

Recurrence Rate of Primary Pterygium Following Excision with Mitomycin C versus Excision with Amniotic Membrane Transplant

Jawad Humayun¹, Mubashir Rehman², Mohammad Farhan³, Muhammad Kashif Karman⁴
Shahid Adbur-Rauf Khan⁵

¹⁻³Nowshera Medical College, Qazi Hussain Ahmad Medical complex, Nowshera, ⁴DHQ Hospital, Mishtimela District Orakzai, ⁵Hayatabad Medical Complex, Peshawar

ABSTRACT

Purpose: To compare recurrence rate of primary pterygium following excision with mitomycin c verses excision with amniotic membrane transplant.

Study Design: Quasi experimental study.

Place and Duration of Study: Qazi Hussain Ahmad Medical Complex, Nowshera, from January 2019 to June 2019.

Material and Methods: One hundred and two patients presenting for the first time with pterygium were included in the study and were divided into two groups. Patients having conjunctivitis, blephritis, keratitis or any other ocular inflammatory condition and patients having history of chemical burns and symblepharon were excluded from the study. Group A underwent surgical excision with 0.02% mitomycin–C application for 3 minutes and Group B was surgically treated with application of amniotic membrane. Patients of both groups were followed up for six months to detect recurrence of pterygium. Data was analyzed using SPSS version 20. Frequency and percentages were calculated for categorical data like age, gender and recurrence rate. Recurrence rate was stratified among age and sex to see the effect modifiers.

Results: Mean age in both groups was 39.98 ± 9.11 years. In group A, 64.70% patients were males and in group B, 62.74% patients were male. Recurrence of Pterygium was seen in 21.5% patients in group A and 7.84% in group B. The difference was statistically significant with a p value of 0.05.

Conclusion: Recurrence rate of primary pterygium following excision with mitomycin C is higher than excision with amniotic membrane transplant.

Key Words: Pterygium, Mitomycin-C, Amniotic membrane.

How to Cite this Article: Humayun J, Rehman M, Farhan M, Karman MK, Khan SAR. Recurrence Rate of Primary Pterygium Following Excision with Mitomycin C Versus Excision with Amniotic Membrane Transplant. Pak J Ophthalmol. 2020; **36 (3)**: 267-271.

Doi: 10.36351/pjo.v36i3.1033

INTRODUCTION

Pterygium is a fibrovascular in growth of degenerative

Correspondence to: Mubashir Rehman
Nowshera Medical College, Nowshera
E. mail: drmubashirrehman78@gmail.com

Received: April 2, 2020

Revised: April 17, 2020

Accepted: May 4, 2020

The limbus onto the cornea¹. Ultraviolet exposure, hot climates and chronic surface dryness are the risk subepithelial bulbar conjunctival tissue extending over factors for the development of the pterigium². It can lead to complications like astigmatism and inflammation. Histologically it is an elastotic degenerative change in the vascularized sub-epithelial stromal collagen³.

Treatment of pterygium includes medical and surgical modalities. Medical treatment includes tears substitute, topical steroids and sunglasses⁴. Different surgical procedures used for the treatment are bare sclera technique, simple conjunctival flap, conjunctival auto-grafting, adjunctive treatment with Mitomycin C or Beta irradiation, amniotic membrane patch grafting and occasionally peripheral lamellar keratoplasty^{5,6}. Each procedure is associated with certain recurrence rates. Multiple studies have been done comparing different surgical procedures⁷.

Mitomycin C (MMC) is an alkylating agent, which has been used during pterygium surgery to reduce chances of recurrence. MMC causes cell death by inhibiting DNA synthesis. It is applied directly over the sclera using sponges during pterygium surgery. It acts by inhibition of fibroblast proliferation in the episcleral region and hence reduces chances of recurrence⁸.

One of the methods to cover the gap created by pterygium excision is to use amniotic membrane graft over the bare sclera. Amniotic membrane has also been used in other ocular surface diseases such as persistent corneal epithelial defects, chemical burns, Stevens–Johnson syndrome and ocular cicatricial pemphigoid⁹. Amniotic membrane grafts reduce chances of recurrence of pterygium because of their anti-inflammatory properties and cause suppression of transforming growth factor β signaling and fibroblast proliferation, hence promoting epithelial healing. Studies have shown that recurrence rates of Pterygia following amniotic membrane grafting is between 14.5% and 27.3%¹⁰.

Our study intends to compare the recurrence rate of pterygium following excision with mitomycin-c and excision with amniotic membrane transplant.

