·Clinical Research·

Pterygium surgery: amniotic membrane or conjunctival autograft transplantation

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Received: 2008-06-30 Accepted: 2008-11-28

Abstract

• AIM: To compare the outcomes of amniotic membrane transplantation (AMT) with conjunctival autograft transplantation (CAT) in primary and recurrent pterygium.

• METHODS: This study was designed as a prospective study on consecutive cases of pterygium from April 2004 to February 2006. The cases were randomly divided into two groups of AMT (26 cases) and CAT (24 cases). All subjects were operated with an extensive excision of the fibro vascular tissues with AMT or CAT approach. Patients were followed for recurrence and complications for 24 months. The surgical procedures were performed by a single surgeon. The associations between demographic variables, surgical techniques (AMT, CAT), recurrences and postoperative complications were analyzed.

• RESULTS: The patients' male to female ratio was 4:1. Involvement of right to left eye ratio was 3:2. Pterygium in 70% of cases was primary and in 30% was recurrent. The most common clinical signs were red eye and reduced visual acuity while the most common complications were recurrence and corneal scar. In the first month of follow up, the recurrence rates in AMT and CAT approaches were 3.8% *vs* 8.3% respectively and these rates increased to 46.2% *vs* 25% respectively after 24 months of follow up.

• CONCLUSION: The success rate of 2 years follow up was better in CAT technique. The AMT technique for pterygium surgery has an unacceptably high recurrence rate.

• KEYWORDS: pterygium; amniotic membrane; conjunctival autograft; recurrence.

Besharati MR, Miratashi SAM, Ahmadi AB. Pterygium surgery: amniotic membrane or conjunctival autograft transplantation. *Int J Ophthalmol* 2008;1(4):362-366

INTRODUCTION

Pterygium is a common worldwide external eye disease, affecting population especially in tropical and subtropical areas [1-2]. Outdoor work, ultraviolet radiation exposure and environmental factors are major risk factors for pterygium formation [3-5]. Simple excision carries a high recurrence rate ranging from 24% to 89%[6]. The addition of various concentrations of mitomycin C (MMC) is effective in preventing recurrence [7-9]. However, MMC may result in devastating complications [10-12]. Alternate adjuncts are conjunctival autograft and amniotic membrane transplantation[13]. Conjunctival autograft decreases the recurrence rate for primary pterygium compared with simple excision [14-19]. Limbal-conjunctival autograft proved to be a promising and safe procedure in recurrent pterygium treatment [20-25]. Amniotic membrane provides lower recurrence rate in cases of recurrent pterygium and may be employed in conjunction with other techniques, such as limbal transplantation [26-29]. Based on published results conjunctival graft appears to be more effective in the prevention of pterygium recurrence. However we set up present study to evaluate efficacy and recurrence rate of two different methods of pterygium surgery.

MATERIALS AND METHODS

From August 2003 to January 2006 in prospective clinical trial, consecutive eyes of 50 patients with primary (35 patients) and secondary (15 patients) pterygium that met the inclusion criteria were enrolled prospectively in the study. Patients were randomized into two groups of: amniotic membrane transplantation (AMT) in 26 cases and conjunctival autograft (CAT) in 24 cases. The surgical procedures were performed by one surgeon and reviewed at one week, 1, 3, 6, and 24 months post operation. Ten eyes were excluded from the study because of difficulties in patients' follow up.

None of patients with major systemic disease such as diabetes or collagen vascular disease, dry eye or glaucoma were enrolled in this study. Amniotic membrane was transplanted with the epithelial side up and conjunctival autograft harvested from supra temporal limbal area and all

Table 1 Frequency of pterygium's risk factors in two groups

Risk factors	CAT		AMT		*P*
	Number	Percentage	Number	Percentage	
Sun light exposure	21	87.5	18	69.2	0.119[a]
Dry air	21	87.5	20	76.9	0.467[b]
Dusty air	19	79.2	20	76.9	0.848[a]
Warm weather	21	87.5	24	92.3	0.661[b]
Wind	17	70.8	17	65.4	0.680[a]

[a]Chi-square test; [b] Fisher exact test

Table 2 Frequency of clinical signs in two groups

Clinical signs	AMT		CAT		*P*
	Percentage	Number	Percentage	Number	
Photo phobia	50	13	58.3	14	0.555[a]
Tearing	30.8	8	33.3	8	0.846[a]
Foreign body sensation	15.4	4	16.7	4	1.00[b]
Reduced V/A	73.1	19	87.5	21	0.294[b]
Red eye	88.5	23	95.8	23	0.611[b]
Cosmetic	65.4	17	29.2	7	0.01[b]
Doplopia	3.8	1	0	0	1.00[b]

[a]Chi-square test; [b] Fisher exact test

of grafts sutured in place with absorbable sutures (8-0 Vicryl). The main outcome measurement was recurrences and complications with 24 months follow-up.

