Original Article

Comparison of recurrence rate of Pterygium, Conjunctivalautograft versus Mitomycin-C adjuvant in pterygium surgery

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ABSTRACT

Objective: Mitomycin-c (MMC) and conjunctivalautograft (CAG) are two well known adjuvants used during pterygium excision to decrease the risk of pterygium recurrence. This study was conducted to compare the recurrence rate of pterygium following intraoperative use of mitomycin-c and conjunctivalautograft.

Methodology: This randomized controlled trial was conducted at Eye Unit-I, Bahawal Victoria Hospital, Bahawalpur, from March 2010 to August 2010. One hundred and thirty patients participated in the study. They were randomized into two groups, one receiving intraoperative Mitomycin-c (n=65) and the other group underwent Conjunctivalautograft application (n=65). Patients were followed monthly for six months, to see any signs of recurrence. Frequency of recurrences in two groups was calculated and compared by using Chi-square test. Results were considered significant at a p-value < 0.05.

Results: There were ten recurrences in Mitomycin-c group (15.3%) and only two recurrences in Conjunctivalautograft group (3%) over a six months follow up period. There was a statistically significant difference in the recurrence rate between the two groups ($p < 0.05$).This implies that the Conjunctivalautograft has a better outcome in terms of its success rate as compared to the Mitomycin-c adjuvant.

Conclusion: In patients having visually significant pterygium, pterygium surgery with conjunctivalautograft application has a lower recurrence rate as compared to the Mitomycin-c adjuvant.

KEYWORDS: Conjunctivalautograft, Mitomycin-c, Pterygium, Pterygium excision.

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INTRODUCTION

Pterygium is a fibrovascular proliferation of conjunctiva onto the cornea.[1] Pterygium is a worldwide condition with a "pterygium belt" between the latitude 30^0 north and south of equator.[2] Ultraviolet radiation is the major risk factor for its development.[3] Patients with pterygium have symptoms of red eye, itching, blurred vision and cosmetically unacceptable growth in the eyes.

Treatment of pterygium is essentially surgical. Simple excision carries a high risk of recurrence. The recurrence rate ranging from 24-89% have been

documented in different studies.[3,4] Two adjuvants most commonly used to prevent this recurrence of pterygium include the Mitomycin-c and the conjunctivalautograft.

Addition of Mitomycin-c in different concentrations at the time of surgery has been reported to be very effective in preventing the recurrence.[5] According to one study, the recurrence rate of pterygium after Mitomycin-c treatment was only 15.9%. Mitomycin-c is an alkylating agent which inhibits cellular proliferation of conjunctival fibroblasts by blocking the synthesis of DNA and RNA within these cells.[6] However, Mitomycin-c may cause some serious complications such as bacterial infections and scleral necrosis.[7]

An alternative to Mitomycin-c is the use of conjunctival autograft.[7,8] When an autograft is applied to the area from where pterygium has been excised, the healthy stem cells within the graft restore the barrier function of the limbus, thus preventing the recurrence of pterygium. Recent studies have reported this procedure to be effective in prevention of pterygium recurrence. Recurrence rates ranging from 2-13% have been documented for conjunctivalautograft by different researchers.[8,9] Numerous studies have been done nationally and internationally to compare the recurrence rates of Mitomycin-c and the conjunctivalautograft, but with variable results.[10-12]

In countries like Pakistan (and specially the hot and dusty areas like Bahawalpur), where most of the population is outdoor worker, the incidence of pterygium is very high and the pterygium surgery carries a high risk of recurrence.[4,13]

The purpose of this study was to compare the recurrence rate of pterygium after primary excision by using either the conjunctivalautograft or the intraoperative application of Mitomycin-c, so as to asses the relative effectiveness of the two adjuvants. This study would help the eye surgeons in selecting a procedure which is easier to perform, has minimal complications and has a significantly low recurrence rate.

METHODOLOGY

Approval for this study was taken from the local ethical committee in February 2010. One hundred and sixty five patients of primary pterygium, presenting to the outdoor patient department of Eye Unit-I, B.V. Hospital, Bahawalpur from March 2010 to August 2010, were recruited for the study after taking a written informed consent from them. Patients with double pterygium, recurrent pterygium, acutely inflamed pterygium on slit lamp examination and those not consenting for pterygium surgery were excluded from the study.