MATERIAL AND METHODS

The study was conducted at the department of Ophthalmology, Qazi Hussain Ahmad Medical Complex, Nowshera. Non-probability consecutive sampling technique was used. Sample size was calculated using WHO calculator, P_1 ; proportion of recurrence rate in mitomycin group = 40%⁶, P_2 ; proportion of recurrence rate in amniotic membrane transplant group = 14.6%⁷, power of test = 90% and keeping confidence interval = 95% (CI), the sample size was 51 patients in each group. Total sample size was 102. All those patients presenting for the first time

with pterygium, both genders and age 18 – 60 years were included in the study. Patients with recurrent pterygium, conjunctivitis, blephritis, keratitis or any other ocular inflammatory condition and patients having history of chemical burns and symblepharon were excluded from the study. All patients were divided into two groups using non probability consecutive sampling. Group A was treated with surgical excision with 0.02% mitomycin–C application for 3 minutes and group B was treated with surgical excision and application of amniotic membrane. Amniotic membrane was retrieved by getting placenta from patients booked for elective C-section in the OBS/Gynae department. The patients were seronegative for Hepatitis B and C. Amniotic membrane was separated from Chorion and was scrapped to remove debris. All the debris/blood was washed with antibiotic cocktail in Balanced Salt solution (Ampicillin, Streptomycin and Amphotericin-B). After surgery, patients were given eye drops of Moxifloxacin and Dexamethasone. Patients of both groups were followed up for six months to detect recurrence of pterygium on slit lamp examination. Data was analyzed using SPSS version 20. Frequency and percentages were calculated for categorical data like age, gender and recurrence rate. Chi square test was applied on the two groups to see the difference between the two groups. P value ≤ 0.05 was considered significant. Recurrence rate was stratified against age and sex to see the effect modifiers.

RESULTS

A total of 102 patients were divided in two equal groups; Patients in group A underwent primary

Table 1: Age Distribution (n = 102).

Age Group	Group A (n = 51)	Group B (n = 51)
18 – 30 years	12 (23.52%)	12 (23.52%)
31 – 40 years	18 (35.29%)	18 (35.29%)
41 – 50 years	11 (21.5%)	11 (21.5%)
51 – 60 years	10 (19.6%)	10 (19.6%)
Total	51 (100%)	51 (100%)
Mean and SD	40.35 \pm 9.62	39.98 \pm 9.11

Table 2: Efficacy (n = 102); Chi square test was applied in which P value was 0.050.

Efficacy	Group A (n = 51)	Group B (n = 51)
Effective (no recurrence)	40 (78.43%)	47 (92.15%)
Not effective (recurrence)	11 (21.5%)	04 (7.84%)
Total	51 (100%)	51 (100%)

Table 3: Stratification of Efficacy with Age (n = 102).

Age	Efficacy	Excision with Mitomycin C	Excision Amniotic Membrane Transplant	P value
18 – 30 years	Effective	09	11	0.273
	Not effective	03	01	
Total		12	12	
31 – 40 years	Effective	14	17	0.148
	Not effective	04	01	
Total		18	18	
41 – 50 years	Effective	09	10	0.534
	Not effective	02	01	
Total		11	11	
51 – 60 years	Effective	08	09	0.531
	Not effective	02	01	
Total		10	10	

Table 4: Stratification of Efficacy with Gender.

Gender	Efficacy	Excision with Mitomycin C	Excision amniotic membrane transplant	P value
Male	Effective	28	29	0.478
	Not effective	05	03	
Total		33	32	
Female	Effective	14	18	0.131
	Not effective	04	01	
Total		18	19	

pterygium excision with MMC and group B had pterygium excision with Amniotic membrane transplant. Age distribution among two groups is shown in table no 1. In both groups, 35.29% patients were in ages between 31 – 40 years. Mean age was 39.98 ± 9.11 . Male were more than females in both groups i.e. in group A, 33 (64.70%) patients were male where as in group B, 32 (62.74%) patients were male. Recurrence was seen in 21.5% patients of group A and 7.84% patients of group B. Stratification of efficacy with age and gender is given in table number 3 and 4.

DISCUSSION

Pterygium is one of the most common disorders in tropical and subtropical region¹¹. Most important risk factors are exposure to sunlight, hot, windy dry weather and old age¹². Short body height is also cited in literature as a risk factor for pterygium development. It causes irritation, redness and affects the visual acuity either by directly affecting the visual

axis or by producing changes in the corneal curvature¹³⁻¹⁴.

