

# Frequency of Pterygium Recurrence with Limbal Stem Cell Autograft

Muhammad Sharjeel, Farhan Ali, Irfan Qayyum Malik

*Pak J Ophthalmol 2016, Vol. 32 No. 4*

See end of article for authors affiliations

Correspondence to:  
Irfan Qayyum Malik  
Associate Professor  
Gujranwala Medical College  
E.mail: irfan790@yahoo.com

**Purpose:** To determine the frequency of recurrence of pterygium with limbal stem cells autograft.

**Study Design:** Descriptive, case series study.

**Place and Duration of study:** Department of Ophthalmology, Mayo Hospital Lahore for eight months (1<sup>st</sup> January 2013 till 31<sup>st</sup> August).

**Material and Method:** There were 120 cases aged between 30-60 years of both genders. Included patients had primary Pterygium encroaching cornea up to 2 mm from limbus. Patients with Pseudopterygium, recurrent Pterygium and active ocular infection were excluded. All the selected patients underwent limbal stem cell autograft technique for pterygium treatment and recurrence was noted after 6 months post-operatively.

**Results:** Mean age was  $41.18 \pm 11.03$  years with majority of the patients i.e. 38 (31.67%) were between 41 to 50 years of age. Out of these 120 patients, 79 (65.83%) were male and 41 (34.67%) were females with ratio of 1.9:1. Pterygium recurrence was found in only 06 (5.0%) patients. Therefore the success rate was 95.0%.

**Conclusion:** Limbal stem cells autograft with pterygium excision significantly reduces the recurrence of Pterygium surgery.

**Keywords:** Pterygium, surgical treatment, autografts, recurrence.

Pterygium is a triangular shaped degenerative fibro vascular encroachment of sub conjunctival tissue on to the cornea, and is made up of a cap, head and body and more frequently located on the temporal side rather than nasally. It is one of the common eye diseases of our region<sup>1</sup>. Corneal epithelium is being constantly replaced by healthy cells originating from limbal stem cells. These cells are supposed to resist growth of conjunctival vascular tissue over the cornea. UV light damages stem cells in exposed limbal area resulting in abnormal cells that cannot resist growth of conjunctival vessels. Hence long term exposure to sunlight, especially ultraviolet rays, UV-A and -B (290-400 nm) is considered the main cause<sup>2</sup>. It is also more common in tropical areas where environment is hot, dry, windy and dusty<sup>3</sup>. Elastotic degenerations of sub-

epithelial conjunctiva most frequently occur when we do histopathology<sup>4</sup>. Anti inflammatory drugs and lubricating drops have some important role in reducing the patient discomfort but they don't treat the actual disease. Ablation by YAG laser and smoothening the surface of the cornea by applying excimer laser has been tried but the results are not so favourable<sup>5</sup>.

Indications of surgery are decreased vision, cosmetic problems, muscle damage, inflammation and problems with contact lens wear<sup>6</sup>. Surgical treatment is the treatment of choice if pterygium is progressive in nature<sup>7</sup>. Simple excision (the technique in which sclera is left bared) is sometimes associated with very higher chances of recurrence (up to 80%) that is usually more aggressive than the primary lesion<sup>8</sup>. Previous and current surgical management includes simple excision

with or without Beta irradiation, intra-operative and postoperative mitomycin C<sup>4,9</sup>, 5-FU<sup>9</sup>, amniotic membrane grafting and different maneuvers of conjunctival grafting<sup>3,5,10</sup>. However autologous conjunctival stem cells grafting proved to be the best method, that gave low recurrence rate and as well as high safety<sup>10</sup>. In 1985 Kenyon, first time described conjunctival autograft. They reported that there are relatively minor complications with conjunctival cell grafting. But when you compare conjunctival grafting with bare scleral technique the surgical time is more prolonged. But these disadvantages are out weighted now. Due to lack of sight threatening complications and the relatively low recurrence rate, this procedure gained popularity in many centers. Limbal-conjunctival stem cells grafting with limbus sutures looks to be an effective and safe operation for decreasing the recurrence rate after pterygium excision<sup>11</sup> due to replenishment of normal corneal epithelial cells by the stem cells. In one study (12.9%) recurrence is seen out of 41 patients with limbal conjunctival stem cells autograft for primary pterygia<sup>03</sup> so prevention of pterygium recurrence (87.1%) is significant.

