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Pterygium Recurrence Related to its Size and Corneal Involvement

Pir Salim Mahar and Nabeel Manzar

ABSTRACT

Objective: To establish the usefulness of grading system based on the size and extent of corneal involvement in predicting recurrence in patients undergoing primary pterygium excision with intraoperative use of adjunctive topical Mitomycin-C (MMC).

Study Design: A case series.

Place and Duration of Study: Section of Ophthalmology, the Aga Khan University Hospital, Karachi, from 2005 till 2010.

Methodology: One hundred and twenty male patients (120 eyes) underwent surgical removal of pterygium using bare sclera method with MMC in concentration of 0.2 mg/ml (0.02%) with exposure time of 3 minutes. Classification of subjects was done according to the grading of pterygium. Patients were followed at 3 months interval for a minimum period of 1 year to record any recurrence.

Results: The pterygium recurrence rate was 6.7% at a follow-up of 1 year. There was no significant association of pterygium recurrence with younger age ($p = 0.14$). A higher level of corneal involvement by the pterygium at presentation correlated significantly with the recurrence ($p = 0.01$).

Conclusion: These results suggest that a higher grade of pterygium at presentation in patients leads to increased rate of recurrence after surgical excision. Hence, early excision of pterygium is recommended to decrease its recurrence rate.

Key words: Pterygium. Recurrence. Grading system. Size. Corneal involvement.

INTRODUCTION

Pterygium is one of the most common conjunctival surface degenerative disorders.¹⁻³ This fibrovascular expansion of bulbar conjunctiva over the limbus, leads to chronic irritation, impaired cosmesis, irregular astigmatism and decreased vision secondary to the development of pupillary axis blockage by the increased growth.² Different surgical techniques have been used for the management of pterygium. The most common has been the Ombrian's bare scleral excision technique.⁴ However, the major limitation to the success of the technique has been the high rate of postoperative recurrence associated with it.⁵

A number of adjunct therapies with varying levels of reported successes have been used along with bare scleral excision during the last three decades. Mitomycin-C (MMC) as an adjunct therapy to bare sclera technique was first introduced by Kunitomo and Mori of Japan.⁶ Further works on MMC usage in the USA by Singh and associates led to its widespread use in Asia.⁷ A relatively new method being used for pterygium management has been the conjunctival autograft method. However, the

reported pterygium recurrence rates for the two techniques are comparable (2 – 39%).^{8,9} Despite these comparable recurrence rates the use of topical Mitomycin-C (MMC) as an adjunct therapy to bare sclera technique to prevent pterygium recurrence is widely used in Asia.

A number of research studies have been carried out to document the influence of age, gender, appropriate dosage of mitomycin-C (MMC) in treating pterygium and preventing its recurrence.¹⁰⁻¹² However, relatively few studies have evaluated the role of grading system based on the size and extent of pterygium encroaching on the cornea, especially in the context of the local population of Asia where there is high prevalence of pterygium. The purpose of the study was to establish the usefulness of grading system based on the size and extent of corneal involvement in predicting recurrence in patients undergoing primary pterygium excision with intraoperative use of adjunctive topical Mitomycin-C (MMC).

METHODOLOGY

This case series study was carried out at Ophthalmology Department, the Aga Khan University Hospital (AKUH), Karachi, Pakistan from 2005 till 2010. The study protocol was reviewed and approved by an ethics committee at the study centre and the study was carried out in accordance with the declaration of Helsinki of 1975 as revised in 1983. The primary outcome measure was the comparison of pterygium affected eye for any kind of recurrence after excision along with the assessment of

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the potential role of a grading system based on the size and extent of corneal involvement in pterygium recurrence after a minimum of 12 months of follow-up.

Only those patients fulfilling the following criteria were enrolled in the study: informed consent from the patient, male patients of all ages with established diagnosis of unilateral progressive primary pterygia of different grades, supervised surgical excision by bare scleral technique and MMC administration with a minimal follow-up period of 12 months. Patients lost to the follow-up or having any suspicious growth other than pterygia and corneal scarring were excluded.