Yu C et al compared the efficacy of amniotic membrane transplantation, corneal limbus stem cell conjunctival transplantation and pedicle conjunctival flap transposition in the treatment of pterygium and observed that the recurrence rates of pterygium for the three surgeries were 14.6%, 13.9% and 7.7%, respectively. No significant difference was identified when comparing the recurrence rate between any two groups¹⁵.

Zeng et al in their meta-analysis compared limbal conjunctival autograft and other adjuvants for pterygium excision. They stated that the recurrence rates after pterygium excision with limbal conjunctival autograft were lower as compared to pterygium excision with bare sclera technique ($P < 0.01$), bulbar conjunctival autograft ($P < 0.01$), and with use of mitomycin C ($P < 0.01$). However, there was no statistically significant difference in the recurrence rates after limbal conjunctival autograft and amniotic membrane graft ($P = 0.39$)¹⁶.

Liang W et al compared the recurrence rate of pterygium excision with conjunctival autograft versus pterygium excision with amniotic membrane graft and found that conjunctival autograft group had low recurrent rate; 6 eyes (7.4%) versus amniotic membrane transplantation group; 10 eyes (19.2%)¹⁷.

The recurrence rates in our study were similar to Koranyi G et al who compared outcome of a 4 years study on pterygium excision using mitomycin C with suturing a free conjunctival autograft and found that the recurrence rate was 38% in mitomycin C group and 15% in conjunctival autograft group ($p < 0.05$)¹⁸.

Kheirkhah A et al compared the prevention of recurrence in patients with primary or recurrent pterygium using adjunctive mitomycin C application following pterygium excision with free conjunctival autograft versus conjunctival-limbal autograft. They observed that in free conjunctival autograft group no eye developed pterygium recurrence; however, two eyes (5.1%) in conjunctival-limbal autograft group developed recurrence, including one patient (3.2%) with primary pterygia and one patient (12.5%) with recurrent pterygia with no statistically significant difference in recurrence rates between the two groups or in the primary and recurrent pterygium groups¹⁹.

Salman AG et al compared the recurrence rate after limbal stem cell transplantation versus amniotic

membrane transplantation as ocular surface reconstructing procedure. They also evaluated the use of antimetabolite drugs as an adjunctive therapy for amniotic membrane transplantation and conjunctival autograft. They observed that the recurrence rate was 10% in limbal stem cell transplantation plus conjunctival autograft group, 30% in amniotic membrane transplantation group and 20% in mitomycin C plus amniotic membrane transplantation group. The rate of recurrence was statistically significantly between the three groups ($P < 0.001$)²⁰.

Fakhry observed that in pterygium excision and limbal-conjunctival autograft transplantation group there were four cases of recurrences while in group operated with injection of 0.1 mL of mitomycin-C, 0.15 mg/mL one month before limbal-conjunctival autograft transplantation surgery, there was one case of recurrence²¹.

Hafez MI compared one-year outcome of two procedures for primary pterygium excision with MMC and excision with suturing a free conjunctival autograft. The recurrence rate of MMC group was 40% compared with 5.3% in conjunctival autograft group²².

The limitation of our study was that it was a single centered study. Moreover, a comparison was only made between two adjuvants.

CONCLUSION

Recurrence rate of primary pterygium following excision with mitomycin C has a higher recurrence rate as compared to excision with amniotic membrane transplant.

Ethical Approval

The study was approved by the Institutional review board/Ethical review board.

Conflict of Interest

Authors declared no conflict of interest.

Authors' Designation and Contribution

Jawad Humayun; Registrar: *Concept, manuscript writing, final review.*

Mubashir Rehman; Associate Professor: *Study design, data analysis, final review.*

Mohammad Farhan; Senior Registrar: *Study design, data analysis, final review.*

Muhammad Kashif Karman; Medical Officer: *Study design, data analysis, final review.*

Shahid Adbur Rauf Khan; Vitreo-retina Fellow: *Study design, data analysis, final review.*

