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Original Research Article

Outcome of Primary Pterygium Surgery with Conjunctival Autograft Versus Intraoperative Mitomycin – C

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Abstract

Background: Pterygium is a triangular fibrovascular subepithelial in growth of degenerative bulbar conjunctival tissue over the limbus on to the cornea. Pterygium typically develops in patients who have been living in hot climates and may represent a response to chronic dryness and ultraviolet exposure. ***Methods:*** This prospective study included 70 patients with primary pterygium, randomly divided into two groups: Group A treated with conjunctival autograft and Group B with intraoperative mitomycin C. Standard preoperative evaluation, surgery under local anesthesia, and postoperative follow-up up to 6 months were performed to assess visual outcomes, complications, and recurrence. ***Results:*** A total of 70 patients with primary pterygium were divided into two groups: Group A (conjunctival autograft) and Group B (mitomycin C). Most patients in Group A were aged 31–40 years (40%), while Group B had more in the 51–60 range (28.6%) (p=0.018). Males predominated in both groups. Visual acuity improved in both, with 6/6 vision in 37.1% of Group A and 28.6% of Group B at 6 months. Complications were fewer in Group A (11.5%) than in Group B (54.3%), making conjunctival autograft the safer and more effective method. ***Conclusion:*** The study of 70 eyes with primary pterygium showed that conjunctival autograft had fewer complications and a lower recurrence rate (2.9%) compared to intraoperative mitomycin C (14.3%), proving it to be a safer and more effective method for managing primary pterygium.

Keywords: Pterygium, Conjunctival autograft, Mitomycin C, Primary pterygium, Recurrence rate, Fibrovascular growth.

INTRODUCTION

Pterygium is a triangular fibrovascular subepithelial in growth of degenerative bulbar conjunctival tissue over the limbus on to the cornea. Pterygium typically develops in patients who have been living in hot climates and may represent a response to chronic dryness and ultraviolet exposure. Pterygium generally occurs in the interpalpebral area at the 3 or 9 o'clock positions adjacent to the limbus. Most commonly they are located nasally, but may occur temporally and in some instances in both positions simultaneously. Many cases are bilateral. Pterygium occurrences rate at 10% - 12% in man and 4.6% - 5% in women [1]. A pterygium that is confined to 1 - 2 mm of the peripheral cornea has little effect on vision may be of only cosmetic concern. As the pterygium advances, however, induced irregular astigmatism can cause decreased visual acuity. Also, the elevated area can disrupt the tear film, leading to irritation and symptomatic epithelial keratopathy. When pterygium progressed towards the center of the cornea, vision is affected, the visual axis is threatened or symptoms or cosmetic become bothersome concern, treatment of pterygium is indicated. A varity of treatment strategies for the removal of pterygium have been advocated over the years. Virtually all have been plagued by significant recurrences rates requiring one or more repeated surgery. Recurrent rates up to 92% [1].

Most pterygium recurrences occur in the early post-operative period, more than 90% occur within the first year after surgery. Pterygium morphology has been shown to be significant risk factor for recurrences; young individuals have a higher rate of recurrences. Conjunctival autograft has been shown to effectively reduce the recurrences rate of primary and recurrent pterygium. A varity of surgical procedure has been described but the recurrences of pterygium still remain the major complication. Recurrences rate vary from procedure to procedure. Simple excision and excision with bare sclera technique [2] carry a higher recurrence rate of 30% to 100% and 5% to 89% [3]

Since pterygium frequently recur after surgical procedure and adjunctive measures have been devised to prevent the recurrences including conjunctival autograft [4] & intraoperative application of mitomycin C [5] & topical mitomycin C drops [6].

Both conjunctival autograft and intraoperative mitomycin C to prevent the recurrences of pterygium after pterygium excision [7]. However, to the best of my knowledge no study so far has compared the effectiveness of conjunctival autograft and intraoperative mitomycin C for primary pterygium surgery in Bangladesh.

