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Original Article

A Comparative Study of Mitomycin-C Versus Conjunctival Autograft Following Pterygium Excision

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ABSTRACT

Purpose: To compare the recurrence rate of pterygium after simple excision with mitomycin-C (MMC) versus conjunctival autograft and to study the complications of the two techniques Methods: This prospective study included 80 eyes fulfilling the inclusion criteria selected from the outpatient department at R.L.J. HOSPITAL AND RESEARCH CENTRE, TAMAKA, KOLAR attached to SRI DEVARAJ URS MEDICAL COLLEGE between December 2011 and July 2013.All the patients were randomly divided into 2 groups of 40 each to undergo pterygium excision followed by MMC 0.02% application for 3 minutes and conjunctival autografting respectively. Results: The average age of patients in the study was 48.5 years with a female preponderance with more incidence of bilateral than unilateral involvement. Postoperative complications like superficial punctuate keratitis was noted in MMC group and Graft oedema, Granuloma and Distortion of the graft were noted in Conjunctival autograft group. Recurrence rate in Mitomycin group (15%) was more compared to conjunctival autograft group(5%) without any statistical significance between the two groups(p=0.13). Conclusion: Hence, as minimal complications were noted in both the groups but recurrence rate is more in Mitomycin-C group than Conjunctival autograft group, pterygium excision with conjunctival autografting is an efficient procedure.

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1. Introduction

Pterygium is derived from greek word 'pterygion'means wing. Pterygium is a degenerative condition of the subconjunctival tissues which proliferates as vascularized granulation tissue to invade the cornea, destroying the superficial layers of the stroma and Bowmans membrane the whole being covered by conjunctival epithelium.[1]

Prevalence of pterygium is 5.2% worldwide but, more common in warm and dry climates with prevalence of 22% in equatorial areas and less than 2% in latitudes above 40 degrees.[2]

The causative factors are not defined but it is known to occur in those who are exposed to sunlight or wind for prolonged periods and in areas where there is higher exposure to U.V. radiation especially UV-A and UV-B (290-400nm).[3]

Higher incidence in males in the age group of 20-40 years. The pterygium can vary from small atrophic quiescent lesion to a large fibrovascular lesion commonly involving nasal limbus but can occur on either side of the cornea. It consists of a Head which rests over cornea, Neck and Body.[4] Pterygium is associated with decreased visual acuity due to involvement of visual axis, irregular astigmatism, extra ocular motility restriction and cosmetic intolerance.[5]

Progressive pterygium which is associated with visual impairment requires surgery but simple excision is associated with high recurrence rate of 24-89%.[6] These recurrences are distressing as they grow at a rapid pace and soon become larger than the original growth. The recurrence may be due to the incomplete excision associated with fibroblastic proliferation and production of matrix metalloproteinases under the influence of inflammatory cytokines.[7] Other reason for the angiogenesis factor to occur is the surgical insult which acts as stimulus for neovascularisation. After excision there is chemotaxis and influx of polymorphonuclear leukocytes, which then release the angiogenic factor which is the stimulus for neovascularisation and recurrence.

Various methods have been adopted to reduce the recurrence rate of pterygium after its excision which includes anti mitotic drugs application like Mitomycin-C and thiotepa, conjunctival

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autografting, limbal stem cell transplantation, β-irradiation and amniotic membrane transplantation.[8] Among these, many studies conducted have shown that intraoperative use of Mitomycin-C and conjunctival autograft had less recurrence rate and fewer complications compared to other techniques.

We are conducting this study in our hospital, to compare Mitomycin-C versus conjunctival autograft following pterygium excision.

2. MATERIALS AND METHODS

Study Design:

This prospective randomized study was conducted on 80 patients with progressive pterygium attending R.L.Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Kolar, Karnataka from December 2011 to July 2013.

Patient Selection:

The study was approved by Institutional ethics committee of SDUMC and the selected patients fulfilling the inclusion criteria were enrolled in the study. Inclusion criteria being patients with progressive pterygium. Exclusion criteria being patients with recurrent pterygium, pterygium associated with ocular inflammatory disorders and atrophic pterygium.

Method Of Collection Of Data

80 eyes fulfilling the inclusion criteria were included in this study. After taking brief clinical history and general physical examination, patients underwent detailed ophthalmic examination including snellen's chart visual acuity, slit lamp biomicroscopic examination, extra ocular movements, intra ocular tension using applanation tonometry, retinoscopy and dilated fundoscopy.

