Citation: Esraa HS, Saif MYS, Abdelrahman SA
Incidence of pterygium recurrence following bare sclera technique with MMC in comparison to conjunctival autograft
Journal of Ophthalmology and Related Sciences 2020;4(1): 25-29

RESEARCH ARTICLE

Incidence of pterygium recurrence following bare sclera technique with MMC in comparison to conjunctival autograft

Esraa HS[1], Saif MYS[1], Abdelrahman SA[1]

Abstract

Background: The goal of this study is to compare incidence of recurrence of pterygium following bare sclera technique with mitomycin C in comparison to conjunctival autograft

Methods: Our study included 40 cases subdivided into 2 groups; 20 cases managed by pterygium excision and intraoperative application of MMC 0.02% for 2 minutes and 20 cases managed by pterygium excision and limbal conjunctival auto graft transplantation ranged from 25 to 65 years old, with mean age of 44.2 years in 1st group, 43.8 years in 2nd group. SD in 1 st group +/- 10.2 and in 2nd group +/-11.3, in 1st group 14 cases (70%) were male and 6 cases (30%) were female, in 2nd group 15 cases (75%) were male and 5 cases (25%) were female. In 1st group the average of recurrence after two months is 3 cases with conjunctival recurrence. In 2nd group, the average of recurrence after two months is 1 case with episcleral vessels with p value <0.05.

Results: It was found that recurrences of pterygium in patients managed with MMC are significantly higher than in patients managed with LCAG.

Conclusion: LCAG is a good method in management for primary pterygium with low recurrence rate.

Keywords

Pterygium, MMC, LCAG

Introduction

A pterygium is a triangular subepithelial fibrovascular growth of degenerative tissue of bulbar part of the conjunctiva over the cornea. Pterygia usually occurs in patients living in hot climates that can respond to ultraviolet exposure and chronic surface dryness.

Symptoms:

The main symptom of a pterygium is a painless area of elevated white tissue with blood vessels on the cornea's inner or outer edge. Sometimes there are no symptoms in the pterygium. It can, however, become inflamed and cause burning, irritation or the feeling that something strange is in the eye. If the growth extends sufficiently to the cornea, vision can be affected[1].

Correspondence to:
Esraa H. Serri, M.B.B.ch
[1]Department of Ophthalmology, Faculty of Medicine, Beni-Suef University, Beni-Suef, Egypt
Email: esraaseri@gmail.com
Full list of author information is available at the end of the article.

Grading:
Pterygium is divided between I and III. Grade I pterygium at the limbus. Grade II occurred when the head of the pterygium was present between the midway point between the limbus and the pupil margin, i.e. the nasal pupil margin for the nasal pterygium and the temporal margin for the temporal pterygium. The pterygium crossing the margin of the pupils was labeled Grade III[2].

Treatment:
Physicians often take a conservative approach early in the disease process, limiting therapy to lubricating drugs. Since it is believed that UV radiation is an important risk factor, the clinician should recommend that patients with pterygia at an early stage use proper protective eyewear. If the lesion increases, surgery becomes more compelling.

Surgical techniques: Recurrence is the main challenge to successful surgical treatment of pterygium, as evidenced by fibrovascular growth in the cornea across the limbus. Many surgical techniques have been used, although due to variable recurrence rates none is universally accepted. The pterygium excision is the first step for repair, regardless off the technique used.

1) **The bare sclera technique:** It involves excising the pterygium's head and body while re - epithelializing the bare scleral bed. In various reports, high recurrence rates have been documented[3].

2) **A conjunctival autograft technique:** It involves obtaining an autograft, usually from the supero-temporal bulbar conjunctiva and suturing the graft on the exposed scleral bed after the pterygium has been excised. Complications are rare and Stark and colleagues emphasize the importance of careful dissection of Tenon's tissue from the conjunctival graft and recipient bed, minimal tissue manipulation and precise graft orientation for optimal results. This technique has reported a very low rate of recurrence[3].

