



Limbal stem cell transplant vs. Intraoperative Mytomycin C in treatment of advanced primary pterygia

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Purpose: To compare the efficacy of treatment in advanced primary pterygia using one of two techniques—limbal stem cell transplant versus low-dose intraoperative mitomycin C (0.2 mg/ml).

Methods: This study was conducted at Bhatti International Teaching Hospital Kasur/ Central Park Medical College Lahore. Seventy consecutive patients presenting with advanced primary pterygia were enrolled from January 2010 to June 2011. Patients were divided in two groups. Group 1 (n=36) received limbal stem cell transplant. Group 2 received intraoperative 0.02% Mytomycin C on bare sclera. All the patients were followed for 12 months for recurrence of pterygium and postoperative complications.

Results: Recurrence occurred in 1 patient (2.78%) of Group 1 (LSCT) and 6 patients (14.7%) of Group 2 (MMC). 8 patients in Group 1 and 6 patients in group 2 complained of mild irritation postoperatively. One patient in group 1 and two patients in group 2 complained of photophobia. In group 2, six patients developed scleral thinning and five developed corneal epithelial defects whereas none of group 1 patients developed this complication.

Conclusions: Pterygium excision with LSCT is a superior technique than pterygium excision with intraoperative MMC having lower recurrence rate and fewer complications.



Introduction:

Pterygium is a wing shaped growth of bulbar conjunctiva along with hypertrophied subconjunctival fibrovascular connective tissue that encroaches upon the cornea. It is a worldwide common ocular surface disorder¹ especially in areas where eyes are exposed to ultraviolet radiations.² Exposure to UV radiations leads to deficiency of limbal stem cells³⁻⁵ and invites bulbar conjunctiva and fibrovascular tissue to grow on to the cornea. Pterygium disrupts precorneal tear film and cause irritation. When advanced, it restricts ocular motility and decreases visual acuity by growing over papillary axis or inducing astigmatism. Excision of pterygium is indicated when it is cosmetically unacceptable or the symptoms become bothersome. Simple excision of pterygium carries a high risk of recurrence.⁶ Therefore various surgical strategies are being adopted to minimize the recurrence rate⁷⁻¹². Excision of pterygium with limbal cell transplant is very popular now-a-days. Another commonly performed procedure is peroperative application of Mytomycin C after pterygium excision. The current study was aimed to compare the surgical outcome of these two procedures in terms of recurrence rate and post operative complications

Materials & Methods:

This study was conducted at Bhatti International Teaching Hospital Kasur/ Central Park Medical College Lahore. Seventy consecutive patients presenting for pterygium surgery & meeting inclusion criteria were enrolled from January 2010 to June 2011. Pterygium was graded according to its size involving the clear cornea as follows:

- G-I: If the pterygium covers less than 1.5 mm
- G-II: Less than half radius of the cornea.
- G-III: Over half radius of the cornea.
- G-IV: Pupillary margin and beyond.

Patients labeled as grades III and IV were included in the study. Exclusion criteria included keratitis, uveitis, glaucoma, dacryocystitis and chronic ocular allergic disorders. Patients with recurrent pterygia and those suffering from collagen vascular diseases were also excluded from study. The patients were divided into two groups. Patients in group 1 underwent pterygium excision with limbal stem cell transplant whereas in group 2 patients 0.02% MMC was applied on bare sclera for 5 minutes after pterygium excision. Before surgery detailed ocular examination of the patient was performed after taking informed consent. The examination included visual acuity, intraocular pressure, extra ocular movements, slit lamp biomicroscopy and funduscopy. The

size of pterygium was measured as encroachment of corneal surface. The operative procedure was as follows. Topical & peribulbar anesthesia was given before draping the eyes. Wire speculum was applied to expose the operative field. The pterygium was filled with 2% xylocaine / 1: 100000 adrenaline mixture to separate it from underlying sclera. The head of pterygium was then grasped with fine toothed forceps near the apex and put on tension to detach it from cornea. Underlying corneal bed was polished with surgical blade No. 15. The body of pterygium was dissected and excised with Westcott scissors. Minimal cautery was applied to control bleeding.

In group 1 patients, subconjunctival injection of 2% Xylocaine/1: 100000 adrenaline mixture was given to balloon superotemporal conjunctiva. A limbal conjunctival auto graft containing 0.5 mm of clear cornea was harvested free of tenon's capsule. The graft was sutured to the recipient bed with 10/0 interrupted Nylon suture. In group 2 patients 0.02% MMC was applied to the bare sclera for 5 minutes intraoperatively. The site of application was then thoroughly irrigated with balanced salt solution. Patients were evaluated on post-operative days 1, 7, 30 and then every 3 months for at least one year.