OBJECTIVES

- To prevent the pterygium recurrence after surgery.
- To compare the efficacy of conjunctival autograft and intraoperative mitomycin - C.
- To assess the postoperative complication.

METHODOLOGY & MATERIALS

This prospective study was conducted in the Department of Ophthalmology, Mymensingh Medical College Hospital and BNSB Eye Hospital, Mymensingh, from January 2008 to June 2009. A total of 80 eyes of 80 patients with primary progressive pterygium were selected on a random basis, with each patient considered as a single case. Due to the lack of sustained follow-up, we excluded 10 participants from the study cohort. The patients were divided into two equal groups: Group A included 35 patients treated with conjunctival autograft and Group B included 35 patients treated with intraoperative mitomycin-C. Allocation was initially done by lottery on the first day, followed by alternate assignment to the two groups on subsequent days. Eligible patients were between 20 and 65 years of age, included both sexes and represented various socioeconomic and educational backgrounds from rural and urban areas. Only healthy patients without local or systemic diseases were included. Patients with other ocular diseases, previous ocular surgery, recurrent pterygium, trauma, prior antimitotic therapy, cataract, glaucoma, systemic comorbidities, or those failing to complete follow-up were excluded.

A detailed history was recorded, including demographic information, ocular complaints, prior illnesses and drug history. Comprehensive ophthalmic examination was performed using Snellen's chart, torchlight, slit-lamp biomicroscopy, applanation tonometry, ophthalmoscopy and retinoscopy. Baseline clinical parameters included visual acuity, ocular adnexal condition, conjunctiva, cornea, anterior chamber, iris, pupil, lens, intraocular pressure and fundus. Routine investigations included complete blood count, ESR, bleeding and clotting time, fasting blood sugar, urine R/M/E, conjunctival swab for culture and ECG.

All surgeries were performed under topical 0.4% oxybuprocaine and local 2% lignocaine with adrenaline. In Group A, the pterygium head was dissected and excised, followed by placement of a conjunctival autograft secured with 10-0 nylon sutures. In Group B, after excision, sponges soaked in 0.02 mg/ml Mitomycin-C were applied to the bare sclera for 150 seconds, followed by copious saline irrigation. Postoperative assessments were performed at Day 1, Week 1, Week 3, Month 3 and Month 6, evaluating visual acuity, ocular symptoms, signs, intraocular pressure, recurrence and graded symptom scores. Data were analyzed using SPSS with appropriate statistical tests. Ethical approval was obtained and written informed consent was taken from all participants.

RESULTS

Table 1: Distribution of the patients age by the type of operation

Age (in years)	Group A (n=35)	Group B (n=35)	p value
21–30	11 (31.4)	6 (17.1)	
31–40	14 (40.0)	12 (34.3)	
41–50	8 (22.9)	7 (20.0)	
51–60	2 (5.7)	10 (28.6)	**0.018**
61–65	0 (0.0)	0 (0.0)	
Total	35 (100.0)	35 (100.0)	
Mean ± SD	**36.77 ± 10.05**	**42.66 ± 10.31**	

Table 1: Shows the distribution of patients' age by type of operation, revealing that most participants in Group A were 31–40 years old (40.0%), while Group B had a higher proportion in the 51–60 age range (28.6%). The mean age was lower in Group A (36.77 ± 10.05) compared to Group B (42.66 ± 10.31), and this difference was statistically significant (p=0.018).

Table 2: Distribution of the patient's sex by the type of operation

Sex	Group A (n=35)	Group B (n=35)	p value
Male	26 (74.3)	23 (65.7)	**0.434**
Female	9 (25.7)	12 (34.3)	
Total	**35 (100.0)**	**35 (100.0)**	

Table 2: Shows the distribution of patients' sex by type of operation, where males were predominant in both groups 74.3% in Group A and 65.7% in Group B. Female representation was lower in both groups, with 25.7% in Group A and 34.3% in Group B. The difference between groups was not statistically significant (p = 0.434).