3) **Amniotic membrane grafting:** It was also used to prevent recurrence of pterygium. While the exact mechanism by which the amniotic membrane gives its beneficial effect has not yet been identified, most researchers have suggested that the basement membrane contains important factors to inhibit inflammation and fibrosis and promote epithelialization. The preservation of the bulbar conjunctiva is a distinct advantage of this technique over the conjunctival autograft. Typically, the amniotic membrane is placed above the bare sclera, the basement membrane facing up and the stroma facing down. Some recent studies have advocated the use of fibrin glue to support the adherence of the amniotic membrane graft to the base[4].

Adjunctive therapies: The high rate of recurrence associated with surgery continues to be a problem, and adjunctive medical treatments have therefore been incorporated into pterygia management. Studies have shown that the rate of recurrence has fallen significantly with the addition of these therapies, but they are not without their own complications.

1. **MMC** Due to its ability to inhibit fibroblasts, it was used as an adjunctive treatment. The effects of beta irradiation are similar. The minimum safe and effective dose levels, however, have yet to be determined. Two forms of MMC are currently used: The intraoperative application of MMC directly to the scleral bed following the excision of pterygium and the postoperative use of topical MMC eye drops. Several studies now advocate the use of only intraoperative MMC to reduce toxicity.

2. **Beta irradiation** Also used to prevent recurrence, since it inhibits mitosis in a pterygium's rapidly dividing cells, although there are no clear-cut data on recurrence rates. The adverse effects of irradiation, however, include scleral necrosis and melting, endophthalmitis and sectoral cataract formation, which prompted doctors to recommend against their use[3].

Purpose
To compare incidence of recurrence of pterygium following bare sclera technique with intraoperative mitomycin C 0.02% in comparison to conjunctival autograft.

3. Subjects & methods:
A prospective, non randomized, and comparative study of 40 eyes of 35 patients complaining of primary pterygium of variable duration.

3.1 Inclusion criteria:

- Primary pterygium

3.2 Exclusion criteria:

- Recurrent pterygium.
- Atrophic pterygium.

3.3 All patients were subjected to: All participants will underwent for ophthalmological examination:

- (UCVA), (BCVA) assessment.
- Refraction using (Topcon. RM-800).
- Anterior segment examination on slit lamp.
- Lacrimal function tests
- Routine fundus examination by 90D lens.
- IOP was done with applanation tonometery.

Statistical methodology

Data were collected and coded to facilitate data manipulation and double entered into Microsoft Access and data analysis was performed using SPSS (Statistical Package for the Social Sciences) software version 18 in windows 7.

-Description of quantitative variables as mean, SD and range.

-Unpaired t-test was used to compare quantitative variables, in parametric data (SD < 50 % mean)

• P value > 0.05 insignificant

• P < 0.05 significant

• P < 0.01 highly significant.

Results

Forty cases of pterygium from outpatient clinic in Fayoum Ophthalmic hospital subdivided into 2 groups; 20 cases will be treated surgically by bare sclera technique with intraoperative mitomycin C 0.02% for 2 minutes and 20 cases will be treated surgically by limbal conjunctival autograft. Follow up cases for two months to detect recurrence. Recurrence will be graded as G1 (normal), G2 (fine episcleral vessels), G3 (conjunctival recurrence), or G4 (corneal recurrence). In 1st group the average of recurrence after two months is 3 cases with conjunctival recurrence. In 2nd group, the average of recurrence after two months is 1 case with episcleral vessels with p value <0.05.

Variables	**MMC** (n=20)		**Graft** (n=20)		**p-value**	**Sig.**
Age (years						
Mean /SD	44.2	10.2	43.8	11.3	0.9	NS
Sex						
Male	14	70%	15	75%	0.9	NS
Female	6	30%	5	25%		
Occupation						
Out door	17	85%	17	85%	1	NS
In door	3	15%	3	15%		

Table (1): Comparisons of demographic characters in different study groups.

Table illustrates that there is no statistically significant difference with p-value >0.05 between two operations as regards demographic characters age, sex, and occupation which indicated proper matching between both operation groups.

	Before		**After**		**p-value**	**Sig.**
	Mean	**SD**	**Mean**	**SD**		
MMC						
UCVA	0.59	0.25	0.72	0.19	0.001	HS
BCVA	0.78	0.22	0.88	0.12	0.002	HS
Graft						
UCVA	0.61	0.23	0.75	0.21	0.001	HS
BCVA	0.80	0.26	0.89	0.17	0.01	S

Table (2): Comparisons of visual acuity before and after operation in each operation.