Recurrence was defined as postoperative re-growth of 2mm fibro vascular tissue onto clear cornea in the area of previous pterygium excision. Pterygium was moderate to large size measuring by slit lamp (more than 2mm extension over the cornea).

This study was approved by ethical committee of Yazd Medical University. It was also approved by ethical committee of Yazd Medical University. From the ethical point of view, following receipt of informed consent, the patients were randomly distributed into two treatment groups. The postoperative complications and recurrence were compared for each group.

The demographic variables, surgical techniques (AMT, CAT), pterygium risk factors, recurrence and postoperative complications were compared by statistical tests such as Chi-square, Fisher Exact Test and ANOVA in SPSS software. All significance less than 0.05 were assumed significant.

RESULTS

Mean age of patients were 49.3±15.5 years (range 24-77 years old). In total 80% of cases were male and 20% were female. Regarding the place of living, 58% of patients were citizen and 42% were villager.

Regarding their occupation, 12% of patients were self-employed, 28% employee, 8% worker, 26% farmer, 14% driver and 12% housekeeper. The past history of treatment showed the pterygium surgery in 24% of cases, medication in 22%, both surgery and medication in 6% and 48% without any previous therapy. Right eye in 58% and left eye in 42% of cases were involved. In 95.9% of cases pterygium located nasally and 4.1% both nasally and temporally. The disease in 38.8% of cases was unilateral and in 61.2% bilateral. Regarding the size of pterygium, 67% of cases had medium size and 33% had large size pterygium. In total, 40.8% of pterygium was fleshy, 57.2% intermediate, and 2% atrophic. The duration of pterygium in 4% of cases was less than one year, in 34% was 1-5 years and in 62% it was more than 5 years. The risk factors and clinical signs of the disease are summarized in Tables 1 and 2.

In the first week of follow up the most common complication (32 cases, 64%) of both approaches was corneal scar. In fact, this was the effect of pterygium rather than surgical complication. Infection was not seen in CAT approach while it was seen in 11.5% of the AMT approach. Other complications in AMT and CAT approaches were conjunctival contraction (8.3% *vs* 7.7% respectively) and graft dehiscence (8.3% *vs* 3.8% respectively).

In the first month of follow up the recurrence rates were 3.8% *vs* 8.3% in AMT and CAT approaches respectively (Table 3). These rates after 3 months of follow up were 26.9% *vs* 16.7% in AMT and CAT approaches respectively

Table 3 Frequency of complications in first month follow up

Surgery approach	AMT		CAT		*P*
Complication	Percentage	Number	Percentage	Number	
Recurrence	3.8	1	8.3	2	0.602[b]
Pyogenic granuloma	7.7	2	16.7	4	0.409[b]
Corneal scar	61.5	16	66.70	16	0.706[a]
Conjunetival contraction	15.4	4	12.5	3	1.00[a]
Infection	3.8	1	0	0	1.00[a]
Graft dehiscena	3.8	1	12.5	3	0.340[b]

[a]Chi-square test; [b] Fisher exact test

Table 4 Frequency of complications in 3 month follow up

Surgery approach	AMT		CAT		*P*
Complication	Percentage	Number	Percentage	Number	
Recurrence	26.9	7	16.7	4	0.382[a]
Pyogenic granuloma	7.7	2	16.7	4	0.409[b]
Corneal scar	65.4	17	66.7	16	0.924[a]
Conjunetival contraction	11.5	3	4.2	1	0.612[b]
Eye movement restriction	3.8	1	0	0	1.00[a]
Drplopia	3.8	1	0	0	1.00[b]
Graft dehiscena	3.8	1	12.5	3	0.34[b]

[a]Chi-square test; [b] Fisher exact test

Table 5 Frequency of complications in 6 month follow up

Surgery approach	AMT		CAT		*P*
Complication	Percentage	Number	Percentage	Number	
Recurrence	42.3	11	16.7	4	0.048[a]
Pyogenic granuloma	7.7	2	16.7	4	0.409[b]
Corneal scar	65.4	17	66.7	16	0.924[a]
Conjunetival contraction	19.2	5	8.5	2	0.424[b]
Eye movement restriction	3.8	1	0	0	1.00[b]
Drplopia	7.7	2	0	0	0.491[b]
Symblepharon	3.8	1	0	0	1.00[b]
Graft dehiscena	3.8	1	12.5	3	0.34[b]

[a]Chi-square test; [b] Fisher exact test

(Table 4). There was no statistically significant difference between complications in two groups in one week, one month and 3 months of follow up.

In the 6 month follow up, recurrence rates were 42.3% *vs* 16.7% in AMT and CAT approaches respectively (Table 5). There was statistically significant difference of recurrence rate between two approaches in 6 months follow up (P=0.048), while other complications was not different in two groups ($P \geqslant 0.05$).

In the 2 years follow up, recurrence rates were 46.2% *vs* 25% in AMT and CAT approaches respectively and the difference was not statistically significant (P=0.119).

In total, although recurrence rate was early and more common in AMT than CAT approach, but there were not statistically significant differences between two approaches (Figure 1).