Patients fulfilling the inclusion criteria were then randomly allocated into two groups. One group was operated for pterygium using conjunctivalautograft and the other group of patients underwent pterygium excision using intraoperative 0.02% Mitomycin-c. Preoperatively, all patients were thoroughly examined for visual acuity, extraocular movements, slit lamp examination (to document the size of the pterygium), intraocular pressure and dilated fundus examination.

All Operations were performed under topical anaesthesia using 0.5% proparacaine (Alcaine, Alcon Labs, Worthfort, Texas, U.S.A) eye drops. Pterygium head covering the cornea was detached and removed and the corneal surface was scraped with surgical blade No.11 (Feather Labs, Japan) to make it smooth and regular. Dissection was continued till the neck and body of the pterygium were also removed.

In one group, intraoperative Mitomycin-c 0.02% was applied for 5 minutes to the bare Scleral area created after ptyregium excision. The area where Mitomycin-c had been applied, was then thoroughly irrigated with 100ml of Ringer's lactate solution. The edges of the remaining conjunctiva were then sutured 2-3 mm from the limbus using 10/0 nylon suture.

In second group the area of bare sclera left after ptyregium excision was measured by using calipers. A free conjunctival graft of size 2mm larger than the recipient bed was obtained from the superotemporal limbal conjunctiva. This free graft was transferred to the recipient bed and secured to the site with the help of interrupted 10/0 nylon suture.

Postoperatively eye was padded for 18-24 hours. Pad was removed after 24 hours and all patients were then examined on slit lamp. Patients were prescribed steroid-antibiotic combination eye drops (Spersadexoline, Novartis Ophthlmics) 4 times daily for 4 weeks. Oral analgesics were also prescribed for three days. Patients were advised to follow up monthly for initial 6 months after the surgery.

At each visit, patients underwent detailed ocular examination including visual acuity, extraocular movements, slit lamp examination and funduscopy. Patients were specially assessed for any signs of recurrence seen on slit lamp (recurrence was defined as a regrowth of conjunctival fibrovascular tissue onto the cornea for an area of 2mm or beyond from the limbus). Frequency of recurrences in two groups was calculated and the results were compared. Computer software SPSS (version 10) was used to

Table-I: Age and Sex of the patients.

Age & Sex Distribution		*MMC Group*	*CAG Group*	*MMC+ CAG*
Mean age		59.06	60.04	59.50
(years)		(14.67)	(10.56)	(12.93)
SEX	Male	42(64%)	39(60%)	39(60%)
	Female	23(36%)	26(40%)	26(40%)
Grand Total		65(100%)	65(100%)	130

Results are shown as mean (standard deviation).
MMC = Mitomycin-C
CAG= Conjunctival autograft.

analyze the data. Mean and standard deviation was calculated according to the age and gender of the patients in each group. Chi-square test was used to compare the frequency of recurrences in two groups. A p-value <0.05 was considered statistically significant.

RESULTS

The age and sex distribution of patients is summarized in the Table-I. There were a total of 130 patients in this study who were randomized into two groups (65 patients in the Mitomycin-c group and 65 in the conjunctivalautograft group). All patients completed the study with a six month of followup period. The two groups were comparable in terms of age and sex (Table-I).

There were a total of 10 recurrences in the Mitomycin-c group (15.38%), two of these recurrences were seen at third month after the surgery, two recurrences were seen at fourth month postoperatively and six recurrences were seen at the sixth month of follow up (Table-II).Of these, 7 patients (10.7%) were male and 3(4.6%) were females.

There were only two recurrences in conjunctivalautograft group (3.07%), both occurring at sixth month after the pterygium excision (Table-III). Both of these patients were males. As can be seen from the Table-IV, the difference in the recurrence rate of pterygium between the Mitomycin-c group and the conjunctival autograft groups was statistically significant(15.3% and 3.0% respectively) (p< 0.05).This shows that the conjunctival autograft has a lower rate of recurrence as compared to the Mitomycin-c.

Table-III: Number of Recurrences in CAG group.