Table illustrates that there is statistically significant increase with p-value <0.05 in visual acuity (UCVA, and BCVA) after operation in each operation group which indicated both operation had same effect on visual acuity.

Variables	MMC (n=20)		Graft (n=20)		p-value	Sig.
	No.	%	No.	%		
After 1 month						
Normal	18	90%	20	100%	0.5	NS
Episcleral vessels	2	10%	0	0%		
After 2 months						
Normal	14	70%	19	95%	**0.03**	**S**
Episcleral vessels	3	15%	1	5%		
Conjunctiva recurrence	3	15%	0	0%		

Table (3): Comparisons of recurrence rate in different operations**.**

Table illustrates that there is no statistically significant difference with p-value >0.05 between two operations as regards recurrence rate after one month which indicated both operation had same effect on recurrence rate. On the other hand there is statistically significant difference with p-value <0.05 between two operations as regards recurrence rate after two months which indicated graft had better effect with little recurrence. In the current study we treated 20 eyes suffering of primary pteryguim with intraoperative MMC 0.02% for 2 minutes **(group A)** and another 20 eyes with L-CAT **(group B).** Over a follow up period of two months, percentage of recurrence was 25% for group A and 10% for group B.

Discussion

The aim of this work was to study and compare incidence of pterygium recurrence following bare sclera technique with intraoperative MMC application in comparison to limbal conjunctival autograft L-CAT. The superiority of L-CAT over MMC in our work could be explained by the fact that the L-CAT technique successfully supplied limbal stem cells and serving as a barrier that prevent the invasion of conjunctival fibrovascular tissue. Postoperative adjunctive therapy of steroids eye drops may decrease inflammatory and proliferative process in subconjunctival tissue. Among various procedures proposed for the treatment of primary pterygium, MMC and L-CAT have a relatively low recurrence rate. Both procedures decrease the invasion of conjunctival tissue to the cornea. Use of MMC has been reported to result in many complications, for example scleral necrosis, corneal perforation, conjunctival and corneal scarring, iritis, cataract, and secondary glaucoma. We did not observe any of these severe complications in this study. This may be related to the exclusion of vulnerable patients with collagen vascular diseases, optimum concentration & perfect irrigation of the MMC after application. Other studies showed nearly similar results compared to ours, 115 eyes in 114 patients in the study were randomized to receive MMC (n=63) and LCAU (n=52). There were 10 recurrences (15.9%) in the MMC group and only one recurrence (1.9%) in the LCAU group[5]. Other study showed there were three recurrences (3.8%) in the amniotic membrane graft group, three recurrences (5.4%) in the conjunctival autograft group, and two recurrences (3.7%) in the topical MMC group[6]. Arsen Akinci et al study included 52 eyes in the MMC group and 60 in the LCAG group. Recurrence occurred in 3 eyes (5.76%) in the MMC group and in 2 eyes (3.33%) in the LCAG group. This difference between recurrences in both groups has no statistically significant ($P > 0.05$). Incidence of complications such as symblepharon, conjunctival cysts, conjunctival hyperemia, and subconjunctival hemorrhage was similar in the two groups ($P > 0.05$) whereas corneal epithelial defects (CED), lacrimation, irritation, and photophobia were common in the MMC group ($P < 0.05$)[7]. Other study compared LCAG with MMC & reported that LCAG is superior for preventing the recurrence in primary pterygium surgery. In this study recurrence was 1.9% in the LCAG group and 15.9% in the MMC group[8]. In Jessica E. Chan et al study, the bare sclera technique resulted in the highest rate of pterygium recurrence, while CLAG had the lowest rate of recurrence. Adjunctive MMC contributed to reduce recurrence rates in all pterygium excision techniques[9]. During follow up of cases in Maxia C et al study, the overall recurrence rate was 9.6% (11 cases). Bare sclera method resulted in 16.7% recurrence (2 cases) in 12 primary pterygia, while 6 out of 68 primary pterygia (8.8%) recurred after bare sclera technique with MMC. Recurrent cases operated with bare sclera technique with MMC had 13% recurrence rate (3 out of 23), while none of the eyes that underwent CAU (9 cases) or AMT (3 cases) had another recurrence. Authors recommend the use of bare sclera technique with MMC for primary and quiet recurrent cases as being fairly effective, and CAU or AMT for invasive recurrent or even 'angry' primary pterygia[10].

