COMPARISON OF PREOPERATIVE AND INTRAOPERATIVE MITOMYCIN C IN PREVENTION OF PTERYGIUM RECURRENCE AND POSTOPERATIVE COMPLICATIONS

Abstract

Objective: To compare the frequency of recurrence and corneoscleral complications with pre-operative and intraoperative mitomycin C when used with excision of primary pterygium by bare sclera technique.

Study Design: Quasi experimental study.

Place of Study: Armed Forces Institute of Ophthalmology Rawalpindi

Duration of Study: Ten months (October 2006 to July 2007).

Patients and Methods: A total of 70 cases with primary pterygium were selected and divided equally into group A and B. In cases of group A, 0.1cc of 0.15 mg/ml of MMC was injected sub-conjunctivally and pterygium excision with bare sclera technique was done 4 weeks later. In cases of group B, after removing the pterygium by bare sclera technique, a sponge soaked in 0.04% MMC was applied over the bare sclera for three minutes intraoperatively. The patients were followed up to see recurrence and corneoscleral complications for three months.

Results: A total of 70 cases, 35 in each group were analyzed statistically. Mean age of group A was 40.83±12.655 years whereas that of group B was 44.57±13.718 years. Group A had 28 (80%) males and 7 (20%) females. Group B had 23 (65.7%) males and 12 (34.3%) females. Number of patients who presented with recurrence in group A was 1 (2.9%) and group B were 4 (11.4%) (Table 1). Using Chi square test on gender distribution between the two groups the p value was found to be 0.179 which was insignificant.

Conclusion: Preoperative MMC is as effective as intraoperative MMC in preventing recurrence but it is much safer than intraoperative MMC causing less corneoscleral complications.

Article

INTRODUCTION

Pterygium is a common fibrovascular proliferative disease affecting the ocular surface, which may result in visual deterioration from encroachment of the visual axis, progressive scarring and irregular astigmatism.1 Histologically it is an active, invasive, inflammatory process, a key feature of which is focal limbal failure resulting in "conjunctivalization" of the cornea.2 Primary pterygium may be excised using bare sclera technique (BST) but surgical trauma and subsequent postoperative inflammation contributes to pterygium recurrence. To prevent recurrence, two major adjunctive therapies are usually performed: (1) the application of antimetabolites, and (2) conjunctival or limbal autograft.3 Mitomycin C (MMC) prevents pterygium recurrence by its ability to inhibit fibroblast proliferation at the level of the episclera. It is an antineoplastic antibiotic agent isolated from the fermentation filtrate of Streptomyces caespitosus. It alkylates and crosslinks DNA and inhibits DNA, RNA, and protein synthesis.4 Intraoperative use of MMC can cause delayed conjunctival healing and serious vision-threatening complications such as scleral necrosis and corneal perforation within 4 weeks.5 Preoperative subconjunctival injection of MMC delivers drug directly to subconjunctival fibroblasts responsible for recurrence and also prevents ocular surface toxicity causing less damage to stem cells and less retardation of epithelial healing.6

PATIENTS AND METHODS

This Quasi experimental study was conducted at Eye department of Military Hospital Rawalpindi (now AFIO). The study was carried out from October 2006 to July 2007. It included a total of 70 cases divided into two groups:

Group A (preoperative MMC) ___ 35 cases

Group B (intra-operative MMC) ___ 35 cases

Ethical committee of the hospital approved the study. All cases of primary pterygium extending for more than 1mm on the cornea were included in the study. Any patient having previous history of conjunctival or squint surgery, ocular cicatricial diseases, keratoconjunctivitis sicca, recurrent corneal conditions like herpetic keratitis or those who were not expected to stay at Rawalpindi for at least one year after surgery were excluded from the study.

The cases were informed in detail about the study and chances of postoperative recurrence and complications due to surgery as well as MMC toxicity. Then informed written consent was obtained.

In cases of group A, 0.1cc of 0.15 mg/ml of MMC was injected sub-conjunctivally with an insulin syringe after instillation of topical anaesthesia. These cases were then sent back to report after one month in operation theatre for excision by bare sclera technique under local anesthesia. In cases of group B, after removing the pterygium by bare sclera technique, a sponge soaked in MMC was applied over the bare sclera and behind the limbus. A single application of 0.1 cc of 0.4 mg/ml (0.04%) of the drug diluted in balanced salt solution was applied for a period of three minutes. The sclera was washed continuously for at least 5 minutes with saline solution to remove excess of MMC solution employed during surgery. The patients were advised to take oral NSAIDs post operatively for 3 days and topical antibiotic-steroid combination for 2 weeks.