All patients had their detailed medical history taken, with complete ocular examination including best corrected visual acuity (BCVA), bio-microscopic examination of anterior segment with Goldman applanation tonometry and fundus examination with +90DS lens.

Pterygia were graded depending on the size and extent of corneal involvement by the principal investigator (PSM) to minimize any bias due to inter-rater variability as follows: grade 1 - between limbus and a point midway between limbus and pupillary margin, grade 2 - head of the pterygium reaching the pupillary margin (nasal papillary margin in case of nasal pterygium and temporal margin in case of temporal pterygium) and grade 3 - crossing pupillary margin.^{3,13}

Pterygium excisions were performed on an outpatient basis by the same surgeon using the same technique.¹⁴ After excision with bare scleral technique under topical anaesthetic (Proparacaine- Alcon, Belgium), a sterile sponge (5 x 5 mm) soaked in 8 – 10 drops of 0.2 mg/ml MMC (0.02%) (Mitomycin-C, Kyowa - Japan) was applied over corneo-sclera and the area from where pterygium was excised with a fixed time duration of 3 minutes to remove any bias due to different MMC application time. The sponge was removed and eye irrigated with 20 ml of normal saline 0.9%. This was followed by topical administration of Dexamethasone 0.1% + Tobramycin 0.3% (Tobradex-Alcon, Belgium) and Hydroxypropyl Methylcellulose (Tear Naturale II - Alcon, Belgium) four times a day for 4 weeks. Patients were regularly followed-up at interval of 3 months after the procedure. Any adverse effect or physical findings were noted on each visit for a minimum of one year period. Recurrence of pterygium was defined as an encroachment of fibrovascular connective tissue across the limbus and onto the cornea for any distance in the position of the previous lesion during the follow-up period.

All data was entered in Statistical Package for Social Sciences (SPSS) version 16. Baseline characteristics of patients were analyzed using means and standard deviations for continuous variables like age while grading, recurrence and site of pterygium were analyzed using frequencies and percentages. Pearson Chi-square test or Fischer Exact test was used to determine the

significance of recurrence among different groups based on age and grading of pterygium. A p-value of < 0.05 was considered as significant.

RESULTS

A total of 120 male patients (120 eyes) aged between 16 and 82 years with mean value of 42.4 ± 1.23 years based on the inclusion criteria were incorporated in the study and were followed for a minimum 12 months. While 32 patients in addition to the 120 patients lost to follow-up during the study period were excluded from the study.

Out of the 120 eyes, 85 eyes (70.8%) were affected by grade 1 pterygium, 20 eyes (16.7%) had grade 2 and 15 eyes (12.5%) were having grade 3 pterygium. In 109 eyes (95.8%), pterygium was located on the nasal side, with 10 eyes (3.4%) having it on the temporal side and 1 eye (0.8%) was affected on both sides. Out of 120 eyes with pterygium, 53 belonged to the right eye and 67 to the left eye. Baseline characteristics of patients are shown in Table I.

The recurrence of pterygium was seen in 8 patients (6.7%) with mean recurrence of time 7.78 ± 6.32 months. There was a higher rate of recurrence seen in subjects with higher grades of corneal involvement ($p = 0.01$). The role of pterygium grading in recurrence of pterygia is shown in Table II.

Table I: Baseline characteristics of patients.

Characteristics of patients	Number of patients (N = 120)	Frequency (%)
Affected eye		
Right	53	44.2
Left	67	55.8
Site of pterygium		
Nasal	109	90.8
Temporal	10	8.3
Central	01	0.83
Grading of pterygium*		
Grade 1	85	70.8
Grade 2	20	16.7
Grade 3	15	12.5
Recurrence		
Yes	08	6.7
No	112	93.3

*Grading of pterygium has been done as given in methods.

Table II: Potential role of grading and age in pterygium recurrence.

