

Original article

Comparison of the surgical outcome between Wet Amniotic Membrane Graft (Wet AMG), Conjunctival Autograft (CAG) and Topical Mitomycin C (MMC)

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Abstract:

Introduction: Although there are numerous surgical techniques that have been described as methods for pterygium treatment and prevention of its recurrence, there are also several attendant complications. With this background present work was done to compare the surgical outcome between Wet Amniotic Membrane Graft (Wet AMG), Conjunctival Autograft (CAG) and Topical Mitomycin C (MMC).

Material and methods: The present study has been carried out in the Department of Ophthalmology at Acharya Vinoba Bhave Rural Hospital attached to Jawaharlal Nehru Medical College, Sawangi (Meghe) Wardha, a constituent college of Datta Meghe Institute of Medical Sciences (Deemed University), Nagpur. Patients were selected by using envelope technique for different surgeries –Topical MMC, CAG and Wet AMG.

Results: Recurrence was seen in 1(4%) eye in WET AMG group as well as CAG group at 6 months & 3 months, respectively. There were 2(8%) recurrences seen in Topical MMC group at 3 months & 6 months follow up period. The chi square test for recurrence rate between the 3 groups was 2.11 with a p value of 0.34, including the lack of significant difference in recurrence rate between the 3 groups.

Conclusion: We have shown that amniotic membrane graft was as effective as the other two methods in reducing astigmatism and was safe with no major complications.

Keywords : pterygium , Recurrence

Introduction:

Although there are numerous surgical techniques that have been described as methods for pterygium treatment and prevention of its recurrence, there are also several attendant complications. Using mitomycin C and 5-Fu in preoperative or post operative periods is one of the alternative methods for the prevention of recurrence, but it was found to be associated with many complications, such as delayed corneal epithelization, sclera ulceration,

sclera calcification, necrotizing scleritis, perforation, symblepharon, iridocyclitis, glaucoma, infection and even the loss of the eye.^(1,2)

Conjunctival autograft decreases the recurrence rate for primary pterygium compared with simple excision.^(3,4) Limbal-conjunctival autograft proved to be a promising and safe procedure in recurrent pterygium treatment. Amniotic membrane provides lower recurrence rate in cases of recurrent pterygium and may be employed in conjunction with other

techniques, such as limbal transplantation.^(5,6) For all of the above reasons, as well as the lack of a known effective prophylaxis, pterygium is still a challenge to be examined and solved. Therefore, we set up present study to evaluate surgical outcome in the form of astigmatism, complications and recurrence rate of three different methods of pterygium surgery namely conjunctival autograft, wet amniotic membrane graft and topical mitomycin C.

With this background present work was done to compare the surgical outcome between Wet Amniotic Membrane Graft (Wet AMG), Conjunctival Autograft (CAG) and Topical Mitomycin C (MMC).

Material and methods:

The present study has been carried out in the Department of Ophthalmology at Acharya Vinoba Bhave Rural Hospital attached to Jawaharlal Nehru Medical College, Sawangi (Meghe) Wardha, a constituent college of Datta Meghe Institute of Medical Sciences (Deemed University), Nagpur.

Inclusion Criteria:

1. Subjects with primary pterygium
2. Subjects between 21-60 years of age.

Exclusion Criteria:

1. Subjects with recurrent/ secondary pterygium
2. Subjects with pseudopterygium
3. Subjects with media opacities
4. Subjects with posterior segment disorders

Surgical Procedure:

Patients were selected by using envelope technique for different surgeries –Topical MMC, CAG and Wet AMG.

All surgeries were performed by the single surgeon.

Results:

The ocular adnexa was cleaned with 5% povidone iodine solution and the surgical field with the sterile drape. Wire speculum was applied and conjunctival wash was given.

Table 1: Showing percentage wise distribution of recovery from complications during periodic review

PERIODIC REVIEW	TOTAL NO. OF COMPLICATIONS		
	WET AMG	CAG	TOPICAL MMC
Post Op 1 st Day	6(24%)	15(60%)	5(20%)
1 Week	2(8%)	11(44%)	5(20%)
1 Month	1(4%)	4(16%)	5(20%)
3 Months	0(0%)	0(0%)	3(12%)
6 Months	0(0%)	0(0%)	1(4%)
χ ² -value	21.21	41.33	15.89
p-value	0.0001,S	0.0001,S	0.0032,S

- It is distinctly observed that the frequency and severity of the post-operative complications was much less in terms of outcome variables.
- It is seen that the complications in WET AMG which were to the extent of 6(24%) on the first post-operative day of observation declined to 2(8%) at 1 week & was observed to be nonexistent in the observations made at the end of three months.
- The complications in CAG which were to the extent of 15(60%) on the first post-operative day of observation declined to 11(44%) & 4(16%) on 1st week and 1 month, respectively. No complications were seen on subsequent follow-ups.
- The complications in Topical MMC surgery were to the extent of 5(20%) on the first post-operative day of observation which remained same on subsequent follow ups till 1 month. It declined to 3(12%) on 3 months follow up which further reduced to 1(4%) on 6 months follow up.