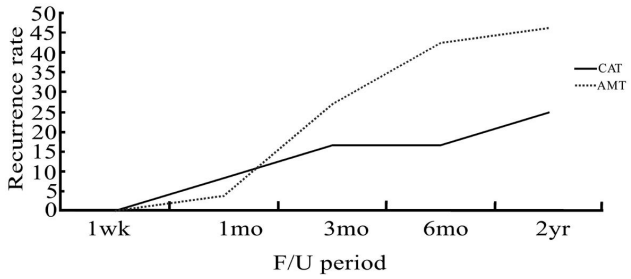

Figure 1 Recurrence rate in follows up periods

DISCUSSION

Pterygium surgery has changed over the past decade and several techniques are now available for the ophthalmic surgeon to choose from. Our study presented some of these techniques, which were employed at our hospital, and reflex our efforts on the efficacy of procedure by minimizing the recurrence rate by two techniques. The complications of two approaches were: recurrence of the disease, pyogenic granuloma, corneal scar, conjunctival contraction, diplopia and eye movement restriction, infection, suture reaction and

graft dehiscence.

Many ophthalmologists prefer conjuntival autografting as an adjunct to pterygium excision. This procedure is time-consuming, requires a significant learning curve, and it is still the proffered approach because of the avoidance of MMC-related complications [30-31] The conjunctival reconstruction may be carried out with various adjunctive therapies. The amniotic membrane is useful for anti inflammatory properties and in achieving a lower recurrence rate [24,25]. In the Tananuvat[26] and Shimazaki[27] studies there were 40.9% recurrences in the AMT group and 4.8% in the CAT group 12 months after operation. These differences between recurrence rates in two groups were similar to our study which showed 46.2% *vs* 25% recurrence rate in AMT and CAT groups, respectively. The prognosis of AMT depends on the grade of disease and the quality of the ocular surface and it is inversely related to the degree of inflammation. Kammoun showed [28] good immediate results for the three kinds of treatment. Long-term results showed a recurrence rate of 10.3% for conjunctival autograft and 11.1% for mitomycin C application, while the pterygium excision alone had a recurrence rate of 55.9%. Other studies support the low rates of pterygium recurrence and complications following conjuntival autografting with adjunctive MMC use. Wong and Law reported 76 patients with primary pterygium who were treated with conjuntival autografting and intraoperative MMC 0.025% for one minute and had recurrence rate of 9.2% [32]. In Figueiredo study [14], the estimated recurrence rate at one year were 40% and 16% in simple excision and CAT technique which was similar to our result by CAT approach, while in a survey by Chaidaroon, 5% of eyes had recurrence within one year by CAT approach[15]. Anduze[29] showed that subjects exposed to more risk factors seemed to correlate with pterygium recurrence. In the present study, the risk factors in two groups were relatively equal. A survey by Schrage[33] showed that the recurrence rate of CAT technique was 32.3%, while this rate in the bare sclera technique was 66.7%. These rates were more than recurrence rate of our study. Lamellar keratoplasties and their variants are indicated in the majority of cases and have demonstrated their efficacy in the prevention of recurrences [34]. Pterygium is known to affect refractive astigmatism, which can have a significant impact on vision. Astigmatism increased with the increase in the grade of pterygium [35-37]. Pterygium recurrence is related to pterygium morphology and fleshiness of the pterygium is a significant risk factor for recurrence if the bare sclera excision is performed. Conjunctival autograft for primary and recurrent pterygium is effective in reducing pterygium recurrence compared with bare sclera excision [38]. A high recurrence rate was found in patients who received inadequate post-operative topical corticosteroid [39]. MMC administered intraoperatively can be considered as an effective treatment to improve the success rate after surgical excision[40]. Hayasaka[41] found the postoperative instillation of 0.02% MMC, twice a day for five days, to be effective and safe in the treatment of primary pterygium.

Now the most frequently used treatment for pterygium is surgery. Various surgical procedures and postoperative treatments for pterygium have been reported, however, the postoperative recurrence rates are somewhat high [42]. The treatment of pterygium is still quite controversial, with various treatments being advocated in the scientific literature. Unfortunately, there are very few well-conducted controlled clinical trials of treatments. However, studies have confirmed that some methods, such as bare scleral closure, are no longer acceptable in the treatment of pterygium and that other methods are likely to be more useful. We feel that an appropriate surgical technique is essential for a successful outcome. And optimal apposition by sutures after conjuntival or amniotic membrane autograft edges to the surrounding conjuntival are important for faster formation of anastomic vessel, faster hilling, avoidance of granuloma formation, and prevention of autograft shrinkage or failure. The effective surgery techniques for prevent recurrence of pterygium needs to be further studied.

Our results indicate that AMT has an unacceptably high recurrence rate, but CAT is a safe and effective method for pterygium surgery. In the future it will be important to develop a grading system, and surgeons will need to be conservative in the treatment of pterygium.

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