.0%

Chi-square = 3.843, p-value = 0.50 (not significant)

Table-2: Distribution of patients with pterygium according to technique of management and complications.

Complications		CAG(group A)		MMC(group B)		Total	
		No.	%	No.	%	No.	%
Scleral thinning	Absent	50	100.0%	35	70.0%	85	85.0%
	Present	0	0.0%	15	30.0%	15	15.0%
DEH	Absent	50	100.0%	36	72.0%	86	86.0%
	Present	0	0.0%	14	28.0%	14	14.0%
SGH	Absent	46	92.0%	50	100.0%	0	0
	Present	4	8.0%	0	0.0%	0	0

There was no significant association between recurrence rate and technique of management ($p=0.5\%$)

Complications : Scleral thinning was observed in 15 cases that were subjected to MMC following pterygium excision. Delayed epithelial healing was observed in 14 cases that were subjected to MMC following pterygium excision. Sub graft hemorrhage was noted in 8 cases that were subjected to CAG technique.

Discussion : In current study there is female preponderance (61%) over males (39%). A national study conducted by Kamil Z shows 63% male and 37% female patients with pterygium.³ The high postoperative recurrence rates indicate that there is still no single definitive treatment. The ideal surgical technique should be one that effectively prevents recurrences without development of complications. Of the procedures used most often to treat recurrent or advanced pterygium, the one that comes closest to achieving this goal is, probably, the conjunctival autograft described by Kenyon et al.² This procedure reduces recurrence with minimal complications when compared with the use of β -radiation or MMC. However, recurrences were not completely eliminated, especially in patients who live in areas with high levels of ultraviolet light. High recurrence rate is a major problem in pterygium surgery. There are various techniques developed to minimize disease recurrence with CAU and MMC the two most commonly adopted adjuvants. The conjunctival auto grafting was first described by Kenyon et al. in 1985 and reported a recurrence rate of 5.3%.² The recurrence rate was reported as 4.6% in a study by Narsani AK et al. in 2013.⁴ In 2005 Fahmi et al. reported 13.3% recurrence with limbal CAG.⁵ In current study we experienced a recurrence of 8% in group A with CAG which is comparable. Complications related to conjunctival autograft transplantation include transient graft edema, corneal scleral dellen, graft retraction, epithelial cysts, and Tenon granuloma.⁶ None of these complications developed in our patients. In present study we applied low dose MMC for short duration i.e. 0.02% for only 2 minutes, this not only reduces the rate of recurrence but also the complication rate. According to Rubinfeld RS et al. complications are mainly related to the uncontrolled and prolonged use of MMC by the patients.⁷ In study by Kamil Z et al 22.5% was the recurrence rate with adjunct use of intraoperative MMC while 16.13% recurrence was noted by Narsani.^{2,4} A recurrence rate of 22% was found in this current study with mitomycin-c. Postoperative complications like corneal melting, symblepharon, dellen were not observed in patients of this present study. However, the use of MMC may lead to severe ocular complications including scleral thinning and necrosis, corneal decompensation, and glaucoma. The current study had a high response rate with more than 80% of patients participating in the follow-up study. The recurrence rate of pterygium after CAU was significantly lower than that of MMC in the current study. The current study demonstrated a comparable success with CAG in terms of long-term pterygium recurrence rate and the lack of complications such as corneal dellen, conjunctival cyst, pyogenic granuloma, symblepharon, and subconjunctival fibrosis. MMC treatment after pterygium excision was shown to be inferior to CAG in preventing recurrence. In the current study, recurrence was found in 15% of our cases (15 of the 100 eyes). 11 eyes had recurrence after topical 0.02% MMC application, 4 eyes had recurrence after conjunctival autografting procedure.

Adjunctive MMC for pterygium surgery was first described by Kunitomo and Mori in Japan in 1963.⁸ In an attempt to decrease ocular morbidity, the intraoperative use of MMC applied directly to the scleral bed has gained increasing acceptance. In this technique, after bare sclera excision, 0.2 to 0.4 mg/ml MMC is applied directly to the scleral bed for 2 to 5 min. The advantages of this technique include decreasing the MMC dosage, the use of MMC only in the operating room and application of MMC directly to the area of pathology rather than to the entire ocular surface. In the present study, a concentration of 0.02% MMC was used in pterygium surgery to minimize the possible side effects, yet maintain the least possible effective dose. Chen et al, reported that a concentration of 0.10 mg/ml MMC inhibits fibroblast replication, while concentrations of 0.3 mg/ml cause fibroblast cell death.⁹ We chose a concentration of 0.20mg/ml as this concentration was slightly higher than the therapeutic window but well below the toxic level associated with cell death. Complications of MMC use occurred in 11 eyes of Group B developing mild scleral thinning 4 months postoperatively which was successfully treated with topical artificial tears (drops and ointment) and withdrawal of corticosteroid and antibiotic combination drops. In the current study most postoperative complications were mild such as subconjunctival hemorrhage, photophobia and conjunctival irritation, all of which were related to the surgical manipulation. Despite being well-documented serious complications of ocular MMC application, corneal ulcerations and perforations, scleral perforation, cataract formation, anterior uveitis, and IOP (secondary glaucoma) did not occur in current study.⁷

Summary: In current study, Recurrence is more common with topical MMC (22%) when compared to CAG (8%). During the follow up period of 6 months, recurrence is seen in 15 of 100 patients. Recurrence with topical MMC is seen in 11 patients and with CAG is seen in 4 patients. Eyes with poor cosmetic appearance had recurrence or associated complications like sclera thinning or delayed epithelial healing.

Conclusion: We conclude that conjunctival autografting and intra operative MMC are equally effective methods in pterygium surgery. A conjunctival autograft is a very safe and effective surgical approach to the treatment of pterygium. morphologic evaluations with standardization for recurrent patterns of pterygium should facilitate an understanding of the mechanisms of reproliferation and enable the prevention of serious recurrence patterns. The advantages of CAG over other modalities of treatments include: 1. Low recurrence rate. 2. No sight threatening complications. 3. Offers anatomical and physiological restoration of ocular surface. 4. Cost effective. 5. Simple procedure not requiring additional surgical skill.

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