Table 3: Grading of pterygium in pre-operative two study group

Grading	Group A (n=35)	Group B (n=35)	p value
1. Invasion <2 mm on the cornea	2 (5.7)	1 (2.9)	**0.606**
2. Invasion 2.1–3 mm on the cornea	12 (34.3)	14 (40.0)	
3. Invasion 3.1–4 mm on the cornea	14 (40.0)	12 (34.3)	
4. Invasion 4.1–5 mm on the cornea	7 (20.0)	6 (17.1)	
5. Invasion >5 mm on the cornea	0 (0.0)	2 (5.7)	
Total	**35 (100.0)**	**35 (100.0)**	

Table 3: Shows the grading of pterygium in the two pre-operative study groups, where most patients in both groups had invasion between 3.1–4 mm on the cornea (40.0% in Group A and 34.3% in Group B). Mild invasion <2 mm was uncommon, seen in only 5.7% of Group A and 2.9% of Group B. No statistically significant difference was observed between the groups (p = 0.606).

Table 4: Distribution of the patients' sides of eye involved by the type of operation

Side of Eye Involved	Group A (n=35)	Group B (n=35)	p-value
Right eye	26 (74.3%)	19 (54.3%)	**0.081**
Left eye	9 (25.7%)	16 (45.7%)	
Total	**35 (100%)**	**35 (100%)**	

Table 4: Shows the distribution of eye involvement between the two study groups. In Group A, right-eye involvement was more common, occurring in 26 patients (74.3%), compared to 19 patients (54.3%) in Group B. Conversely, left-eye involvement was higher in Group B (45.7%) than in Group A (25.7%). Both groups had 35 patients each.

Table 5: Distribution of the patient's education level by the type of operation

Level of Education	Group A (n = 35)	Group B (n = 35)	p-value
Illiterate	3 (8.6%)	12 (34.3%)	**0.002**
Primary	12 (34.3%)	12 (34.3%)	
Secondary	6 (17.1%)	1 (2.9%)	
SSC	5 (14.3%)	1 (2.9%)	
HSC	0 (0%)	6 (17.1%)	
Graduate	8 (22.9%)	2 (5.7%)	
Post Graduate	1 (2.9%)	1 (2.9%)	
Total	**35 (100.0%)**	**35 (100.0%)**	

Table 5: Presents the distribution of participants according to their level of education in both groups. In Group A, the majority had primary education (34.3%) and 22.9% were graduates, while in Group B, 34.3% had primary education and 34.3% were illiterate. The difference in educational levels between the two groups was statistically significant (p = 0.002).

Table 6: Distribution of the patients by visual acuity and type of operation by pre and post-operative follow up

Visual Acuity	Type of Operation		Mean±SD	p value
	Group A (n=35)	Group B (n=35)	Group A Group B	
Preoperative			2.34 ± 0.94	0.193
6/6	5 (14.3)	5 (14.3)	2.71 ± 1.38	
6/9	17 (48.6)	16 (45.7)		
6/12	11 (31.4)	6 (17.1)		
6/24	2 (5.7)	8 (22.9)		
1st post-operative day				
6/6	5 (14.3)	7 (20.0)	2.31 ± 0.87	0.395
6/9	17 (48.6)	16 (45.7)	2.57 ± 1.40	
6/12	11 (31.4)	4 (11.4)		
6/18	1 (2.9)	1 (2.9)		
6/24	1 (2.9)	7 (20.0)		
7th post-operative day				
6/6	12 (34.3)	13 (37.1)	2.23 ± 1.24	0.854
6/9	11 (31.4)	10 (28.6)	2.29 ± 1.34	
6/12	7 (20.0)	4 (11.4)		
6/18	2 (5.7)	5 (14.3)		
6/24	3 (8.6)	3 (8.6)		
3rd Post Operative Week				
6/6	15 (42.9)	16 (45.7)	1.74 ± 0.78	0.513
6/9	15 (42.9)	11 (31.4)	1.89 ± 1.02	
6/12	4 (11.4)	4 (11.4)		
6/18	1 (2.9)	4 (11.4)		
3rd Post Operative Month				
6/6	12 (34.3)	9 (25.7)	2.26 ± 1.29	0.095
6/9	12 (34.3)	6 (17.1)	2.80 ± 1.39	
6/12	4 (11.4)	7 (20.0)		
6/18	4 (11.4)	9 (25.7)		
6/24	3 (8.6)	4 (11.4)		
6th Post Operative Month				
6/6	13 (37.1)	10 (28.6)	2.06 ± 1.14	0.102
6/9	13 (37.1)	11 (31.4)	2.57 ± 1.44	
6/12	5 (14.3)	3 (8.6)		
6/18	2 (5.7)	6 (17.1)		
6/24	2 (5.7)	5 (14.3)		