In previous studies pterygium recurrence with limbal conjunctival auto grafting in primary pterygia is as high as 39%<sup>13</sup> (efficacy61%) out of 52 patients to as low as 1.9%<sup>12</sup>(efficacy 98.1%) out of 30 patients so we need to address this variability in results. So to the best of my knowledge no study previously has taken such a larger sample size of limbal stem cells autograft technique in primary pterygia cases specifically to estimate the true efficacy of this technique and correct the variability of previous results.

**MATERIAL AND METHODS**

It was Descriptive, Case Series study. The study was done at Ophthalmology department of Mayo Hospital Lahore. The duration of study was 8 months from January 2013 to August 2013. Patients of both gender with ages between 20 - 60 years having primary pterygium encroaching cornea up to 2 mm from the limbus on slit lamp examination and causing discomfort, visual impairment or cosmetic disfigurement were selected. Patients who were excluded were those having pseudopterygium, active ocular infection and recurrent pterygium.

Approval from the hospital ethical committee was taken for all 120 cases who presented in OPD of Ophthalmology department, Mayo Hospital, Lahore.

Informed consent was taken from each patient meeting the inclusion criteria, explaining to them the purpose and procedure of the study and ensuring the confidentiality of information. Participants were also told that there was no risk of participating in this research. Moreover; early detection of this complication carried a potential benefit of good treatment results. After Informed consent, personal profile of all patients (name, age, sex, and postal address) and eye having pterygium was noted.

Procedure was done under topical anaesthesia. Conjunctiva was dissected away from pterygium, excision of the pterygium mass was done avoiding damage to the medial rectus muscle. Conjunctival limbal stem cell autograft was then taken from superior limbus and stitched on excised area at limbus. All procedures were done by one consultant ophthalmologist. After the procedure, combination of topical steroid antibiotic drops was used and pad was applied for 48 hours. This combination of drops was continued for a month four times a day and then tapered off.

Follow up with slit lamp examination of patients was done at 6 months post-operatively for recurrence of pterygium (fibrovascular re-growth crossing the corneo-scleral limbus by 1.0 mm or more). All data was collected on pre-designed Performa which contained two parts i.e. part one contained patient’s bio-data while part two contained study variables.

**RESULTS**

Age range in this study was from 20 to 60 years with mean age of 41.18 ± 11.03 years. Majority of the patients i.e. 38 (31.67%) were between 41 to 50 years of age as shown in Table I.

**Table 1:** % age of participants according to Age distribution (n=120).

Age (in Years)	No. of Patients n (%)
20 - 30	23 (19.17)
31 - 40	35 (29.17)
41 - 50	38 (31.67)
51 - 60	24 (20.0)
Total	120 (100.0)

Mean ± SD = 41.18 ± 11.03 years

Out of these 120 patients, 79 (65.83%) were male and 41 (34.67%) were females with ratio of 1.9:1 respectively (Figure 4).

All the selected patients then underwent limbal stem cell autograft technique for pterygium treatment and recurrence was noted after 6 months post-operatively.

The results show pterygium recurrence in 06 (5.0%) while 114 (95.0%) patients had no recurrence as shown in figure 1. Stratification of age groups and gender is shown in Table 2 and 3 respectively which show no significant difference in pterygium recurrence with respect to age of patients and gender.