Table 2 : Recurrence Rate among various surgeries

Follow up period	Recurrence Rate		
	WET AMG	CAG	Topical MMC
1 week	-	-	-
1 month	-	-	-
3 months	-	1(4%)	1(4%)
6 months	1(4%)	-	1(4%)
χ^2 -value	2.11, p=0.34, NS		

- Recurrence was seen in 1(4%) eye in WET AMG group as well as CAG group at 6 months & 3 months, respectively. There were 2(8%) recurrences seen in Topical MMC group at 3 months & 6 months follow up period.
- The chi square test for recurrence rate between the 3 groups was 2.11 with a p value of 0.34, including the lack of significant difference in recurrence rate between the 3 groups.

Table 3 : Recurrence Rate according to grade of pterygium

	Recurrence Rate		
	GRADE I	GRADE II	GRADE III
WET AMG	-	-	1 (4%)
CAG	-	-	1 (4%)
Topical MMC	-	1 (4%)	1 (4%)

- Recurrence was seen in GRADE III pterygium in all the three groups.
- Additionally, 1(4%) eye showed recurrence in GRADE II pterygium following Topical MMC.

Table 4 : Comparison between average corneal astigmatism among various surgeries

	Preoperative Mean Corneal Astigmatism	Postoperative Mean Corneal Astigmatism at 1 month	% Reduction	t-value
WET AMG	1.38±1.54	0.78±1.08	43.47%	3.28, p=0.003,S
CAG	1.39±1.49	0.76±0.94	45.32%	3.29 p=0.003,S
Topical MMC	1.04±0.69	0.38±0.45	63.46%	5.95 p=0.0001,S

- The reduction in the mean corneal astigmatism after all three types of surgery was statistically significant.
- However, the changes in astigmatic values did not correlated with the method of surgery ($R = 0.030, P = 0.797$, Spearman correlation analysis).

Discussion:

It is believed that surgical trauma and subsequent postoperative inflammation activates subconjunctival fibroblasts, and the proliferation of fibroblasts and vascular cells, and deposition of extracellular matrix (ECM) proteins in turn contribute to the pterygium recurrence. Alternatively, pterygium fibroblasts were reported to exhibit some characteristics of transformed cells such as hyperproliferation and overexpression of matrix metalloproteinases,⁽¹⁾ which may partially explain the invasive nature of pterygium tissue.^(7,8)

In this study, the recurrence rate following WET AMG was 4%, which was same as the CAG group(4%) and was slightly better than topical Mitomycin-C group(8%). However, there was no statistically significant difference in recurrence rates between the 3 groups. Recurrence was seen at 6 months follow up in WET AMG group and at 3 months follow up in CAG group. In topical Mitomycin-C group, one recurrence was noted at 3 months & other was noted at 6 months follow up.

The dissection and extent of clearance by surgeons would further contribute to variation in recurrence rate . In a study conducted by **Prabhasawat et al,**⁽⁹⁾ they first compared amniotic membrane graft (n=54) retrospectively with conjunctival auto graft (n=122) in both primary and recurrent pterygium. They noted that the recurrence rate is 10.9% using amniotic membrane graft, which is still higher than 2.6% of conjunctival graft. Subsequently, **Solomon et al**⁽¹⁰⁾ reported that by incorporating a larger removal of subconjunctival fibrosis tissue and injection of long acting steroids, amniotic membrane grafts achieved a lower recurrence rate of 3.0%, compatible with 2.6% of conjunctival auto grafts published by Prabhasawat. Conjunctival autograft has been proved as safe and

effective in reducing pterygium recurrence. However, obtaining a good conjunctival graft requires a skillful conjunctival dissection technique to ensure optimal handling, harvesting, and preservation of healthy conjunctiva. Also, the meticulousness with which the limbal tissue is included in the autograph, in our opinion, determines the success of the procedure. This may explain why recurrence rate after conjunctival autograft vary as low as 2%⁽¹¹⁾ to a wide range of higher recurrences in other reports.⁽¹²⁾

The recurrence rate was lower (4%) in WET AMG group as well, and we suggest that this was due to removal of more conjunctiva, especially the conjunctiva adjacent to pterygium at the limbus, which might also be abnormal.⁽¹⁴⁾ The coverage of a larger area by amniotic membrane in turn may promote the proliferation and differentiation of the remaining normal limbal epithelial cells,⁽¹⁵⁾ which may have an inhibitory effect on fibrovascular ingrowth.⁽¹⁶⁾ A distinct advantage of this technique over the conjunctival autograft, however, is the preservation of bulbar conjunctiva. Unfortunately, recurrence rates vary widely among the studies that exist, somewhere between 2.6 percent and 10.7 percent for primary pterygia and as high as 37.5 percent for recurrent pterygia.⁽¹⁷⁾

Mitomycin-C is an alkylating antineoplastic agent which inhibits cellular division and replication by inhibiting DNA synthesis. Intra operative MMC is preferred and current regimen of 0.02% MMC for 5 minutes has been found to be equally effective, simple, and has comparable recurrence rates.

Conclusion:

We have shown that amniotic membrane graft was as effective as the other two methods in reducing astigmatism and was safe with no major complications. This suggests that amniotic membrane

graft may be a preferred procedure for primary pterygium, and is especially suited for pterygium with diffuse conjunctival involvement or glaucoma patients waiting for filtering operations where conjunctival autograft is not possible.

Recommendations:

Thus, every effort should be made to reduce the risk of pterygium by changing the modifiable risk factors, such as increasing the use of sunglasses among people living in tropical climates, especially for those with outdoor occupations.

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