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Original Article

Conjunctival Limbal Autograft Implantation in Primary and Recurrent Pterygium

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Abstract

Objectives: The aim of this study was to evaluate the clinical results and recurrence rate after pterygium excision with a conjunctival limbal autograft in patients with primary and recurrent pterygium.

Methods: Patients who had primary (Group 1) or recurrent (Group 2) pterygium and who underwent pterygium excision with a conjunctival limbal autograft implantation (with interrupted 10-0 nylon sutures or fibrin glue) were retrospectively reviewed. Only patients with a follow-up of at least 6 months were included. The primary outcome measures were the spherical equivalent (SE) of manifest refraction, uncorrected distance visual acuity, distance corrected visual acuity, topographical astigmatism, and keratometry values measured preoperatively and at 3- and 6-month follow-up visits. Complication and recurrence data were also recorded.

Results: A total of 145 patients were included in the study. There were no statistically significant differences between the groups preoperatively. When all of the cases were evaluated, there was a statistically significant correlation between pterygium length and corneal astigmatism. After surgery, SE, corneal astigmatism, and topographical astigmatism measurements had decreased significantly in both groups when compared with the preoperative values. Postoperative visual acuity, corneal astigmatism, and manifest cylinder values were similar between the groups. There was no recurrence in Group 1. The recurrence rate was 1.75% in Group 2.

Conclusion: Pterygium excision with a conjunctival limbal autograft is a safe and effective method for the surgical treatment of primary and recurrent pterygium. The recurrence rate was very low.

Keywords: Autograft, fibrin glue, pterygium, suture.

Introduction

Pterygium is a common ocular surface disease originating in the conjunctiva and extending to the cornea; the incidence rate is between 0.7% and 31% (1-3). The standard treatment option for pterygium is surgical excision, but the recurrence rate after surgery has been quite high (24%-89%) (4). The average length of time after the surgery before recurrence has been reported as 3.13 months. Therefore, multiple strategies and new techniques have been developed to reduce the high rate of pterygium recurrence, including limbal conjunctival autograft, human amniotic membrane grafting, beta-irradiation, stem cell transplantation, and the use of mitomycin-C and fibrin glue (FG) (5-11).

Conjunctival or limbal conjunctival autograft is currently thought to be the best treatment, with a low recurrence rate ranging from 1.9% to 5.3%, and a high degree of safety, according to some studies (12–15). These treatments have also been demonstrated to be more effective at treating recurrent pterygium than other techniques (16). Although the most common method of conjunctival autograft fixation in pterygium surgery is the use of absorbable or non-ab-

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sorbable sutures, FG is an alternative to sutures for conjunctival autograft fixation.

The aim of this study was to evaluate and compare the effectiveness of conjunctival autograft implantation using sutures and FG in primary and recurrent pterygium.

Methods

This study adhered to the tenets of the Helsinki Declaration, and it was approved by the institutional review board of Beyoglu Training and Research Hospital. Patients who had primary (Group 1) or recurrent (Group 2) pterygium and who underwent pterygium excision with conjunctival autograft implantation between September 2011 and July 2012 were included in the study. Only patients with a follow-up of at least 6 months were included. Patients with a history of trauma, use of a topical agent, or previous ocular surgery were not included in this study. The main outcome measures were spherical equivalent (SE) of manifest refraction, uncorrected distance visual acuity (UCVA), distance corrected visual acuity (DCVA), topographical astigmatism, and keratometry values preoperatively and at postoperative 3- and 6-month follow-up visits. The Sirius corneal topography system (Costruzioni Strumenti Oftalmici, Florence, Italy) was used for corneal topography examinations. Anterior segment photography was taken preoperatively and at each postoperative visit. The length of the pterygium tissue over the cornea was measured from the limbus in anterior segment images.

Surgical Methods

All of the procedures were performed by a single surgeon using subconjunctival anesthesia. The leading edge of the pterygium was avulsed from the cornea and the pterygium tissue over the corneal surface was dissected with a crescent knife. Remaining pterygium tissue over the bulbar conjunctiva was removed with scissors. The superotemporal bulbar conjunctiva was used to harvest a rectangular limbal conjunctival autograft to match the size of the bare sclera left after the pterygium excision. The conjunctival graft was sutured in place with 10-0 interrupted nylon sutures or FG (Tisseel; Baxter International, Inc., Deerfield, IL, USA). All of the patients received a topical antibiotic and a topical steroid 4 times a day for 1 month. Suture removal was performed 2 weeks postoperatively in patients with sutured conjunctival grafts.

Statistical Methods

IBM SPSS Statistics for Windows, (Version 22.0; IBM Corp., Armonk, NY, USA) was used to perform the statistical analysis. Mean and SD were used for descriptive statistics. The Shapiro-Wilks test was used to test the normality of data. Intergroup comparisons were conducted using Student's t-test for parametric variables, and the Mann-Whitney U for non-parametric data.