Table 6: Shows the comparison of visual acuity outcomes between Group A and Group B at different postoperative intervals. Preoperatively, 48.6% of patients in Group A and 45.7% in Group B had a visual acuity of 6/9 (p = 0.193). On the first postoperative day, 14.3% of Group A and 20% of Group B achieved 6/6 vision (p = 0.395). By the 3rd postoperative month, 34.3% in Group A and 25.7% in Group B reached 6/6 vision, with mean visual acuity scores of 2.26 ± 1.29 and 2.80 ± 1.39, respectively (p = 0.095). At the 6th postoperative month, visual acuity continued to improve, with 37.1% in Group A and 28.6% in Group B achieving 6/6 vision (p = 0.102). Overall, both groups demonstrated progressive visual recovery over time, though the differences were not statistically significant.

Table 7: Distribution of the patients' post-operative complications by the type of operation

Complication	Group A (n = 35)	Group B (n = 35)
Superficial punctate keratitis	0 (0%)	3 (8.6%)
Conjunctival granuloma	0 (0%)	2 (5.7%)
Delayed wound healing	1 (2.9%)	4 (11.4%)
Itching	2 (5.7%)	9 (25.7%)
Anterior chamber reaction	1 (2.9%)	0 (0%)
Limbal avascularity	0 (0%)	1 (2.9%)
Total	**4 (11.5%)**	**19 (54.3%)**

Table 7: shows the postoperative complications observed in both groups. Complications were more frequent in Group B (54.3%) compared to Group A (11.5%). The most common issue in Group B was itching (25.7%), followed by delayed wound healing (11.4%) and superficial punctate keratitis (8.6%). In contrast, Group A showed minimal complications, with only isolated cases of delayed wound healing (2.9%), itching (5.7%), and anterior chamber reaction (2.9%).

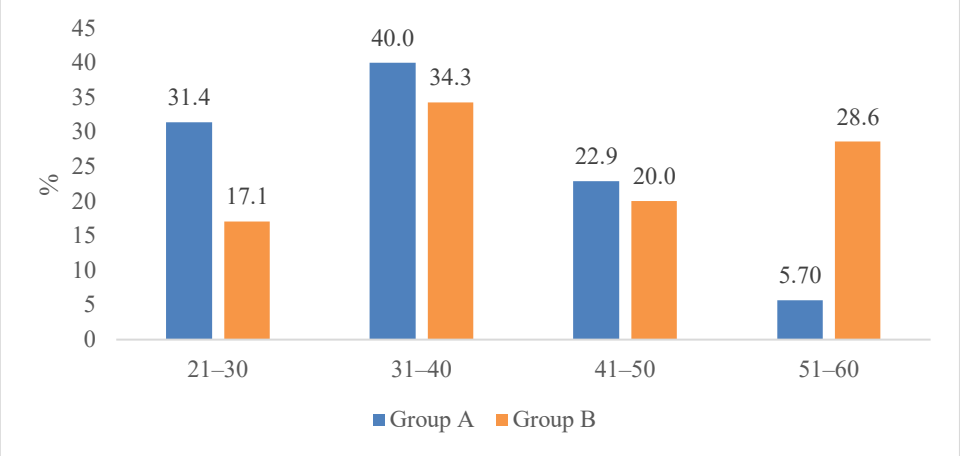

Figure I: Bar diagram shows distribution of patients by age and category of treatment in the two study groups in percentage