Follow up visits to see recurrence and corneoscleral complications were conducted at 2 weeks, 4 weeks, 2 months and 3 months postoperatively. Recurrence and corneoscleral complications were identified and noted down on a follow-up proforma.

RESULTS

A total of 70 cases, 35 in each group were analysed statistically. After applying independent sample t test for age distribution in both groups, it was found that mean age in group A was 40.83±12.655 years while in group B it was 44.57±13.72 years. Even though average age of group A was less than group B, this difference was found to be significant after applying test of significance (P=0.040).

Descriptive statistics were used to calculate the frequency (percentages) of recurrence and corneoscleral complications in operated cases. Chi-square test was applied to compare the frequency of recurrence and corneoscleral complications between the two groups. Mean and standard deviation for age were calculated.

Table-1: Frequency of recurrence

<table>
<thead>
<tr>
<th>Recurrence</th>
<th>GROUP A</th>
<th>GROUP B</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>34</td>
<td>31</td>
<td>65</td>
</tr>
<tr>
<td>Percentage</td>
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</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Percentage</td>
<td>2.9%</td>
<td>3.4%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>35</td>
<td>70</td>
</tr>
<tr>
<td>Percentage</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Chi Square Test for Significance: P=0.056

In group A no patient presented with corneoscleral complications during the study whereas in group B 7(20%) patients developed complications (Table 2).
Out of these 4 patients had thinning of sclera, 2 developed corneal epithelial defects and 1 had dellen. All the patients improved with artificial tear replacement. Chi-square test revealed no significant difference in recurrence (P=0.356) whereas significant difference in conorlocral complications between the groups (P=0.011) was seen.

DISCUSSION

Singh et al introduced the use of MMC, as an adjunct to pterygium surgery, to Western ophthalmology in 1988. Although MMC significantly reduced the rate of pterygium recurrence, severe complications such as corneal oedema, corneal perforation, scleral calcification, corectopia, iritis, sudden onset mature cataract, severe secondary glaucoma, incapacitating photophobia, and pain were also reported. These complications occurred within the first postoperative period and were mostly because of high cumulative doses of MMC or poor selection of patients who either had dry eyes or some immune disorders.

Our study included patients from different ages and both genders. Patients younger than the age of 15 years rarely acquire pterygium. Although in our study was carried out by Donnenfeld in 2003. The rate of recurrence in a group of 36 patients was 6% over a mean follow-up time of 24.4 months. The higher recurrence rate in this study may be because of a much longer follow-up period. The dose of drug used and the method adopted was similar to that of our group B. This study had a longer follow-up period and included males more than females which might have contributed to higher rate of recurrence. Young applied 0.02% MMC intraoperatively for 5 minutes and followed up for 1 year. The rate of recurrence was 15.9%. Another study showed a recurrence of 33.3% in 60 cases having 0.02% MMC being applied for 3 minutes and 2.7% in 74 cases where same preparation was applied for 5 minutes after 12 months of follow-up. The rate increased to 36.6% and 5.4% in both groups respectively after follow-up of another 3 months only (total 15 months). Same dosage of MMC with different recurrence rates highlighted the importance of other factors like age and ultraviolet exposure.

Various studies prove that very few, if any, complications occurred with intraoperative MMC7,21,22. Treatable delen were noted in 13 out of 371 patients who had pterygium excision followed by topical MMC 0.02% application for 5 minutes in a follow-up period of 26 months. Frucht-Pery showed that when conjunctival autografting was combined with MMC, 1 out of 120 patients developed minor melting of the flap24. All these studies support the results of my group A which had no complication but our group B showed corneoscleral complications at a higher rate. In our study, 7 patients developed complications. Out of these 6 had an average age of 62.67 years. This advanced age may have been responsible for the increased number of complications. There are multiple reports where patients with advanced age developed sclera melting and other corneocerellar complications with intraoperative use of MMC4,25. Moreover, most of the patients with complications belonged to lower socioeconomic class where malnourishment, illiteracy and poor hygiene are prevalent. Fortunately all these patients improved with conservative treatment without any need of surgical intervention.

CONCLUSION

Our study proves that preoperative MMC is as effective as intraoperative MMC in preventing recurrence but it is much safer than intraoperative MMC causing less corneoscleral complications. This technique can be used with more confidence in high risk patients especially those with advanced ages or who have predisposing conditions and still need excision due to high astigmatism or visual deterioration.