

Comparison of Conjunctival Rotational Flap and Conjunctival Autograft Techniques in Pterygium Surgery

Pterijum Cerrahisinde Konjonktival Rotasyonel Flep ve Konjonktival Ototogreft Tekniklerinin Karşılaştırılması

Burak BİLGİN,^a

Ali ŞİMŞEK^b

^aClinic of Ophthalmology,
Medical Park Gaziantep Hospital,
Gaziantep

^bDepartment of Ophthalmology,
Adıyaman University Faculty of Medicine,
Adıyaman

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Correspondence:

Burak BİLGİN

Medical Park Gaziantep Hospital,
Clinic of Ophthalmology, Gaziantep,
TURKEY/TÜRKİYE
burbilgin@yahoo.com

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ABSTRACT Objective: In the present study, our aim was to investigate and compare the efficacy of conjunctival rotational flap and conjunctival autograft techniques in terms of recurrence and complication rates, after primary pterygium surgery. **Material and Methods:** 109 eyes of 101 patients who have undergone primary pterygium surgery between September 2012 and August 2014 were examined retrospectively. Patients were categorized into two groups according to the surgical technique applied. The patients received either a superior temporal conjunctival autograft or a conjunctival rotational flap to cover the scleral bed. **Results:** In the conjunctival autograft group, recurrence was seen in 3 eyes of 3 patients (6.1%). In the conjunctival rotational flap group, recurrence was seen in 4 eyes of 4 patients (6.6%). The difference between two groups in terms of recurrence was not statistically significant. Postoperative graft edema was seen in 8 eyes (16.3%) in the conjunctival autograft group. Postoperative flap edema was seen in 9 eyes (15%) in the conjunctival rotational flap group. There was not statistically significant difference between two groups in terms of flap/graft edema. **Conclusion:** Both techniques use conjunctival transplant either as a free autograft or a rotational flap. They both have some advantages and disadvantages. Both techniques are effective in preventing the recurrence.

Keywords: Pterygium; conjunctival autograft; conjunctival rotational flap

ÖZET Amaç: Bu çalışmada, pterijum cerrahisinde konjonktival rotasyonel flep ve konjonktival otogreft tekniklerinin rekürrens ve komplikasyon oranları açısından etkinliğinin karşılaştırılması amaçlandı. **Gereç ve Yöntemler:** Eylül 2012 ve Ağustos 2014 tarihleri arasında primer pterijum cerrahisi geçiren 101 hastanın 109 gözü retrospektif olarak değerlendirildi. Uygulanan cerrahi tekniğe göre hastalar iki gruba ayrıldı. Skleral yatağı kapatmak için hastalara üst-temporal konjonktival otogreft veya konjonktival rotasyonel flep tekniklerinden bir tanesi uygulanmıştı. **Bulgular:** Konjonktival otogreft tekniği uygulanan 49 gözün 3 tanesinde (%6,1) rekürrens görüldü. Konjonktival rotasyonel flep uygulanan grupta, 60 gözden 4 tanesinde (%6,6) rekürrens görüldü. Rekürrens oranları açısından iki grup arasında istatistiksel olarak anlamlı bir fark görülmedi. Postoperatif greft/flep ödemi konjonktival otogreft grubunda 8 gözde (%16,3), konjonktival rotasyonel flep grubunda 9 gözde (%15) görüldü. İki grup arasında greft/flep ödemi açısından istatistiksel olarak anlamlı bir fark görülmedi. **Sonuç:** Her iki teknikte de, serbest otogreft veya rotasyonel flep olarak konjonktival transplant kullanılmaktadır. Her iki tekniğin de bazı avantaj ve dezavantajları mevcut olup bunların rekürrensi önlemede başarılı olduğu görülmüştür.

Anahtar Kelimeler: Pterijum; konjonktival otogreft; konjonktival rotasyonel flep

Pterygium is a wing shaped growth of fibrovascular conjunctival connective tissue on the cornea. It has been known for 3000 years but first described by Sushruta in 1000 B.C.¹ It may impair vision by inducing astigmatism and blocking the optical axis. Also it may cause a chronic ocular surface inflammation, tearing and be a cosmetic problem.^{2,3} Although etiopathogenesis of the pterygium is unclear, there are some hypotheses. Environmental factors, heredity, ocular surface changes and ultraviolet ra-