Figure I: Shows the distribution of patients' ages by type of operation. The majority of patients in Group A were aged 31–40 years (40%), followed by 21–30 years (31.4%). In contrast, Group B had a slightly higher proportion of patients aged 51–60 years (28.6%) and 31–40 years (34.3%). Overall, most patients in both groups were between 21 and 40 years of age.

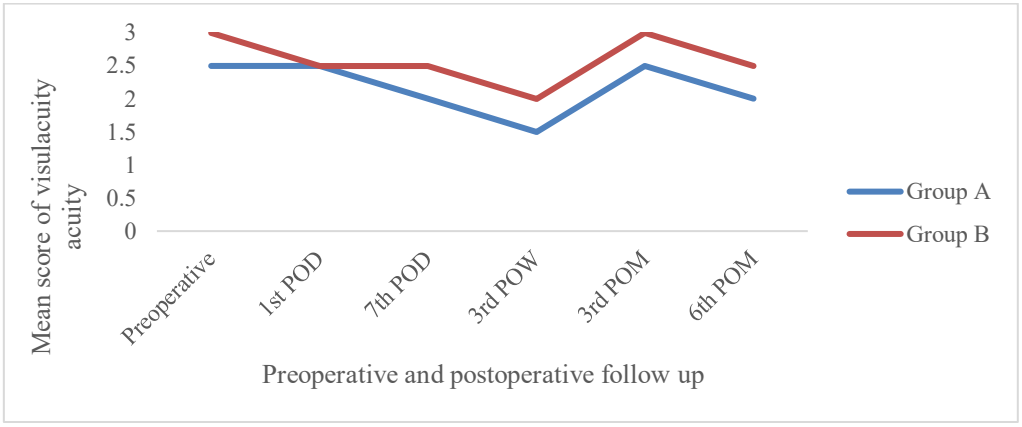

Figure II: Line graph shows distribution of the patients of Visual acuity by type of operation in pre and post-operative follow up

Figure II: Shows the mean visual acuity scores of the two groups across the preoperative and postoperative follow-up period. Preoperatively, Group A and Group B had scores of 2.5 and 3.0, respectively. The values remained similar at the 1st POD (2.5 in both groups), then declined by the 7th POD to 2.0 in Group A and 2.5 in Group B. The lowest scores were observed at the 3rd POW, with 1.5 in Group A and 2.0 in Group B. Improvement was seen again at the 3rd POM, reaching 2.5 and 3.0, followed by a slight decrease at the 6th POM to 2.0 in Group A and 2.5 in Group B.

DISCUSSION

Various surgical techniques have been employed to treat the pterygium. The unpredictable rates and timing of recurrence are the main problems encountered after various treatment modalities. A recurrent pterygium can be associated with decreased visual acuity due to involvement of visual axis and/or irregular astigmatism, extraocular motility restriction and symblepharon formation. Because of the high recurrence rate the bare sclera excision alone proved unsatisfactory. This study shows 35 eyes received conjunctival autograft their recurrence rate was low. Another study of the British Journal of ophthalmology,

shows 52 patients receive conjunctival autograft their recurrence rate was1.9% [8]. A prospective study was done with 30 eyes of primary pterygium treatment with conjunctival autograft. Here the recurrence rate was 3.0% [9].

