

Comparative Study of Incidence, Recurrence Rate and Conjunctival Autografting with intraoperative Mitomycin-C in Management of Pterygium

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Received: 15-04-2022 / Revised: 20-05-2022 / Accepted: 05-06-2022

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Conflict of interest: Nil

Abstract

Background: Pterygium excision with CONJUNCTIVAL AUTOGRAFTING is very popular technique to prevent recurrence with very few side effects. This is being tried out with success in different country. Aims of the present series an attempt was made to do a comparative study between intraoperative application of Mitomycin-C (0.02 %) and conjunctival autografting and their effectiveness, effects and rate of recurrence in patients.

Material and Methods: The study was carried out on 30 patients who presented to the Eye department at Darbhanga Medical College and Hospital, Laheriasarai during the period from July 2019 to September 2020 and was analysed retrospectively. Efforts were made to select patients with pterygium. Selected patients were divided into two groups Group I and Group II. The statistical calculations shows standard error of difference is 10.6, whereas observed difference (13.33 - 6.66) was 6.67. The observed difference between the two groups is less than twice the S.E. of difference i.e. 2×10.6 . Therefore observed difference between recurrence rates was not significant.

Results: It was found that pterygium was more prevalent in between 3rd and 5th decade and beyond this range of age the incidence declines. The disease was more common in males than females. In symptomatology growth of red mass or fleshy mass was the predominant presenting symptom. This was followed by redness and irritation of the eye. In most of the patients improvement of visual acuity occurred after pterygium surgery. In group one patients, (conjunctival autografting) recurrence rate was 6.66 % (one out of fifteen). In group two patients, (intra-operative application of Mitomycin-c) there was 13.33% (two out of fifteen) recurrence rate. When recurrence rates of two groups were compared statistically, the difference was not significant.

Conclusion: So it was concluded that either excision of pterygium with bare sclera technique along with conjunctival autograft or intra-operative application of Mitomycin-c (0.02 %) for 3 minutes are both equally effective adjuncts to prevent recurrence in pterygium surgery.

Keywords: Conjunctival Autografting, Mitomycin-C, Pterygium

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Background

Pterygium is a degenerative condition characterized by a wing-shaped fibrovascular conjunctival growth in the interpalpebral fissure encroaching on the cornea [1]. It is a good example for UV-sunlight-induced ocular damage. Its relatively high incidence has gained importance in public health since it is one among the earliest signs of UV sunlight damage [2]. Pterygium is a cause of cosmetic complaints, chronic irritative symptoms, and decreased vision secondary to induced astigmatism or growth over the visual axis. The pterygium may induce irregular corneal astigmatism, owing to abnormal pooling of tears in advance of the apex of the pterygium. This tear film causes topographic horizontal flattening, that results in astigmatism with the rule [3]. The management of pterygium poses a great challenge to ophthalmologists because of the high recurrence rates (2.1%–87%). The various methods used for the treatment of pterygium include bare sclera excision, with or without the adjunctive use of mitomycin C or beta - irradiation, wound closure by using a conjunctival autograft, conjunctival rotation autograft, conjunctival limbal autograft, and conjunctival flaps along with adjuvant therapies for recurrences. Among all these procedures, Conjunctival autografting is a good technique as it is effective in reducing recurrences (less than 2%). It is widely performed for single-head pterygium. However, its use in doublehead pterygium is limited because of insufficient conjunctival donor tissue to cover the bare scleral defects both nasally and temporally [4].

Materials and Methods

The study was carried out on 30 patients who presented to the Eye department at Darbhanga Medical College and Hospital, Laheriasarai during the period from July 2019 to September 2020 and was analysed retrospectively.

Patients selected were divided into two groups Group I and Group II.

Group I: 15 patients were selected randomly with primary pterygium. The pterygium was excised with bare sclera technique. Conjunctival autograft taken from superior bulbar conjunctiva is placed on scleral bed and sutured with 10-0 Nylon in interrupted manner.

Group II: 15 patients were selected randomly with primary pterygium. The pterygium were excised with bare sclera technique and then 0.2 mg/ml (0.02 %) of Mitomycin-c was applied with a sponge (3 × 4 mm) to the bare scleral area intra-operatively for 3 minutes and then washed off thoroughly with normal saline.