REFERENCES

1. **Kanski JJ.** Clinical Ophthalmology. A Systemic Approach, 9th Edition. Butterworth, Heinmann, London. 2019; **5 (7)**: 163.
2. **Khoo J, Saw SM, Banerjee K, Chia SE, Tan D.** Outdoor work and the risk of pterygia: A case-control study. *Int Ophthalmol.* 1998; **22 (5)**: 293-8.
3. **Tsim NC, Young AL, Jhanji V, Ho M, Cheng LL.** Combined conjunctival rotational autograft with 0.02% mitomycin C in primary pterygium surgery: a long-term follow-up study. *Br J Ophthalmol.* 2015; **99**: 1396-400.
4. **Bilge AD.** Comparison of conjunctival autograft and conjunctival transposition flap techniques in primary pterygium surgery. *Saudi J Ophthalmol.* 2018; **32**: 110-3.
5. **Chan TC, Wong RL, Li EY, Yuen HK, Yeung EF, Jhanji V, et al.** Twelve-Year Outcomes of Pterygium Excision with Conjunctival Autograft versus Intraoperative Mitomycin C in Double-Head Pterygium Surgery. *J Ophthalmol.* 2015; **2015**: 891582.
6. **Nuzzi R, Tridico F.** How to minimize pterygium recurrence rates: clinical perspectives. *Clin Ophthalmol.* 2018; **12**: 2347-62.
7. **Forbes J, Collin R, Dart J.** Split thickness buccal mucous membrane graft and beta irradiation in the treatment of recurrent pterygium. *Cornea.* 2002; **19**: 126-34.
8. **Martins TG, Costa AL, Alves MR, Chammas R, Schor P.** Mitomycin C in pterygium treatment. *Int J Ophthalmol.* 2016; **9 (3)**: 465-8.
9. **Gelareh S Nouredin, Sonia N Yeung.** The use of dry amniotic membrane in pterygium surgery. *Clin Ophthalmol.* 2016; **10**: 705-12.
10. **Pan X, Zhang D, Jia Z, Chen Z, Su Y.** Comparison of hyperdry amniotic membrane transplantation and conjunctival autografting for primary pterygium. *BMC Ophthalmol.* 2018; **18**: 119.
11. **Tan C, Lim T, Koh W, Liew GC, Hoh ST, Tan CC, et al.** Epidemiology of pterygium on a tropical island in the Riau Archipelago. *Eye.* 2006; **20**: 908-912.
12. **Zeng K, Cai J, Jhanji V, Chen H.** Comparison of Pterygium Recurrence Rates After Limbal Conjunctival Autograft Transplantation and Other Techniques: Meta-analysis. *Cornea.* 2012; **31 (12)**: 1422-7.
13. **Olander K, Haik KG, Haik GM.** Management of pterygia: should thiotepa be used? *Annals Ophthalmol.* 1978; **10**: 853.

14. **Maheshwari S.** Pterygium-induced corneal refractive changes. *Indian J Ophthalmol.* 2007 Sep-Oct; **55 (5):** 383-6.
15. **Yu C, Liang W, Huang Y, Guan W.** Comparison of clinical efficacy of three surgical methods in the treatment of pterygium. *Eye Sci.* 2011; **26 (4):** 193-6.
16. **Zeng W, Liu Z, Dai H, Yan M, Luo H, Ke M, Cai X.** Anti-fibrotic, anti-VEGF or radiotherapy treatments as adjuvants for pterygium excision: a systematic review and network meta-analysis. *BMC Ophthalmol.* 2017; **17:** 211-14.
17. **Liang W, Li R, Deng X.** Comparison of the efficacy of pterygium resection combined with conjunctival autograft versus pterygium resection combined with amniotic membrane transplantation. *Eye Sci.* 2012; **27 (2):** 102-5.
18. **Koranyi G, Artzén D, Seregard S, Kopp ED.** Intraoperative mitomycin C versus autologous conjunctival autograft in surgery of primary pterygium with four-year follow-up. *Acta Ophthalmol.* 2012; **90 (3):** 266-70.
19. **Kheirkhah A, Hashemi H, Adelpour M, Nikdel M, Rajabi MB, Behrouz MJ.** Randomized trial of pterygium surgery with mitomycin C application using conjunctival autograft versus conjunctival-limbal autograft. *Ophthalmology.* 2012; **119 (2):** 227-32.
20. **Salman AG, Mansour DE.** The recurrence of pterygium after different modalities of surgical treatment. *Saudi J Ophthalmol.* 2011; **25 (4):** 411-5.
21. **Fakhry MA.** The use of mitomycin C with autologous limbal-conjunctival autograft transplantation for management of recurrent pterygium. *Clin Ophthalmol.* 2011; **26 (5):** 123-7.
22. **Hafez MI.** Autologous conjunctival autograft versus intraoperative Mitomycin C in surgery of primary pterygium. *Life Sci J.* 2013; **10 (3):** 403-8.