A prospective study, 52 eyes treated with conjunctival autograft. Here the recurrence rate was 3.33%. Conjunctival autograft generally yields better results because it helps to restore its various functions [10]. Simple excision of primary pterygium followed by conjunctival autograft has the lowest recurrence rate and minimum incidence of complication as compared to other procedures such as intraoperative MMC [11].

A prospective study of 52 eyes with primary pterygium use of intra operative 0.02% MMC for five minutes recurrence rate was 5.76% [9,10]. This study shows 30 eyes treated with intra operative 0.02% MMC for two minutes their recurrence rate was 10%. 50 eyes treated with intra operative 0.02% MMC for five minutes their recurrence rate was 16.13%.

Study shows 63 eyes treated with intra operative 0.02% MMC for five minutes where the recurrence rate was 15.9%. The motivation for changing to 0.2mg/ml and more dilute concentrations of mitomycin C is the reports, now numerous, of corneal and scleral ulceration, uvcitis, and secondary glaucoma after use of 0.4mg/ml of mitomycin -C.

A detailed report of 10 cases with serious, vision threatening complications associated with mitomycin C use after pterygium surgery has been published [12]. A report describing conjunctival autografting is a promising technique in the treatment of pterygium. [13]. They documented the recurrence rate of 5.3% in the primary pterygium group. Since then a number of papers on the success of conjunctival grafting have been published with various success rates. Compared with the bare sclera method, conjunctival autograft is a more technically demanding procedure; surgeon factors such as experience, techniques, etc. may have a profound influence on the recurrence rate 15%.

Moreover, conjunctival grafts including limbal epithelium generally yield better results because it will help to restore its barrier function 24. In 1998, Lewallen S, published a report of a randomized trial of the conjunctival autografting technique for pterygium removal. She documented a lower recurrence rate (21%) ingrafted cases compared with bare sclera technique (37%) [14]. Simple excision of pterygium followed by conjunctival autograft has the lowest recurrence rate and minimal incidence of complications as compared to intraoperative Mitomycin – C [11]. London supported Lewallen S [14] finding when they re-ported a statistically significant reduction in recurrence rate following conjunctival autografting for pterygium. In 2005 Fahmi, reported a 13.33 % recurrence rate with conjunctival autograft [15].

In our study recurrence rate was found to be Group A = (Conjunctival autograft after primary pterygium excision) 2.9% and Group B = (Intraoperative mitomycin - C after primary pterygium excision) 14.3%.

The results of our study reported an advantage of conjunctival autograft over intraoperative Mitomycin C. Our results are compatible with national and international studies.

Limitations of the study

This study was conducted in a tertiary level hospital, hence may not represent whole population. However, research on this subject should be encouraged with large number of patients and long-term effect of the study evaluated.

CONCLUSION

This prospective study involved 70 patients with primary pterygium, randomly assigned to two groups: Group A underwent conjunctival autograft surgery, while Group B received intraoperative mitomycin C. The condition was more prevalent in males 74.3% in Group A and 65.7% in Group B and was most common among individuals aged 31–40 years (40%). All cases affected the nasal side of the eye, consistent with existing evidence that prolonged outdoor exposure increases the risk of pterygium development.

Postoperative complications were considerably lower in the conjunctival autograft group (11.5%) compared to the mitomycin C group (54.3%). In Group A, only minor complications such as delayed wound healing (2.9%) and itching (5.7%) occurred, whereas Group B exhibited higher incidences of itching (25.7%), delayed wound healing (11.4%), and superficial punctate keratitis (8.6%).

Recurrence was significantly reduced in the conjunctival autograft group (2.9%) compared to the mitomycin C group (14.3%), demonstrating better long-term results with the autograft technique. In conclusion, conjunctival autograft surgery proved to be a safer and more effective method for treating primary pterygium, associated with fewer complications and lower recurrence rates. Considering that most district hospitals are equipped with basic ophthalmic surgical facilities, this technique can be effectively adopted for broader use in resource-limited healthcare settings.

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