Comparison of Preoperative Subconjunctival Injection of Mitomycin C versus Conjunctival Auto Graft with Fibrin Glue in the Management of Primary Pterygium - A Clinical Study

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Author’s contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

ABSTRACT

Aim: To evaluate the outcome of preoperative subconjunctival Mitomycin C to conjunctival autografting using fibrin glue with respect to the recurrence rate and complications.

Methodology: A prospective randomized hospital based study was conducted. 60 eyes were taken into consideration with primary progressive pterygium and were randomly divided into 2 groups of 30 each. In group A subconjunctival injection of Mitomycin C (MMC) 0.1 ml of 0.1 mg/ml was given 1 month before bare sclera technique and in group B pterygium excision with conjunctival autograft using fibrin glue was performed. They were regularly followed up for 18 months.

Results: The mean age of the patients in this study was a 39.6±12.3 year with females outnumbering the males. The mean follow up period of group A was 10.6 ±5.44 months while in group B it was 11.2 ±4.49 months. It was found out that the recurrence rate with subconjunctival MMC before bare sclera technique was 3.4 %while the recurrence rate with conjunctival autograft using fibrin glue was6.7%. The average surgery time was more in group B than compared to Group A. Both the techniques were not associated with any vision threatening complications.

Conclusion: Administration of subconjunctival injection of MMC 1 month before the bare sclera technique is considered to be safer, economical, less time consuming, technically less demanding and as effective as conjunctival autograft with fibrin glue.
Keywords: Pterygium; bare sclera; MMC; auto graft.

1. INTRODUCTION

Pterygium is an elastotic subconjunctival degenerative fibro-vascular tissue proliferation. It is more commonly seen among those who are exposed to dry hot climatic conditions and ultra violet radiation exposure. Surgical intervention is indicated only if the individual has severe irritation, recurrent inflammation, obstruction to the visual axis, induced astigmatism, restriction in the motility and cosmetic blemish [1].

Due to its high recurrence rates (30-70%), adjuvant modalities are required such as radiation, antimetabolites, conjunctival grafts and limbal grafts to reduce its recurrence [2]. Among them it is observed that the best available option to prevent recurrence after pterygium excision is conjunctival autograft, where in after the excision of the pterygium a graft is fixed with the help of sutures or fibrin glue and autologous blood [3].

Usage of Mitomycin as an adjunctive was first described in the year 1963 in Japan by Kunitomo and Mori. Since then various modifications have been made to use them either preoperatively or intra operatively. However the long term usage of Mitomycin C eye drops can lead to various complications such as secondary glaucoma, corneal edema, scleral necrosis, sudden onset of mature cataract thereby limiting its usage to a single intraoperative application [4]. In a study done by Donnenfeld et al he reported a success rate of 94% with subconjunctival injection of MMC 1 month before the pterygium excision with bare sclera technique. It was observed that it allows the exact titration of MMC delivery to the activated fibroblasts and minimizes the epithelial toxicity [5].

The purpose of this study was to analyze if a simple and easy technique like subconjunctival MMC before pterygium excision by bare sclera technique can give results comparable to conjunctival autograft with regards to its recurrence rates. To observe if subconjunctival injection of MMC is associated with complications such as ocular toxicity that is seen with intra operative application of MMC.

2. MATERIALS AND METHODS

A prospective randomized hospital based study was conducted for a period of 12 months. In this study 60 eyes were taken who had primary progressive pterygium. In this study 12 patients had bilateral pterygium of which 5 were willing to get both their eyes operated and hence one eye was allocated in group A and the other in group B. In the remaining 7 patients only one eye was included for the study.

A detailed preoperative eye examination was done for all the patients. The vision, anterior segment and the retina was thoroughly evaluated. Following the procedure the patients were regularly followed up from 6 to 18 months.

2.1 Inclusion Criteria

All patients less than 50 years of age having primary progressive pterygium and willing to undergo the procedure were taken into consideration.

2.2 Exclusion Criteria

Patients having atrophic pterygium, recurrent pterygium, dry eye syndrome, collagen vascular diseases, co existent conjunctival diseases like previous alkali burns, Mooren's ulcer which can predispose to pseudo pterygium, history of uveitis, scleritis, glaucoma and those who could not come for a regular follow up were excluded from the study.

The patients were divided into 2 groups, Group A and Group B.

In group A subconjunctival injection of MMC 0.1 ml of 0.1 mg/ml was given 1 month before the bare sclera technique. And in group B pterygium excision with conjunctival auto grating using fibrin glue was done. In order to reduce the cost in Group B, a group of 5 to 6 patients were made and each group was operated with fibrin glue on the same day.