Results

In all, 145 patients were included in the study. The mean length of follow-up was 10.92±4.18 months for Group 1 and 11.20±4.25 months for Group 2. The preoperative characteristics of the patients are shown in Table 1 and Table 2. There were no statistically significant differences between the groups preoperatively. When all of the cases were evaluated, it was observed that there was a statistically significant correlation between pterygium length and corneal astigmatism (Pearson correlation analysis: $r=0.657$; $p<0.001$).

There was a statistically significant increase in UCVA and CDVA after the operation in both groups ($p<0.001$ for UCVA and CDVA in Group1 and Group 2). SE, corneal astigmatism, and topographical astigmatism decreased significantly in both groups when compared with the preoperative values ($p<0.001$ for UCVA and CDVA in Group1 and Group 2). The postoperative visual acuity, corneal astigmatism, and manifest cylinder values were similar between the groups. The postoperative findings are presented in Table 3 and the postoperative complications are provided in Table 4.

Table 1. Preoperative demographic data

	Group 1 (n=88)	Group 2 (n=57)	p
Fibrin glue	43	26	n/a
Nylon suture	45	31	n/a
Age (years) Mean±SD	48.79±12.9	50.94±11.5	0.78
Gender (male/female)	55/33	36/21	0.82
Pterygium length (mm) Mean±SD	3.46±0.9	3.1±1.05	0.69

n/a: not applicable.

Table 2. Preoperative clinical data of the groups

	Group 1 Mean±SD	Group 2 Mean±SD	p
Mean keratometry (D)	43.6±1.95	42.99±1.60	0.08
Mean topographic cylinder (D)	-3.77±2.81	-5.03±5.59	0.1
UCVA (decimal)	0.52±0.27	0.66±0.31	0.07
DCVA (decimal)	0.68±0.28	0.77±0.26	0.07
SE (D)	0.86±1.87	0.86±1.28	0.97
Mean manifest cylinder (D)	-2.81±2.56	-2.23±-2.21	0.16

D: diopters; DCVA: distance corrected visual acuity; SE: spherical equivalent; UCVA: uncorrected distance visual acuity.

Table 3. Postoperative clinical findings

	Group 1 Mean±SD	Group 2 Mean±SD	p
Mean keratometry (D)	44.4±1.7	44.1±1.3	>0.05
Mean topographic cylinder (D)	-1.5±1.6	-0.84±0.7	>0.05
UCVA (decimal)	0.76±0.2	0.84±0.3	>0.05
DCVA (decimal)	0.90±0.02	0.92±0.07	>0.05
SE (D)	0.04±0.02	0.11±0.04	>0.05
Mean manifest cylinder (D)	-1.03±0.3	0.66±0.2	>0.05

D: diopters; DCVA: distance corrected visual acuity; SE: spherical equivalent; UCVA: uncorrected distance visual acuity.

Table 4. Complications

	Primary pterygium		Recurrent pterygium	
	Fibrin Glue	Suture	Fibrin Glue	Suture
Hematoma	1	1	0	1
Dellen	1	0	0	1
Tenon's granuloma	1	1	0	2
Folding of graft	1	0	1	0
Conjunctival cyst	1	2	1	0

Discussion

In this study, we evaluated the results of pterygium surgery with a conjunctival limbal autograft in cases of primary and recurrent pterygium. We found a statistically significant relationship between preoperative corneal astigmatism and preoperative pterygium length. Other studies in the literature have reported similar findings (17,18). After the surgery, visual acuity and corneal topographical findings improved as expected, and no sight-threatening complications were seen in this study in either group.

The most important problem after pterygium surgery is recurrence. Accordingly, multiple strategies and new techniques have been developed to reduce the high rate of pterygium recurrence. In this study, the recurrence rate in Group 1 and Group 2 was 0% and 1.75%, respectively. It is well established in the literature that recurrence is more frequent in younger patients (19). In this study, the only patient to experience recurrence was younger than 40 years of age. Various studies in the literature have evaluated recurrence rates after pterygium surgery with a conjunctival limbal autograft (12-15). Consistent with our study results, several other authors have reported lower recurrence rates in cases of primary pterygium (12, 13). However, the recurrence rate after surgery in primary and recurrent pterygium cases seen in the literature varies (12-15, 13). These differences are probably related to surgical technique and the definition of recurrence. As in our study, Kenyon et al. (12) reported that none of the patients with primary pterygium experienced recurrence, while Allan et al. (20) reported a recurrence rate of 6.5%. Although there was a lower rate of recurrence in the primary pterygium group in our study, the small number of recurrences (only 1) prevents us from drawing a statistically significant conclusion. The low recurrence rate in this study is probably related to a wide excision of pterygium tissue with the surrounding conjunctiva, a large conjunctival graft with limbal tissue, and the surgeon's experience. Furthermore, we may have found a higher rate of recurrence with a longer follow-up period.

The most important limitation of this study is the relatively short length of follow-up and the retrospective design. However, the large number of cases performed by a single surgeon is a major strength.

In conclusion, we evaluated the surgical results of pterygium surgery and found that excision with a conjunctival limbal autograft is a safe and effective method for the surgical treatment of pterygium in primary and recurrent cases. The recurrence rate was very low, whether the graft was fixed in place using interrupted nylon sutures or FG.

Disclosures

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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