Results:

Table 1: Demographic and general data of patients studied

Parameters	GROUP1 (n=36)	GROUP2 (n=34)
Mean Age (years)	50.04	51.05
Age range (years)	31-62	35-61
Sex (female/male)	17/19	19/15
Laterality (right/left)	19/17	14/20

Table 2: Rate of recurrence in studied groups

Recurrence month	GROUP1(n=36)	GROUP2(n=34)	p-value
1	00(00)	03(8.82%)	0.07
3	01 (2.78%)	01(2.94%)	0.964
6	00(00)	01(2.94%)	0.3
9	00(00)	00(00)	-
12	00(00)	00(00)	-
Total	01(2.78%)	05(14.7%)	0.07

Table 3: Post-operative complications in both groups

Complication	GROUP 1 (n=36)	GROUP 2 (n=34)	p-value
Irritation	08(22.22%)	06(16.67%)	0.63
Photophobia	01(2.78%)	02(5.56%)	0.53
Corneal epithelial defect	00 (00)	05(13.89%)	0.017
Scleral thinning	00 (00)	06(16.67%)	0.008

All of recurrence appeared before 6 months postoperatively. Only one recurrence (2.78%) was seen in group 1 (LSCT) at 3rd month. In group 2 (MMC), 5 (14.7%) recurrences were noted; 3 at first month, one at 3rd month and one at 6th month. The rate of recurrence between the two groups at any stage as well as overall was not significant statistically.

During first week of surgery, 08 patients in group 1 complained of mild irritation which disappeared when sutures were removed. Six patients in group 2 complained of irritation at different occasions. One patient in group 1 and 2 patients in group 2 complained of photophobia. Five patients in MMC group developed scleral thinning whereas in LSCT group none of the patients had this complication.

Discussion:

Pterygium formation is believed to be closely associated with stem cell deficiency. Pathogenesis of pterygium can be divided into two stages.¹³ In stage 1 there is progressive damage to limbal stem cells causing disruption of conjunctival – corneal epithelial barrier. In stage 2 there is active progressive conjunctivalization of cornea. Extensive cellular proliferation, angiogenesis and connective tissue remodeling occur during this stage. Limbal stem cell transplant replenishes the deficient stem cells and restores conjunctival – corneal epithelial barrier. Corneal invasion by conjunctiva is thus limited. Although it is a time consuming and technically demanding procedure, limbal stem cell transplant is a relatively safe procedure being not associated with sight threatening complications. Multiple studies already conducted show promising results with limbal stem cell transplant as adjuvant to pterygium excision.^{14-17,22} The recurrence rate remained less than 10% (1.9%-9%) in most of such studies.

Mitomycin C (MMC) is an alkylating antineoplastic agent which inhibits DNA synthesis and thus prevents cell

replication. When used as intraoperative adjuvant, MMC significantly reduces the rate of pterygium recurrence¹⁸⁻²¹ Recurrence rate were reported to be 5.4 - 21% depending upon the surgical techniques used. Recurrence rate remained higher when sclera was left bare following application of MMC as compared to when sclera was covered with conjunctival flap.

AL Young et al 2002 compared the efficacy of intraoperative 0.02% MMC with limbal conjunctival autograft.⁽²²⁾ In their study recurrence rate in MMC group was significantly higher (15.9%) than in limbal conjunctival autograft (1.9%). In our study recurrence rate in MMC group was (14.7%) and in LSCT group it was (2.78%). Regarding recurrence rates, our results are comparable with those of AL Young.

Both techniques were also compared for post operative complications like irritation, photophobia, corneal epithelial defects and scleral thinning. Mild post-operative irritation was more common in Group1 (LSCT). Eight patients (22.22%) of this group complained of post operative irritation. This was due to the conjunctival stitches applied to fix the transplant and to close the conjunctiva of donor site. The patients got relief when conjunctival stitches were removed. Photophobia was more common in Group 2. Two patients in Group2 (5.56%) complained of photophobia as compared to one patient (2.78%) in Group 1. The difference of all the preceding complications in both the groups was, however, not statistically significant. The statistically significant complications were corneal epithelial defects and scleral thinning, which were noticed only in Group 2 patients. Five patients (13.89%) in this group developed corneal epithelial defects while 6 (16.67%) patients developed scleral thinning. However after liberal use of artificial tears epithelial defects healed and sclera regained its normal thickness in all of the affected patients.

Conclusion:

Pterygium excision with LSCT is a superior technique than pterygium excision with intraoperative MMC having fewer complications.

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