Under aseptic precautions 0.5% proparacaine was instilled and with a 30 G needle on a tuberculin syringe 0.1 ml of 0.1 mg/ml of MMC was injected into the body of the pterygium approximately 1.5 mm away from the limbus under an operating microscope. A sterile cotton bud was placed on the injection site for a few seconds to prevent the regress of MMC. After the injection, the conjunctival sac was washed with normal saline to wash out the excess MMC. The patient was advised to administer Ofloxacin 0.3% eye drops one drop 4 times a day for the next 4 days. The patient was reviewed on day 1, after 1 week and after 1 month. During the follow up
A complete ophthalmic examination was done including fluorescein staining. One month after the MMC injection, the patients were subjected to removal of the pterygium by the bare sclera technique. The eye was prepared and draped in a sterile manner. A Peribulbar block was given using 5 cc of 2% xylocaine and 1:200 000 adrenaline. The eye speculum was applied. The neck of the pterygium was grasped with the help of Saint Marin’s forceps and the head was dissected from the cornea with the help of conjunctival scissors following which the sclera portion of the pterygium was excised. A thorough removal of the subconjunctival fibrous tissue was done. The scleral bed and the cornea was polished with the help of a 15 surgical blade. Antibiotic steroid combination ointment (polymyxin B sulfate 10 000 units + chloramphenicol 10 mg + dexamethasone sodium phosphate 1 mg/g ointment) was instilled and a sterile eye pad was applied. The time taken for the entire procedure was noted.

In group B, the initial steps till the polishing of the corneal and scleral bed are the same, as in group A. The vertical and horizontal extents of the bare sclera was measured with Castroviejo’s measuring caliper. And a free conjunctiva limbal graft of the same size was taken from the superotemporal conjunctiva. In cases where the exposure of the donor site was poor, a superior rectus bridle suture was applied to fix the eye in the down gaze to get a better exposure of the donor site. The dissection was started from the fornical end and brought towards the limbus. During this process extreme care had to be taken to avoid button holing of the graft and involvement of the tenon’s capsule. Once the graft reached the limbus, it was flipped on to the cornea and the tenon’s attachment at the cornea was meticulously dissected, the graft was then cut at the limbus and once again flipped over the cornea so that its tenon’s surface faces the cornea. With the help of a duploject, fibrin glue was applied over the bare sclera and the conjunctival autograft was immediately flipped over the conjunctival defect. Proper care was taken to not disturb the orientation and the sides of the graft were opposed to the edges of the receipt conjunctiva. After a period of 3 minutes which was given for drying, the lid speculum was removed, antibiotic steroid eye drops (ofloxacine +dexamethasone) was instilled and a sterile eye pad was applied. The duration of the procedure was noted. The eye patch was removed after 6 hours followed by instillation of the antibiotic steroid eye drops 4 times a day for 15 days. Follow up of both the groups were done at 1 week, 1 month, 3 months, 6 months, 12 months and 18 months post operatively.

Statistical analysis was done using latest SPSS version 2.0. The age of the patients, surgical time, follow up time of patients in group A and B were compared. Simple t-test was used to compare the recurrence and complications between group A and group B and p value < 0.05 was considered statistically significant.

3. RESULTS

(13.33%) patients were in the age group of 21-30 years, 25 (41.6%) were in the age group 31-40 years and 27 (45%) patients were in the age group 41 to 50 years. The average age of the patients in this study was 39.6±12.3 years. Out of the 60 patients in the study group, 22 (36.66 %) were males and 38 (63.33%) patients were females. Among the patients included for the study 26 (43.33%) patients had an indoor occupation while the remaining 43 (56.66%) of the patients had an outdoor occupation. The average surgical time taken for bare sclera with preoperative subconjunctival MMC was 16.77±1.73 minutes while in group B where conjunctival autografting with fibrin glue was done, the average time taken was 23.36±1.53 minutes.

4. DISCUSSION

Though pterygium excision is a very simple procedure but the only drawback and main concern is its recurrence rate. It is assumed that the surgical trauma and post operative inflammation activate the subconjunctival fibroblast which causes proliferation of the fibroblasts and deposition of extracellular matrix which causes the recurrence of the pterygium [6].