diation related limbal stem cell damage are suggested as risk factors.⁴ Pterygium prevalence depending on age, gender and geographic region has been reported as 10.2%.⁵ Pterygium is seen more often in some individuals, especially outdoor workers and those residing in rural areas.⁶ Surgical intervention is the main treatment method for pterygium. Several surgical techniques have been performed and defined in the literature. Some of these are pterygium excision by bare sclera technique with or without application of anti-neoplastic agents, primary conjunctival closure, amniotic membrane transplantation, conjunctival autografting and conjunctival rotational flap.⁷ The perfect technique preventing recurrence which is the most common postoperative complication has not been defined yet. Graft edema, suture loosening, persistent epithelial defects, granuloma and dellen formation are other easily managed complications of pterygium surgery. Symblepharon, diplopia and scleral melting are rare complications which are more likely to be seen after recurrent pterygium excisions.⁸

In the present study, our aim was to investigate and compare the efficacy of conjunctival rotational flap and conjunctival autograft techniques in terms of recurrence and complication rates, after primary pterygium surgery.

MATERIAL AND METHODS

This study followed the tenets of the Declaration of Helsinki and was approved by the institutional ethics committee. Informed consent was obtained from the patients before surgery. 109 eyes of 101 patients who have undergone primary pterygium surgery between September 2012 and August 2014 were examined retrospectively. Fifty three male and 48 female patients with a mean age of 49 years (range; 21-81 years) were included in the study. Patients were categorized into two groups according to the surgical technique applied. Patients with complaints of foreign body sensation, hyperemia, visual disability and undesired cosmetic appearance underwent to pterygium surgery. Patients with dry eye syndrome, collagen vascular diseases, history of ocular surgery and recurrent pterygium were excluded. All surgeries were performed by a single

surgeon (B.B) under local anesthesia. 0.5% proparacaine hydrochloride drop (Alcaine, Alcon Laboratories, Inc., Forth Worth, TX, USA) was used two times for ocular surface anesthesia. Marker pen was used to mark the resection margins of the pterygium saving 1 mm free tissue from the pterygium neck and the body. 0.2 ml of lidocaine HCl 20mg/ml and epinefrine HCl 0,0125 mg/ml combination (Jetokain, Adeka, Türkiye) was injected subconjunctivally beneath the pterygium. The pterygium head over the cornea was separated with the help of No.15 blade and the rest of the pterygium tissue was dissected from the normal conjunctiva, cornea and sclera. Minimal cauterization was applied. The patients received either a superior temporal conjunctival autograft or a conjunctival rotational flap to cover the scleral bed.

In the conjunctival autograft group, superior temporal conjunctiva was marked 1 mm larger than the bare scleral area. 0.2 ml of lidocaine HCl 20mg/ml and epinefrine HCl 0,0125 mg/ml combination (Jetokain, Adeka, Türkiye) was injected subconjunctivally. Conjunctival tissue was bluntly dissected from the underlying tenon using Westcott scissors. The free conjunctival autograft was embedded on the scleral bed with normal orientation (limbus to limbus and fornix to fornix). Graft was sutured to the surrounding conjunctiva with 8 interrupted 8/0 polyglactin910 sutures (Vicryl, Ethicon Inc., USA).

In the conjunctival rotational flap group, superior nasal conjunctiva with a pedicle adjacent to the pterygium excision area was marked 1 mm larger than the scleral area. 0.2 ml of lidocaine HCl 20mg/ml and epinefrine HCl 0,0125 mg/ml combination (Jetokain, Adeka, Türkiye) was injected subconjunctivally. Conjunctival tissue was bluntly dissected from underlying tenon by using Westcott scissors and rotated at an angle of 90° around the scleral site saving the pedicle. The flap was sutured to the surrounding conjunctiva with 6 interrupted 8/0 polyglactin910 sutures (Vicryl, Ethicon Inc., USA).

After surgery the eye was closed with sterile patch. Topical antibiotic and steroid drops were used in all eyes postoperatively. Topical antibiotic drops were ordered 4 times a day for a week. Topical steroid drops were ordered 4 times a day for a week and then tapered over 3 weeks. All participants were

examined at first postoperative day, 1 week, 1 month, 3 month and 6 month. Complications and recurrences were noted. Encroachment of the cornea 1 mm or more by fibrovascular tissue derived from the surgical site was accepted as recurrence.⁹

Statistical analyses were performed using Statistical package for social sciences (SPSS) version 20.0 software (SPSS, Chicago,IL,USA). The chi-square test and independent samples t-test were used to compare qualitative and quantitative values respectively. A p-value of < 0,05 is taken to be significant in all analyses.