All patients under this study were subjected to a thorough general and ocular examination.

Enrolled patients details pre-operative

Patient work up (pre-operative): history, systemic examination, general ophthalmic examination, refraction

Conjunctival autografting:

After that to the patients belonging to group I, conjunctival autografting was done with following procedure.

The size of the conjunctival graft required to resurface the exposed scleral surface was determined by using castroveizo calipers in 3 directions-

1. Extent across the limbus
2. Maximum circumferential extent of the bed vertically.
3. Maximum distance from the limbus to the medial margin of excised conjunctiva.

Method of Preparation of Mitomycin-c:

Mitomycin-c is available in 2 mg vial as powder. It is reconstituted by diluting with distilled water. 10 ml distilled water is added into the vial, this reconstituted solution contains 0.2 mg of Mitomycin-c.

After that in group II patient, after excision of pterygium with bare sclera technique Mitomycin-c 0.2 mg/ml (0.02 %) was applied with a sponge (3 × 4 mm) to the bare sclera intraoperatively for 3 minutes and then washed off thoroughly with normal saline. Then pad and bandage applied after administration of antibiotic ointment.

Post-Operative Treatment:

The pad and bandage were removed next day. A systemic antibiotic was given for a week and oral analgesic and H₂ blockers for 3 days. Patients were prescribed Prednisolone eye drop (1 % w/v) four times daily for 1st week and twice daily for next one week. Moxifloxacin eye drop 4 times daily for 2 weeks. Conjunctival stitches were removed on the 7th post-operative day. After examining the patient on 1st postoperative day again patient was

examined on 7th post-operative day. Eye was stained with 2 % freshly prepared Fluorescein and examined under slit lamp using cobalt blue filter light for superficial punctate keratitis. The subsequent check-ups were on 15th post-operative day, at 1st month, 3rd month and 6th month and same procedure was follow up to 1 year.

Results

The study was carried out on 30 patients. patients were divided into two Groups - Group I and Group II.

In Group I, In 15 patients Pterygium was excised with bare sclera technique and after that conjunctival autografting was done.

In Group II, In 15 patients after excising the Pterygium with bare sclera technique, intraoperative Mitomycin-c (0.02 %) were applied.

Table 1: Treatment Group Data

Treatment Group	No. of Eyes	Average-Age (in years)	Gender (M : F)
Group I	15	39.12	11:4
Group II	15	41.32	12:3

In group I, 15 eyes of 15 patients were treated, out of which eleven patients (73.37 %) were males and four patients (26.63 %) were females. Their age ranged from 24 years to 62 years (average age 39.12 years).

In group II, 15 eyes of 15 patients were treated, twelve (80 %) were males and three (20 %) were females. Their age ranged from 25 years to 60 years (average age 41.32 yrs).

Table 2: Incidence According to Age Distribution

Age incidence (in years)	Number of cases
21-30	5
31-40	6
41-50	9
51-57	4
58-65	6

Majority of patients were of Age group ranged from 31 years to 50 years. 5 patients were less than 31 years of age.

Table 3: Incidence According to Type of Pterygium in Group I

Type of Pterygium	Number of cases	Percentage (%)
Nasal	12	80 %
Temporal	2	13.34 %
Both	1	6.66 %

In Group I, out of 15 eyes of 15 patients one eye (6.66 %) had bilateral Pterygium (both nasal

and temporal). Two eyes (13.34 %) had temporal pterygium. Rest 12 eyes (80 %) had pterygium located nasally.

Table 4: Incidence According to Type of Pterygium in Group II.

Type of Pterygium	Number of cases	Percentage (%)
Nasal	12	80 %
Temporal	1	6.66 %
Both	2	13.34 %

In Group II, out of 15 eyes of 15 patients two eyes (13.34 %) had bilateral pterygium. One eye (6.66 %) had temporal pterygium. Rest twelve eyes (80 %) had pterygium located nasally.