<table>
<thead>
<tr>
<th>Group</th>
<th>Surgical Technique</th>
<th>Number of eyes operated</th>
<th>Number of eyes with recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bare sclera with preoperative MMC</td>
<td>30</td>
<td>1(3.4%)</td>
</tr>
<tr>
<td>B</td>
<td>Conjunctival autograft with fibrin glue</td>
<td>30</td>
<td>2(6.7%)</td>
</tr>
</tbody>
</table>
Table 2. To compare the complications in group A and group B

<table>
<thead>
<tr>
<th>Complications</th>
<th>Group A</th>
<th>Group B</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjunctival congestion</td>
<td>30(100%)</td>
<td>30(100%)</td>
<td></td>
</tr>
<tr>
<td>Subconjunctival hemorrhage</td>
<td>4(13.33%)</td>
<td>1(3.3%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Conjunctival granuloma</td>
<td>2(6.7%)</td>
<td>1(3.3%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Graft edema</td>
<td>2(6.7%)</td>
<td>1(3.3%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Graft hemorrhage</td>
<td>2(6.7%)</td>
<td>2(6.7%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Graft loss</td>
<td>1(3.3%)</td>
<td>2(6.7%)</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

However conjunctival autograft helps to reduce the recurrence rate by the presence of limbal stem cells which helps to restore the limbal barrier [7]. But the drawback of conjunctival autografting is that it can adversely affect the outcome of future glaucoma filtration surgeries if ever required and it is of limited use with a large double headed pterygium and scarred conjunctiva as enough donor conjunctiva tissue might not be available [8].

The usage of fibrin bioadhesive in conjunctival limbal autograft surgery simplifies the surgical technique, shortens the duration and has lesser postoperative complications [9]. Though cost is a concern the average cost decreases with increasing number of patients scheduled for the surgery on the same day. But for this we need to get an adequate number of patients on the same day which might increase the waiting period for the patients which is not a practical and feasible solution.

Recurrence of pterygium is common among younger patients [10]. In our study the youngest patient was 23 year old and the oldest was 48 years old. The average age of the study was 39.6 ±12.3 In a study done by Gazzard et al, the prevalence rates of pterygium in subjects over the age of 51 years were 6 times than that between 21-30 years of age. A study conducted by the Kim et al showed that 39.3 % were males and 66.5% were female which was similar to our study where the females outnumbered the males [11]. In a study done in Meiktila it was found that the rates of pterygium and pinguecula in rural residents were more than five times as high as in urban residents and it was primarily as a result of ocular sun exposure.

The average surgical time taken for bare sclera with preoperative subconjunctival MMC was 16.77±1.73minutes. The average surgical time for conjunctival autografting with fibrin glue was 23.36±1.53 minutes. It was observed that the time taken for conjunctival autografting using fibrin glue was significantly more than that of bare sclera with preoperative MMC[12]. In our study the recurrence rate was 3.4% in group A at the end of mean follow up of 10.6±5.44 months. And in group B it was 6.7% at the end of the mean follow up of 11.2±4.49 months. Recurrence rates after conjunctival autografting with fibrin glue in various studies ranges from 4 to 12%.

All patients had conjunctival congestion postoperatively due to surgical trauma which subsided with topical antibiotics- steroid eye drops, 4 patients in Group A had sub conjunctival hemorrhage after injection of MMC which cleared in 5 days. No patient had any sign of conjunctival or corneal staining after injection of MMC. 2 patients had conjunctival granuloma at 1 week and at 1 month post operatively after the bare sclera technique. No patient had vision threatening complications s during the study period like glaucoma, corneal edema, corneal perforation, scleral melting and cataract which are usually associated with intraoperative application of MMC. In group B it was observed that after conjunctival autografting using fibrin glue 2 patients had graft edema and 1 patient had hemorrhage under the graft after the first post operative day which cleared up with topical steroid drops. One patient had donor site granuloma on the 1st week post operatively which resolved with topical steroids and lubricating eye drops.

It was found out that the recurrence rate with subconjunctival MMC before bare sclera technique was 3.4 %while the recurrence rate with conjunctival autograft using fibrin glue was6.7%. Subconjunctival MMC 1 month before the bare sclera technique is simple, safe, economical, less time consuming, technically easy and as effective as various other techniques. It is useful in patients with recurrent pterygium, large double headed pterygium, patients with glaucoma who require filtration surgery or combined cataract and pterygium operation[13].
5. CONCLUSION

It can be concluded that subconjunctival MMC 1 month before the bare sclera excision has a potential to replace other methods of management. However a longer follow up period along with a larger sample size are needed to further establish the safety and efficacy of preoperative MMC in pterygium surgery.

6. LIMITATIONS OF STUDY

Since this is a small sample with short term follow up we would need bigger studies with larger sample size to validate the results.

CONSENT AND ETHICAL APPROVAL

Approval to conduct the study was obtained from the ethical committee and a prior consent was taken from all the patients.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES


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