**Table 2:** Stratification of patients with respect to age (n=120).

Age (in years)	Frequency	Pterygium Recurrence		P-value
		Yes n (%)	Yes n (%)	
20 - 30	23	00 (0.0)	23 (100.0)	0.582
31 - 40	35	02 (6.06)	33 (93.94)	
41 - 50	38	03 (7.89)	35 (92.11)	
51 - 60	24	01 (4.17)	23 (95.83)	

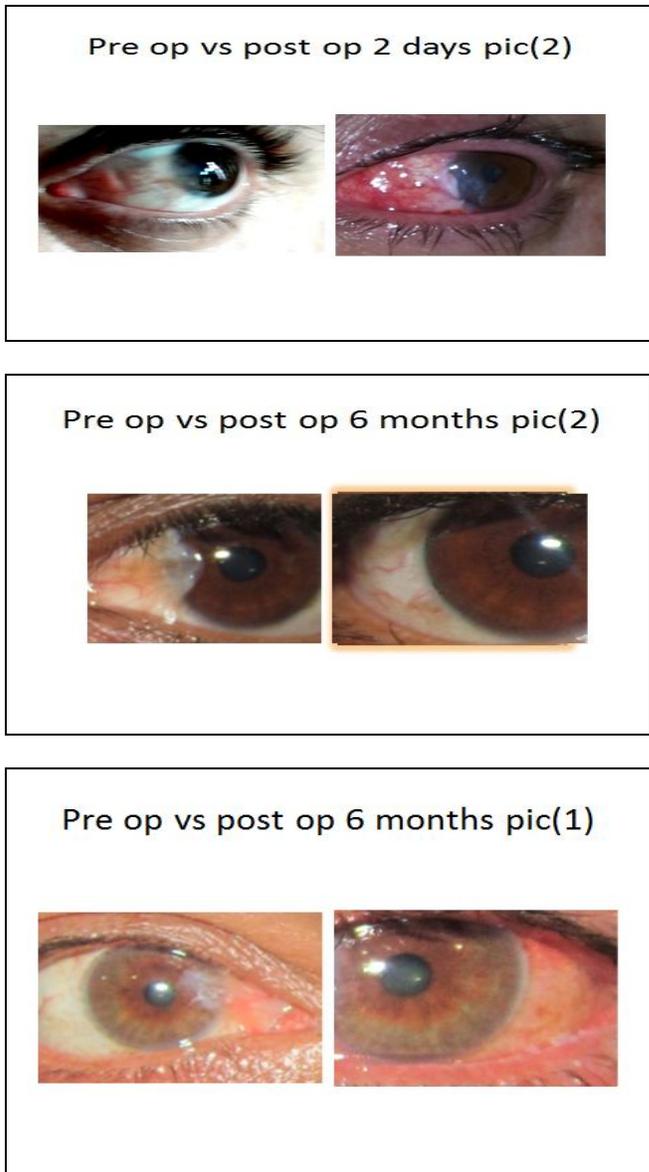
**Table 3:** Stratification of gender with respect to Pterygium recurrence.

Gender	Frequency	Pterygium Recurrence		P-value
		Yes n (%)	Yes n (%)	
Male	79	04 (5.06)	75 (94.94)	
Female	41	02 (4.88)	39 (95.12)	

**DISCUSSION**

Pterygium in the conjunctiva is characterized by elastotic degeneration of collagen (actinic elastosis) and fibrovascular proliferation. It has an advancing portion called the head of the pterygium, which is connected to the main body of the pterygium by the neck. Sometimes a line of iron deposition can be seen adjacent to the head of the pterygium called Stocker's line. The location of the line can give an indication of the pattern of growth. The exact cause is unknown but

seems to be due to limbal stem cells damage that resist the conjunctival growth onto the cornea, but pterygium do occur with increased exposure to wind, ultraviolet light, or sand<sup>14</sup>.