Table 5: Distribution of Postoperative Subjective Symptoms

Postoperative subjective symptoms	
Group I	Group II
Foreign Body sensation - 3 Patients	Conjunctival congestion - 2 Patients
Lacrimation - 2 Patients	Lacrimation - 1 Patient
Photophobia - 1 Patient	Photophobia - 1 Patient

In group I, during 1st postoperative week, 3 patients had foreign body sensation, 2 patients had lacrimation and in 1 patient photophobia was present. During 2nd postoperative week after removal of stitches foreign body sensation was absent in all three patient, but lacrimation and photophobia was present which is much reduced in severity. After one month post-operatively, when patients came for check-up these symptoms were absent.

In group II, during 1st postoperative week. 2 patients had conjunctival congestion, 1 patient had lacrimation, 1 patient had photophobia. During 2nd postoperative week, the above symptoms were present, but very much reduced in severity. These symptoms were very less than Group I. All symptoms subsided within one month.

Table 6: Distribution of Postoperative Complications

Postoperative complications	
Group I	Group II
Loose Graft -One patient (6.66%)	Superficial punctate keratitis -
Graft oedema-One patient (6.66%)	1 Patients (6.66 %)
Graft displacement -One patient (6.66 %)	Delayed epithelialisation - 2
Pyogenic granuloma -One patient (6.66%)	patient (13.3%)
Vascularisation of graft - 3 patients (20 %)	
Graft rejection – Nil	

In Group I, Complication like loose graft were seen in one patient (6.66 %). In one patient (6.66 %) graft became displaced. One patient (6.66 %) developed pyogenic granuloma. The granuloma was excised after detection (4 week postoperative). One patient (6.66 %) developed graft oedema, which gradually resolved. Vascularisation of graft was common problem occurring in 3 patients at the end of 2nd week.

In Group II patients, one patient (6.66 %) developed superficial punctate keratitis of cornea, which gradually subsided after taking antibiotic eye drops. After completion of 2nd weeks bare sclera was still present. But in most of the cases bare sclera got covered by epithelium within 3 months, excepting few i.e. 2 cases (13.3 %), where it took more than three months for bare area of the sclera to be covered by epithelium. After 6 months in all the cases bare area was covered by epithelium.

Table 7: Comparison of Pre and Post-Operative Visual Acuity

No. of Patient	Pre-Operative Visual Acuity	Post-operative Visual Acuity
1	Finger Counting	6/60
3	6/60	6/24
5	6/24	6/12
6	6/18	6/9
7	6/12	6/6
8	6/6	6/6

Above table shows improvement of visual acuity in most of the patient after pterygium surgery.

Table 8: Recurrence in Study Group

Treatment Group	No. of Eyes	No. of Eyes with Recurrence	Recurrence Rate
I	15	1	6.66 %
II	15	2	13.33 %

In group I, out of 15 eyes, one patient had developed recurrence, so the recurrence rate in group I is 6.66 %.

In group II, out of 15 eyes, two patients had developed recurrence. So the recurrence rate in Group II is 13.33 %.

Discussion

In present study pterygium was more common in males than females. In Group I out of fifteen patients, eleven patients (73.37%) were males and four patients (26.63 %) were females. In Group II, out of fifteen patients, twelve (80%) were males and three (20 %) were females. Parthasarathy *et al* (2007) [5] had a similar observation in rural India in pterygium and found prevalence of pterygium higher among the males. Out of total of 98, 790 male patients of eye diseases, they found pterygium in 1728 persons (1.74 %) and out of 93,991 females, 1120 (1.19 %) were suffering from pterygium.

Majority of patients were middle aged (31-50 years). Parthasarathy *et al* (2007) [5] in their study in rural India found that after the age of 25 years, there is sudden increase in prevalence of pterygium in both sexes. The prevalence shoots up from

0.9 % to 6.1 % in males and from 0.65 % to 3.85 % in females.

In group one patients twelve eyes (80 %) had nasal pterygium, two (13.34 %) eyes had temporal pterygium and one (6.66%) eye had pterygium located both nasally and temporally.

In Group II patients twelve (80%) eyes had nasal pterygium, one eye (6.66 %) had temporal pterygium and two (13.34 %) eyes had pterygium located both nasally and temporally.

In present study, in group one patients complications like loose graft were seen in one patient (6.66 %). In one patient (6.66 %) graft became displaced, one patient (6.66 %) developed graft oedema, which gradually resolved. Vascularisation of graft was present in three patient (20 %).