Preoperatively, the detailed study of pterygium was done in terms of pterygium vascularity, extension, dimensions, depth of invasion, tear film integrity and distortion of corneal mires in keratometry. The condition of superotemporal conjunctiva in patients undergoing excision with conjunctival autograft was also looked for.

Topical Ciprofloxacin 0.3% eye drops is advised to be instilled 6 times a day on the day before surgery and 1 hourly on the day of surgery. Oral Ciprofloxacin 500mg is prescribed 2 times a day starting from a day prior to surgery which was continued for 4days post operatively.

All the patients were divided randomly into two groups:

Group-A: Included 40 eyes, pterygium excision was done followed by intra operative application of 0.02% mitomycin-C for 3 minutes.

Group-B: Included 40 eyes, pterygium excision followed by conjunctival autografting.

Informed consent was obtained from all the cases. All the surgeries were done under peribulbar block.

Xylocaine test dose was given.

Operation Technique:

Pterygium Excision:

All procedures were performed under Peribulbar anaesthesia with 2% lignocaine (Xylocaine) containing 1:1,00,000 adrenaline (epinephrine) with all aseptic precautions. The head of the pterygium was first separated at the apex and dissected towards the limbus with spring scissors. After excising the head and most of the body, Tenon's and subconjunctival fibrovascular tissue were separated from the overlying conjunctiva, undermined and excised extensively upward and downward towards the fornices and medially towards, but not reaching the caruncle, caution was taken not to damage the medial rectus. Cautery was gently applied to bleeding vessels. Residual fibrovascular tissue over the cornea was detached using toothed forceps or by gentle scraping with a No.15 surgical blade.

In Group-A:Following pterygium excision, 2mg of mitomycin-C is diluted by adding 10ml of distilled water, 1ml of this solution is diluted with 9ml of distilled water to prepare the concentration of 0.02% of mitomycin-C. This mitomycin-C 0.02% is applied on the bare sclera for 3 minutes by using surgical sponge. The site was then thoroughly irrigated with Ringer lactate.

In Group-B: Following pterygium excision, the size of the conjunctival graft required to resurface the exposed scleral surface was determined using Castroviejo calipers in 3 directions - extent across the limbus, maximum circumferential extent of the bed, and the maximum distance from the limbus. The eyeball was rotated down and an area of the superior bulbar conjunctiva adjacent to the limbus was exposed. The measured dimensions were marked onto the superotemporal conjunctiva using marker. Using a Pierse-Hoskins forceps and Westcott scissors, the conjunctiva was dissected without the Tenon's capsule starting at the forniceal end measuring 1 mm greater than the dimensions of bare sclera. The limbal tissue was not included.

Care was taken to obtain as thin a graft as possible without button-holing. Careful hemostasis of the exposed scleral surface was done using bipolar cautery. Once the limbus was reached, the graft was flipped over onto the cornea and the Tenon's attachments at the limbus were meticulously dissected. The flap was then excised using a Vannas scissors.

The autograft was slid into place over the bare sclera in its correct limbus-limbus anatomical orientation. The position of the graft was secured using interrupted 10-0 nylon sutures (The four corners of the graft were anchored with episcleral bites to maintain position). Extra sutures were applied, depending on the size of the graft and the defect. The medial edge of the graft was sutured with 2-4 additional sutures, preferably including episclera.

Post operatively, patients were put on steroid and antibiotic drops 6 times daily for 1 month with gradual tapering.

Patients were followed upon 1day, 1week, 1month, 3months and 6months post operatively for any recurrence and complications.

Statistical Analysis:

We assessed the proportion of recurrences in each group. The difference in proportion of recurrence was tested by using chi-square test.

RESULTS:

In this study, 40 patients each were enrolled in both Mitomycin-C group and Conjunctival autograft group. The recurrence rate between the two groups were compared and intra and postoperative complications in both the groups were noted.

The patients were comparable in age and sex in both the groups (Tables 1 &2). The mean age was 49.1years in Group-A and 47.9 years in Group-B with female preponderance in both the groups. The majority of the patients were outdoor workers (farmers and labourers) (Table-3) and all patients had nasal pterygium.