**Figure 1:** Post op pictures.

It causes chronic irritative symptoms, cosmetic complaints and decreased vision as the pterygium encroaches the visual axis or induces astigmatism. Indications of intervention include interference with vision, looking bad, motility problem, recurrent inflammation and hindrance with contact lens wear. Although the diagnosis of pterygium has been

extremely easy, it remains an unresolved disease with unsatisfactory outcomes and frequent recurrences.<sup>15</sup> Different options available are bare sclera excision with or without the use of adjuncts like beta irradiation, thiotepa eye drops, intra-operative or post operative mitomycin-C (MMC) or anti neoplastic agents, amniotic membrane transplantation, conjunctival autograft with or without limbus stem cells have been described<sup>16</sup>.

Despite these innovative procedures, recurrence continues to be a complication. Reported rates of recurrence range from 2% for excision with CAG to 89% for bare sclera excision. In recent two years, 2 surgical techniques have become increasingly accepted as methods likely to prevent pterygium recurrence, namely Mitomycin C application and conjunctival autograft transplantation<sup>17</sup>. Conjunctival auto-grafting is a surgical technique that is effective and safe procedure for pterygium removal. When the pterygium is removed, the tissue that covers the sclera known as the conjunctiva is also extracted. Auto-grafting replaces the bare sclera with conjunctival tissue that is surgically removed from the temporal healthy conjunctiva. That "self-tissue" is then transplanted to the bare sclera and is fixated using sutures, tissue adhesive, or glue adhesive<sup>18</sup>.

It has been suggested that limbal stem cells in the conjunctiva of the autograft may act as a barrier to conjunctival cells migration onto the corneal surface and helps in preventing the recurrence. The limbal conjunctival graft includes approximately 0.5 mm of the limbus and peripheral cornea. The limbal side of the conjunctival autograft is sutured with interrupted 10/0 nylon sutures, and the conjunctival side is sutured with absorbable sutures. The recurrence rates after limbal conjunctival autograft surgery (ranging from 0 to 15%) are almost identical to the conjunctival autograft surgery<sup>19-21</sup>, while some authors suggest that limbal conjunctival autografts are more effective than conjunctival autografts in preventing the recurrence of pterygium.

This study was conducted to determine the frequency of recurrence of pterygium with limbal stem cells autograft. The mean age of patients in our study was  $41.18 \pm 11.03$  years with majority of the patients i.e. 51.67% were above 40 years of age which was very much comparable to studies of Salagar KM et al and Rao SK et al who had a mean age of 41 and 42 years respectively with majority of patients were above 40 years of age. Similarly, Mejia LF et al<sup>22</sup> in his study had found mean age of 42 years in Pterygium patients. On

the other hand, Ahmed I et al<sup>23</sup> and Saleem MI et al had found mean age of 55 and 60 years in their studies respectively which is much larger compared to our study. But the mean age reported by Al-Fayez MF et al<sup>24</sup> was very low i.e. 33 years, compared to our study. In our study, 79 (65.83%) were male and 41 (34.67%) were females with male to female ratio of 1.9:1. Many previous studies have also shown higher incidence of pterygium in male than female.<sup>2,4,5,8</sup>. While Young AL et al<sup>25</sup> has shown female predominance in his study. This male predominance in our study is confined to the fact that men mostly work outside and are exposed to dust and environmental hazards more than women.

Our study showed the Pterygium recurrence in 06 (5.0%) while 114 (95.0%) patients have shown no recurrence after limbal stem cell autograft technique for pterygium treatment. This is a little lower to the results observed by Rasool AU et al<sup>7</sup> i.e. 10.0%. There are also many clinic based studies on limbal stem cell autograft technique for pterygium treatment which have shown almost higher recurrence rates to our study i.e. Kralj P et al<sup>26</sup> reported 11.11%, while Rao SK et al have reported lower recurrence rate i.e. 4.7% and 3.8% respectively.