Kenyon *et al* (2015) [6] described the conjunctival autograft in pterygium surgery. In his study minor complications like conjunctival graft oedema, pyogenic granuloma, epithelial inclusion cyst formation, retraction and necrosis of graft was present, which almost matches with my study. Dadeya *et al* (2019) [7]. conducted a study on conjunctival autograft. In their study, they found

complications like pyogenic granuloma in 5.5 %, graft oedema in 2.77 %, loose graft in 2.77 % and dellen formation in 2.77 %.

In group two, one (6.66 %) patient developed superficial punctate keratitis and two (13.3 %) patients had delayed epithelialisation.

Heliligenhaus A *et al* (2015) [8] used intra-operative Mitomycin-c (0.02 %) after excising the pterygium. They found complications like conjunctival irritation in 21.42 % and delayed epithelialisation in 4.76 % patients.

In present study improvement of visual acuity occurred in most of the patients after pterygium surgery. The improvement was mainly in the group who had significant loss of visual acuity due to progressive pterygium involving cornea more than midway between limbus and nasal pupillary margin. The group, which had stationary pterygium had almost equally good visual acuity pre and post operatively because the head of the pterygium had just crossed the limbus.

In group I, out of fifteen eyes, one (6.66 %) eye had developed recurrence.

The low recurrence rate (6.66 %) in present study probably resulted from the surgical technique of incorporating limbal tissue in the grafts as much as possible. Kenyon *et al* (1985) first described the conjunctival autograft as a method to reduce recurrence of pterygium. The recurrence rate was 5.3 % using this approach. They have included limbal conjunctiva within the graft and found low recurrence rates.

Simona *et al* (2010) [9] reported a recurrence rate of 35 % after autografting in 14 eyes and advocated that procedure should not be used as a standard primary surgical procedure for the pterygium. They have not included limbal conjunctiva within the graft.

Allan BDS (2013) [10] achieved low recurrence rate using conjunctival grafting in a large series. Kotch and Guler also

found low recurrence rate in their study. They all had included limbal tissue in the graft. Figureirdedo *et al* (1997) in his study also stressed the importance of limbal tissue transplantation. Dushku *et al* (1994) gave a basis for the importance of limbal cells in the transplant. They used immunohistochemical techniques to demonstrate altered limbal basal cells invading normal cornea at the advancing edge of the pterygium. Ramkrishnan *et al* (2005) achieved 5 % recurrence rate using conjunctival autograft with inclusion of limbal tissue in the graft.

Archimedes, *et al* (2014) [11] in a study to compare the recurrence rate after conjunctival autograft alone versus conjunctival autograft with mitomycin-C in the treatment of pterygium, there was no significant difference in the rate of recurrence ($p=0.53$) between the two treatments for both primary and recurrent pterygium.

In Group two patients I have used 0.02 % Mitomycin-c intra-operatively for 3 mins in pterygium surgery. Out of fifteen eyes, two eyes (13.33 %) had developed recurrence.

Tranavee *et al* (2018) [12] confirmed that a single administration of 0.02% of Mitomycin-c intra-operatively for 3 mins in pterygium surgery. They found recurrence rate of 13.33 % with no serious complications.

A comparative study of intra-operative Mitomycin-c and conjunctival autograft in pterygium surgery was done by some author.

In their study, group A patients underwent bare sclera excision along with conjunctival autograft and Group B patients underwent bare sclera excision with intra-operative Mitomycin-c (0.02 %) for 3 minutes. They found recurrence rates of 8.33 % in group A and 7.14 % in group B. In present study, when recurrence rates of two groups were compared statistically, the difference was not significant.

So, single intra-operative application of Mitomycin-c (0.02 %) for 3 mins and conjunctival autograft are both equally effective adjuncts to pterygium surgery.

Limitations

The sample size studied in this study was less and hence this study requires a large group of patients and long term follow up for the incidence of recurrence.

Conclusion

Pterygium with bare sclera technique along with conjunctival autograft or intra-operative application of Mitomycin-c (0.02 %) for 3 minutes are both equally effective adjuncts to prevent recurrence in pterygium surgery. Incidence of recurrence after pterygium surgery with conjunctival auto grafting is very low making the use of antimetabolites unnecessary.

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