Conclusion

Although various treatment approaches including surgical procedures, beta-irradiation and medications have been proposed for the treatment of pterygium, the common problem after these applications is recurrence. When surgical techniques proposed for primary pterygium are applied in recurrent cases, secondary recurrence is increased. The recurrence rate has been estimated as high as 30% to 70%.

Treatments such as radiation therapy, the use of antimetabolites, or the use of antineoplastic agents have succeeded in diminishing the number of recurrences from between 5% and 12%. However, serious complications are associated with these methods off treatment, such as severe secondary glaucoma, cataracts, uveitis, corneal perforation, and scleral necrosis, resulting in perforation and secondary endophthalmitis. In 1985, Kenyon and collaborators introduced the conjunctival autograft for the treatment off recurrent or advanced pterygium. Although this surgical technique is more time consuming, it has reduced the number of recurrences with the same efficacy as the previously described treatments without the risk of potentially serious complications. Recently some works have emphasized the importance of stem cells of the limbus as the cause of pterygia and the role of the healthy limbus as a barrier to conjunctival overgrowth. So, one could possibly decrease the number of pterygium recurrences by including the limbal cells in the conjunctival graft used in the surgical technique of Kenyon. In addition, one should expect a low number of complications because we are moving only a limited area of limbus with no losing of a significant amount of stem cells. The goals of this study are to compare LCAT with MMC with respect to rate of recurrence in the management of primary pterygia. In this work we presented our results of pterygium excision with MMC application compared to limbal conjunctival autografts in 40 cases of primary pterygia, where recurrence was more with MMC than in LCAT.

Summary

Limbal autograft is safe and effective surgical management for cases of primary pterygium. LCAT was found to provide excellent cosmetic results and avoid vision threatening complication.

Author details

Esraa HS, M.B.B.ch.[1]

Saif MYS, MD[1]

Abdelrahman SA, MD[1]

[1]Ophthalmology Department, Beni-Suef University, Beni-Suef, Egypt

Received Date: February 25, 2020
Accepted Date: May 9, 2020
Published Online: September 12, 2020

References

1. Folberg R. The eye. In: Kumar V, Abbas AK, Aster JC, eds. Robbins and Cotran Pathologic Basis of Disease. 9th ed. Philadelphia, PA: Elsevier Saunders; 2015:chap 29
2. Sejal M., Topography, grading system help analyze pterygium FFebruary 2008
3. Ardalan Aminlari, Ravi Singh and David Liang, Management of Pterygium, December, 2010
4. Krachmer, J. H. Cornea, 2nd ed. (Philadelphia: Elsevier Mosby, 2005), 1481.
5. A L Young,G Y S Leung,A K K Wong,L L Cheng, and D S C Lam A randomised trial comparing 0.02% mitomycin C & limbal conjunctival autograft after excision of primary pterygium Br J Ophthalmol. 2004 Aug; 88(8): 995–997
6. Barraquer JI (1980) Etiology, pathogenesis, & treatment off the pterygium. Transactions off the New Orleans Academy of Ophthalmology, symposium on medical & surgical diseases of the cornea (CV Mosby, St Louis), p 167–178.
7. Arsen Akinci, Orhan Zilelioglu., Comparison of limbal comjunctival autograft and intraoperative 0.02 % MMC for treatment of primary pterygium, International ophthalmology 2007.
8. A L Young,G Y S Leung,A K K Wong,L L Cheng, and D S C Lam A randomised trial comparing 0.02% mitomycin C & limbal conjunctival autograft after excision of primary pterygium Br J Ophthalmol. 2004 Aug; 88(8): 995–997
9. Jessica E. Chan; Jesse J. Jung; Michelle Y. Cho; Daniel Yoon; Abraham Sleem; David Howard, Outcomes off Pterygium Surgery Over 4 Years at an Academic Institution in New York ARVO Annual Meeting Abstract ,March 2012.
10. Maxia C, Perra MT, Demurtas P, Minerba L, Murtas D, Expression off survivin protein in pterygium and relationship with oxidative DNA damage. J Cell Mol Med 2008, 12: 2372-2380.