Variable	Recurrence N (%)		p-value*
	Yes	No	
Age (years)			0.14
Mean \pm std. dev	42.4 ± 1.23		
< 50	07 (9.6)	66 (90.4)	
> 50	01 (2.2)	46 (97.8)	
Grading of pterygium			0.01
Grade 1	01 (1.2)	84 (98.8)	
Grade 2	04 (20.2)	16 (79.8)	
Grade 3	03 (19.8)	12 (80.2)	

N = Number of subjects; * Fischer Exact test; std. dev = Standard deviation; min: minutes

Corneal nebular opacity was the frequent finding seen in most patients postoperatively with 2 patients developing conjunctival cyst at the site of excision.

DISCUSSION

Recurrence of pterygium remains an important health care issue in ophthalmic patients worldwide,¹ but especially in tropical and Asian countries like Pakistan due to high sun exposure coupled with increased rate of air pollution and dusty weather. The present study was motivated by the invariably high recurrence of pterygium not only in Pakistan but world over.^{5,15}

The recurrence rate of pterygium in the present study was 6.7%. In a recent trial carried out in Pakistan, Rahman *et al.* documented a recurrence of pterygium in 10% of the population. In a prospective study,¹⁶ Cheng *et al.* observed a recurrence of 7.9% in subjects with primary pterygia and a recurrence of 19.2% in subjects with recurrent pterygia.¹⁷ In a study carried out by Narsani *et al.* 6.97% recurrence was seen in primary pterygia patients who underwent conjunctival autograft as compared to 16.13% in patients treated by intraoperative MMC.¹⁸ In contrast, Joseph *et al.* reported a recurrence rate of 6.6% with intraoperative MMC as compared to 13.3% in conjunctival autograft group.¹⁹ In another study carried out by the author (PSM), 25.9% recurrence was seen in conjunctival autograft group as compared to 9.4% in the topical MMC group. Hence, the author's preference for MMC based treatment for patients was based on his own experience.²⁰ However, comparison between our study and others is likely to be biased attributed to the different study population, setting and criteria used for grading pterygium. Similar conclusions have been drawn from numerous studies carried throughout the globe.^{21,22} In this study, only male patients with primary pterygium were enrolled for the study and the intraoperative MMC application time was also fixed at 3 minutes to limit the influence of factors implicated in pterygium recurrence.⁵

A lot of grading systems are currently being used for grading pterygium but in our study we have used the grading system based on the size and extent of corneal involvement by the fibrous pterygium. The same system of grading is currently being used extensively in Asian countries and some developed countries as well.^{3,13} There was a higher tendency of recurrence seen in participants with higher grades of corneal involvement with rate of recurrence of 1.2% in group grade 1 as compared to 20.2% in group grade 2. Similar results have been obtained in studies across Far East by Tan *et al.*, where a high rate of recurrence has been associated with increased fleshiness of the pterygia,²³ though the grading system used in these studies is slightly different, with translucency and vascularity being used as a criterion for grading. Nonetheless it is a known fact that translucency and vascularity increase with the increase

in the size and extent of corneal involvement by the pterygium. In contrast, in a study carried out on Asian-Canadians using the same grading system as used in this study, no significant difference in recurrence between groups for less severe grade pterygia (grade 1) was found.²⁴ Similarly, Amano *et al.*, using a slightly extended version of the grading system, as used in this study, have documented no significant association with recurrence.²⁵ A higher grade is increasingly being recognized as a risk factor for recurrence. However, a uniform grading system with global acceptability for improving and predicting recurrence outcomes in patients is currently lacking. Nonetheless, new grading systems are being developed for documenting and improving surgical outcomes and cosmesis after pterygium removal.^{26,27}

While this study fulfills the objective set by the study protocol for this project of determining the recurrence of pterygium by its grading method in patients assisted with intra-operative topical MMC of 0.02%, there remain certain limitations to this study due to its small sample size. However, as each patient served as his own control, any bias due to large inter patient variation or due to other risk factors is minimized. A large scale prospective study with appropriate power is recommended for evaluating the role of grading system based on the size and extent of corneal involvement in cases of pterygium recurrence.

CONCLUSION

This study found a significant association of recurrence with higher grade of corneal involvement by the pterygium. This has important implications as early excision of pterygium is not practiced even today until the patient presents with disturbing visual symptoms. Hence, early excision of pterygium is recommended to decrease the recurrence rate of pterygium.

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