RESULTS

In this study, among 109 eyes of 101 patients with primary pterygium, 49 eyes (46 patients) received superior temporal conjunctival autograft and 60 eyes (55 patients) underwent conjunctival rotational flap surgery. Of 46 patients in the conjunctival autograft group 24 were male and 22 were female. Of 55 patients in the conjunctival rotational flap group 29 were male and 26 were female. The mean age of the patients were 48.06 ± 12.92 and 49.58 ± 12.56 years in the conjunctival autograft and conjunctival rotational flap groups respectively. There was not statistically significant difference between the two groups in terms of age and sex ($p > 0.05$). The mean postoperative follow-up period was 12 months (range, 6-18 months) for the conjunctival autograft group and 12.3 months (range, 6-18 months) for the conjunctival rotational flap group.

Of 49 eyes treated with conjunctival autograft technique, recurrence was reported in 3 eyes (6.1%) of 3 patients. In the conjunctival rotational flap group, of 60 eyes recurrence was reported in 4 eyes (6.6%) of 4 patients. The difference between

two groups in terms of recurrence was not statistically significant ($p > 0,05$).

The most common postoperative complaint was foreign body sensation and it was minimized with artificial tear drops. No severe complication threatening vision was seen among the groups. Postoperative graft edema was seen in 8 eyes (16.3%) in the conjunctival autograft group. Postoperative flap edema was seen in 9 eyes (15%) in the conjunctival rotational flap group. There was not statistically significant difference between two groups in terms of flap/graft edema ($p > 0,05$). Patient characteristics of the two groups were presented in Table 1.

DISCUSSION

Several surgical techniques were reported in the literature which have been performed and modified to optimize pterygium surgery. Recurrence is the most common complication after pterygium surgery.¹⁰ It is a source of disappointment for the patient and discouragement for the surgeon. The ideal technique preventing recurrence has not been defined yet. There are many factors related to recurrence such as type of pterygium, age and sex of the patient, environment, geographic location and surgical technique used for pterygium treatment.¹¹ Since the surgical technique is the only modifiable factor to prevent recurrence, many studies were performed to compare different techniques in terms of recurrence and other complications.¹²⁻¹⁴

In this study, we compared two popular pterygium excision techniques; which are conjunctival rotational flap and conjunctival autografting. Both techniques use conjunctival transplant either as a free autograft or a rotational flap. There are many

TABLE 1: Patient characteristics.

Characteristic	Conjunctival Autograft (n=49)	Conjunctival Rotational Flap (n=60)	P-Value
Sex (M:F)	24:22	29:26	0.956
Age (years)	48.06 ± 12.92	49.58 ± 12.56	0.536
Duration of follow-up (months)	12.3	12	0.665
Postoperative flap/graft edema	8	9	0.849
Recurrence	3	4	0.908

Independent t-test and Chi-square tests were used for the calculation of P-values.

studies in the literature reporting that both techniques are effective for preventing recurrences with different success rates. However, there is a controversy about which one is superior to the other particularly in terms of recurrence. Kim et al. reported lower recurrence rate of 4.7% with conjunctival flap technique compared to conjunctival autograft technique with a 17.6% recurrence rate.¹⁴ In accordance with previous study, Müller et al. found a lower recurrence rate with conjunctival flap technique (6.9%) compared to conjunctival autograft technique (18.5%).¹⁵ In contrast with previous studies, Alpay et al. reported that recurrence rate is higher in conjunctival flap technique (33.3%) than conjunctival autograft technique (17%).¹² Predominantly, most of the studies comparing recurrence rates of free conjunctival autograft and conjunctival flap techniques have reported that results were similar.¹⁶⁻¹⁹ Our results are in accordance with most of the literature with 6.1% and 6.6% recurrence rates for conjunctival autograft technique and conjunctival rotational flap technique respectively. No severe complication threatening vision was seen among the groups. Postoperative graft or flap edema rate was 16.3% and 15% for the conjunctival autograft group and conjunctival rotational flap group respectively.

This study has some limitations. Because of retrospective design, we do not have occupational information of the patients (indoor or outdoor workers). It is known that chronic UVR exposure

plays a major role in the pathogenesis and recurrence of pterygium.²⁰ Another limitation of this study is to include only primary pterygium cases.