There were 6 recurrences (15%) noted in mitomycin-C group. 1 at 1month, 3 at 3 months and 2 at 6 months follow up period. There were 2 recurrences(5%) noted at 6 months follow up in conjunctival autograft group without any statistical difference between the groups with a P value of 0.13.(Table-4)

No intraoperative complications were noted during this study. 12(30%) had superficial punctuate keratitis in mitomycin group. 2 patients(5%) had granuloma, 5 patients(12.5%) had graft edema and 3 patients(7.5%) had distortion of the graft in conjunctival autograft group.(Table-5)

TABLE-1: 1) Age distribution:

Table-1: Showing age distribution

AGE GROUP	GROUP-A		GROUP-B		TOTAL
	NO.(40)	%	NO.(40)	%	
<20	0	0%	02	5%	5%
21-30	04	10%	04	10%	10%
31-40	09	22.5%	09	22.5%	22.5%
41-50	07	17.5%	08	20%	18.75%
51-60	15	37.5%	07	17.5%	27.5%
61-70	05	12.5%	10	25%	18.75%
TOTAL	40	100%	40	100%	100%
MEAN±SD	49.1±12.37		47.9±15.18		

P-VALUE 0.69

Table-2: showing sex distribution

SEX	GROUP-A		GROUP-B		TOTAL
	NO.(40)	%	NO.(40)	%	
MALE	10	25%	09	22.5%	23.75%
FEMALE	30	75%	31	77.5%	76.25%
TOTAL	40	100%	40	100%	100%

Table-3: Showing effect of occupation

OCCUPATION	GROUP-A		GROUP-B		TOTAL
	NO.(40)	%	NO.(40)	%	
FARMERS	24	60%	23	57.5%	58.75%
LABOURERS	10	25%	08	20%	22.5%
HOUSEWIVES	06	15%	08	20%	17.5%
OFFICE	00	0	01	2.5%	2.5%
TOTAL	40	100%	40	100%	100%

TABLE-4: Recurrence rate noted

RECURRENCE RATE NOTED				
	GROUP-A(Excision with MMC)		GROUP-B(Excision with CAG)	
	NO(40)	%	NO(40).	%
1DAY	0	0%	0	0%
1WEEK	0	0%	0	0%
1MONTH	01	2.5%	0	0%
3MONTHS	03	7.5%	0	0%
6MONTHS	02	5%	02	5%
TOTAL	06	15%	2	5%

P-VALUE-0.13

TABLE-5:

Table-5: Complications noted

COMPLICATIONS	GROUP-A		GROUP-B	
	NO(40)	%	NO(40)	%
Superficial Punctate Keratitis	12	30%	-	-
Scleromalacia	-	-	-	-
Symblepharon	-	-	-	-
Conjunctival cyst	-	-	-	-
Granuloma	-	-	02	5%
Graft edema	-	-	05	12.5%
Graft rejection	-	-	-	-
Distortion of the graft	-	-	03	7.5%
Others	-	-	-	-

FIGURE-1:

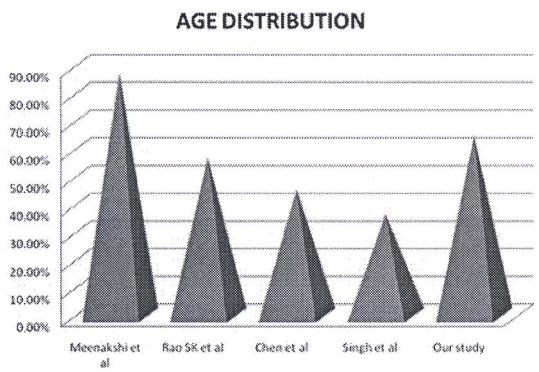


FIGURE-2

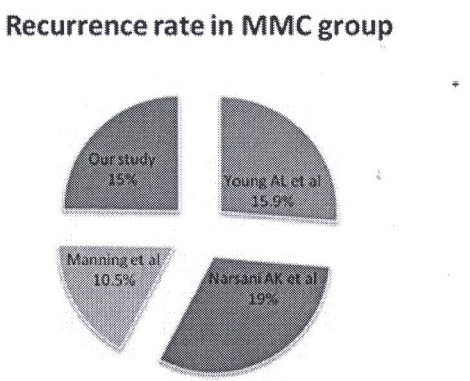


FIGURE-3:

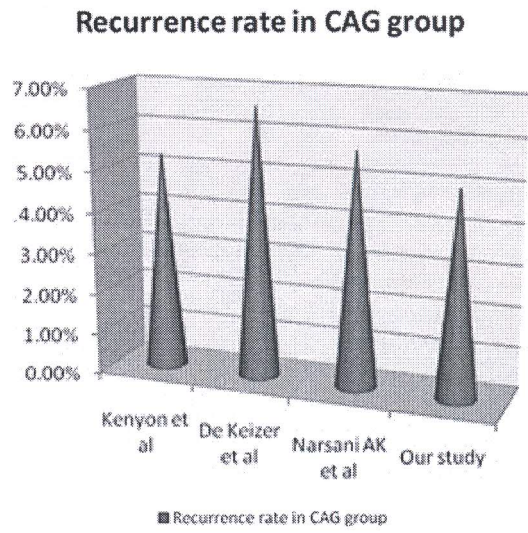


FIGURE-4:

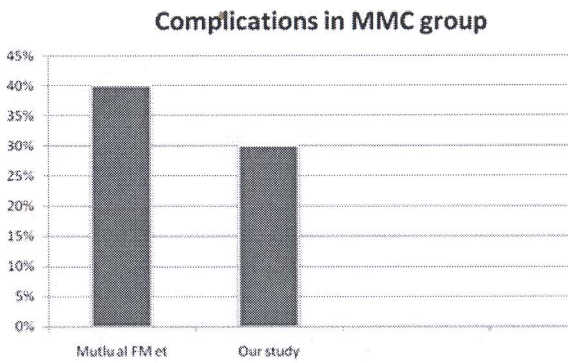
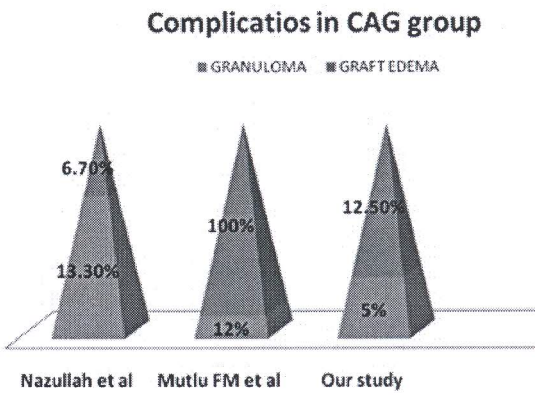


FIGURE-5:



DISCUSSION:

The pterygium is one of the commonest disorders in a tropical country like India. Exposure to ultraviolet light is presumed to be the most important risk factor. The unpredictable rates and timing of recurrence are the main problems encountered after various treatment modalities. [9] The simplest technique of bare sclera excision alone proved to be unsatisfactory due to high recurrence rates of 30-70%.[10] These recurrences are distressing as they grow at a rapid pace and soon become larger than the original growth.

Various methods have been adopted to reduce the recurrence rate of pterygium after its excision which includes antimitotic drugs application like Mitomycin-C and thiotepa, conjunctival autografting, limbal stem cell transplantation, β-irradiation and amniotic membrane transplantation.[11] Beta irradiation reduced the recurrence rate to as low as 0.5-1% but was associated with significant complications like sclera necrosis.[12] One of the factors that play a role in outcome of pterygium surgery is the postoperative conjunctival inflammation which in present in 31-40% of cases after pterygium surgery with amniotic membrane transplantation.[13,14] In 1985, Kenyon et al reported conjunctival autografting as a promising technique in treatment of pterygium with a recurrence rate of 5.3%. [15]

In our study maximum number of patients were above 40 years of age group(65%) which was comparable with the studies done by Dr. Meenakshi et al Showed that 87.5% were above the age of 40 years, Dr. Rao SK. et al showed that 56.98%were above the age of 40 years, Chen et al [16] showed that 45.6% , Lewallen et al [17] 37.4% and Singh et al 36.7%.(Figure-1).

In our study we found 6 recurrences (15%) in mitomycin-C group which was comparable with studies done by Young AL et al [18] (15.9%), Narsani Ak et al [19] (19%), Manning et al [20](10.5%)[Figure-2]. There were 2 recurrences (5%) in conjunctival autograft group which was comparable with studies done by Kenyon et al [15] (5.3%), De Keizer et al(6.6%), Narsani AK et al [19] (5.7%)[Figure-3].

In our study 12 patients (30%) had superficial punctuate keratitis in Mitomycin-C group which was comparable with study done by Mutlu FM et al [21] (40%)[Figure-4]. In conjunctival autograft group, 2 patients (5%) had granuloma, 5 patients (12.5%) had graft edema which was comparable with the studies done by Nazullah et al and Mutlu FM et al [Figure-5] and 3 patients (7.5%) had distortion of the graft.

CONCLUSION:

In conclusion simple excision of pterygium followed by Conjunctival autografting has the lowest recurrence rate compared to Mitomycin-C and minimal complications were noted in both the groups. Hence Conjunctival autografting is an safe and efficient procedure.

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