Age Range (years)	*Male*	*Female*	*total*
39-81	42(64%)	23(36%)	65(100%)
Recurrence	2(3%)	0	2(3%)

CAG= ConjunctivalAutograft

Table-II: Number of Recurrences in MMC group.

Age Range (years)	*Male*	*Female*	*total*
32-84	39(60%)	26(40%)	65(100%)
Recurrence	7(10.7%)	3(4.6%)	10(15.3%)

MMC = Mitomycin-C

DISCUSSION

Various surgical techniques have been employed to treat the pterygium. The unpredictable rates and timings of the recurrence are the main problems encountered after various treatment modalities.[7] A recurrent pterygium causes decreased visual acuity, ocular motility restriction and symblepharon formation.[6,7] Mitomycin-c and Conjunctivalautograft are two useful adjuncts in reducing the pterygium recurrence.

Mitomycin-c is an alkylating agent which blocks the DNA synthesis in conjunctival fibroblasts.[6] This mechanism leads to adown regulation of cellular proliferation and release of mitogenic agents from the newly formed conjunctival fibroblasts, thereby inhibiting the growth of the conjunctival tissue. Topical use of Mitomycin-c, whether intraoperative or postoperative, has been associated with certain complications e.g. scleral melting, corneal edema, corneal perforation and secondary glaucoma.[6,7] It has been shown that these complications are dependent on the dose of Mitomycin-c. As the dose of the drug being used intraoperatively is very low as compared to postoperative topical preparations (0.2mg/ml and 1.0mg/ml respectively), these complications are very rare after intraoperative use of the drug.

Table-IV: Number of Recurrences of MMC vs CAG group.

Followup (month)	*MMC*	*CAG*	*MMC+CAG*
1st	0	0	0
2nd	0	0	0
3rd	2	0	2
4th	2	0	2
5th	0	0	0
6th	6	2	8
Total.	10(15.3%)	2(3 %)*	12(9.2 %)

*P<0.05, Statistically significant.
MMC= Mitomycin-C.
CAG= ConjunctivalAutograft.

In our study, the recurrence rate after Mitomycin-c application was 15.38%. These results are comparable to the results of Young's study, which showed a recurrence rate of 15.9%after Mitomycin-c application.[8]

As an alternative to Mitomycin-c, conjunctivalautograft can be applied to an area from where pterygium has been excised. It is a promising technique to decrease the risk of pterygium recurrence. In this method, a conjuctivalautogarft is taken from the same eye or contralateral eye and is then applied to the area from where the pterygium has been removed. Superotemporal conjunctiva is usually preferred for harvesting a graft because this site is easily accessible to the operating surgeon as compared to the superonasal and inferior conjunctiva. Additionally, there is no visible postoperative scarring of the conjunctiva in this area because it is covered by the upper eyelid. If superotemporal conjunctiva is observed to be scarred due to previous surgeries or disease, superonasal area is an alternative site for harvesting the graft.[9]

Recent studies have shown conjunctivalautograft to be more effective adjuvant in decreasing the recurrence rate of ptyregium when compared to Mitomycin-c.[8-10] In 2005, Fahim et al reported a recurrence rate of 13.33% with conjunctival autograft.[9] In our study the recurrence rate was found to be only 3.0%.This difference may be due to surgeon factors such as experience and technique, which have a profound influence on the recurrence rate after excision.[6,7,12]

Numerous workers have compared the recurrence rates of mitomycin-c with that of conjunctival autograft. Most of these studies show a better outcome after conjunctivalautograft application.[9-12] Our results are exactly in line with the findings of these studies. According to our results conjunctivalautograft yields a better success rate in primary ptyerygium surgery as it has a lower recurrence rate when compared to the Mitomycin-c. Further studies may be needed to compare the outcome of mitomycin-c and conjunctivalautograft, specially in cases with recurrent ptyregia and double pterygia.

CONCLUSION

Pterygium excision followed by Mitomycin-c or Conjunctivalautograft application, both have acceptable results, but the conjunctival autograft has a lower recurrence rate when compared to the Mitomycin-c. Therefore the choice of adjuvant should be according to the environmental conditions, individual recurrence risk factors and the surgeon's expertise.

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