CONCLUSION

In conclusion, both techniques are effective in preventing recurrence compared to conventional pterygium excision techniques. Further prospective studies with larger series and more detailed patient demographics are needed to compare these two surgical techniques in all respects.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Burak Bilgin, Ali Şimşek; **Design:** Burak Bilgin, Ali Şimşek; **Data Collection and/or Processing:** Burak Bilgin, Ali Şimşek; **Analysis and/or Interpretation:** Burak Bilgin; **Literature Review:** Burak Bilgin; **Writing the Article:** Burak Bilgin; **Critical Review:** Burak Bilgin, Ali Şimşek.

REFERENCES

- Hiwt L. Distribution, risk factors and epidemiology. In: Taylor HR, ed. Pterygium. Vol. 2. 1st ed. Hague: Kugler Publications; 2000. p.15-28.
- Detorakis ET, Spandidos DA. Pathogenetic mechanisms and treatment options for ophthalmic pterygium: trends and perspectives (Review). *Int J Mol Med* 2009;23(4):439-47.
- Lin A, Stern G. Correlation between pterygium size and induced corneal astigmatism. *Cornea* 1998;17(1):28-30.
- Chui J, Di Girolamo N, Wakefield D, Coroneo MT. The pathogenesis of pterygium: current concepts and their therapeutic implications. *Ocul Surf* 2008;6(1):24-43.
- Liu L, Wu J, Geng J, Yuan Z, Huang D. Geographical prevalence and risk factors for pterygium: a systematic review and meta-analysis. *BMJ Open* 2013;3(11):e003787.
- Coroneo MT, Di Girolamo N, Wakefield D. The pathogenesis of pterygia. *Curr Opin Ophthalmol* 1999;10(4):282-8.
- Hirst LW. The treatment of pterygium. *Surv Ophthalmol* 2003;45(2):145-80.
- Tananuvat N, Marfin T. The results of amniotic membrane transplantation for primary pterygium compared with conjunctival autograft. *Cornea* 2004;23(5):458-63.
- Al Fayed MF. Limbal versus conjunctival autograft transplantation for advanced and recurrent pterygium. *Ophthalmology* 2002; 109(9):1752-5.
- Janson BJ, Sikder S. Surgical management of pterygium. *Ocul Surf* 2014;12(2):112-9.
- Mutlu FM, Sobacı G, Tatar T, Yildirim E. A comparative study of recurrent pterygium surgery: limbal conjunctival autograft transplantation versus mitomycin C with conjunctival flap. *Ophthalmology* 1999;106(4): 817-21.
- Alpay A, Uğurbaş SH, Erdoğan B. Comparing techniques for pterygium surgery. *Clin Ophthalmol* 2009;3:69-74.
- Prabhasawat P, Barton K, Burkett G, Tseng SC. Comparison of conjunctival autografts, amniotic membrane grafts, and primary closure for pterygium excision. *Ophthalmology* 1997;104(6):974-85.
- Kim M, Chung SH, Lee JH, Lee HK, Seo KY. Comparison of mini-flap technique and conjunctival autograft transplantation without mitomycin C in primary and recurrent pterygium. *Ophthalmologica* 2008;222(4):265-71.
- Müller S, Stahn J, Schmitz K, Behrens-Baumann W. [Recurrence rates after pterygium excision with sliding conjunctival flap versus free conjunctival autograft]. *Ophthalmologie* 2007;104(6):480-3.
- Akhter W, Tayyab A, Kausar A, Masrur A. Reducing postoperative pterygium recurrence: comparison of free conjunctival auto-graft and conjunctival rotation flap techniques. *J Coll Physicians Surg Pak* 2014;24(10):740-4.
- Yu C, Liang W, Huang Y, Guan W. Comparison of clinical efficacy of three surgical methods in the treatment of pterygium. *Eye Sci* 2011;26(4):193-6.
- Kim SH, Oh JH, Do JR, Chuck RS, Park CY. A comparison of anchored conjunctival rotation flap and conjunctival autograft techniques in pterygium surgery. *Cornea* 2013;32(12):1578-81.
- Aslan L, Aslankurt M, Aksoy A, Ozdemir M, Yüksel E. Comparison of wide conjunctival flap and conjunctival autografting techniques in pterygium surgery. *J Ophthalmol* 2013; 2013:209401.
- Chui J, Di Girolamo N, Wakefield D, Coroneo MT. The pathogenesis of pterygium: current concepts and their therapeutic implications. *Ocul Surf* 2008;6(1):24-43.