Patel D et al and Shimazaki J *et al* in their studies reported pterygium recurrence in 7.4% and 7% patients respectively after limbal stem cell autograft technique for pterygium treatment. Gris O *et al* used a similar technique closer to the one used in our study in 7 patients with recurrent pterygium. They reported no recurrence or significant complications. Young AL et al<sup>12</sup> compared mitomycin C and limbal conjunctival autograft surgery in preventing pterygium recurrence, and they showed that the mitomycin C patients were associated with a higher recurrence rate (15.9%) as compared to limbal conjunctival autograft patients (1.9%). In one study (12.9%) recurrence is seen out of 41 patients with limbal conjunctival stem cells autograft for primary pterygia<sup>4</sup> so prevention of pterygium recurrence (87.1%) is significant.

In one study by Chen PP et al<sup>13</sup> pterygium recurrence with limbal conjunctival autografting in primary pterygia is as high as 39% that is much higher as compared to our study. This high recurrence rate was also found in the study by Simona et al that reported recurrence rate of 35%. Salagar KM et al reported recurrence in 6.38% eyes after 3-4 months post-operatively. In a prospective, randomized study, Al-Fayez MF et al found limbal conjunctival autograft transplantation more effective than conjunctival

autograft alone in prevention of recurrence after pterygium excision and has found no recurrence after the limbal-conjunctival autograft.

Many other authors have shown variable recurrence rates after limbal-conjunctival autograft transplantation for Pterygium. In a long-term study, Pulte P et al found recurrences in 2.86% patients who underwent limbal-conjunctival autograft transplantation. In a group of 41 cases of recurrent pterygia, Mutlu FM et al reported a 14.6% recurrence rate with a minimum follow-up of 15 months. DekarisI et al in his study recorded no pterygium recurrence in 90.90% patients and only 9.1% showed recurrence after follow up of 5 months. Mejia LF et al<sup>22</sup> has shown this rate as 1.8%.

Rasool AU et al<sup>7</sup> in his study found a positive association of age with recurrence of pterygium. He concluded that youth is associated with increasing risk of recurrence and as the person gets older, the recurrences decrease. This contradicts findings of our study in which we have found no statistically significant difference in Pterygium recurrence between different age groups and gender. On the whole, it was concluded that frequency of recurrence of pterygium with limbal stem cells autograft is very low and have no association with age and gender.

## CONCLUSION

The frequency of recurrence of pterygium with limbal stem cells autograft technique is very low i.e. 5.0%. So, we recommend that limbal stem cells autograft technique should be performed as a main surgical option in every patient with pterygium for the prevention of its recurrence after surgery to reduce the morbidity of patients.

### Author's Affiliation

Dr. Muhammad Sharjeel  
Mayo Hospital Lahore

Dr. Farhan Ali  
Mayo Hospital Lahore

Dr. Irfan Qayyum Malik  
Associate Professor  
Gujranwala Medical College

### Role of Authors

Dr. Muhammad Sharjeel  
Main Author

Dr. Farhan Ali  
Helped in data collection

Dr. Irfan Qayyum Malik  
Helped in writing manuscript

## REFERENCES

1. **Asokan R, Venkatasubbu RS, Velmuri L, Lingam V, George R.** Prevalence and associated factors for pterygium and pinguecula in a south Indian population. *Ophthalmic Physio Op* 2012; 32:39-44.
2. **Khan N, Ahmad M, Baseer A, Kundi NA.** To compare the recurrence rate of pterygium excision with bare-sclera, free conjunctival autograft and amniotic membrane grafts. *Pak J of Ophthal* 2010; 26: 138-142.
3. **Mohammad S, Khan S, Ahmad H, Shah Z.** Comparison of frequency of recurrence after surgery for primary pterygium using free conjunctival autograft transplantation and bare sclera technique. *Ophthalmology Update.* 2013; 11: 34-9.
4. **Hussain Z, Rehman HU, Bilal M.** Comparison of preoperative injection vs intraoperative application of mitomycin c in recurrent pterygium. *Ophthalmology Update.* 2013; 11: 21-4.
5. **Narsani AK, Jatoi SM, Khanzada MA, Dabir SA, Gul S.** Recurrence of Pterygium with Conjunctival Autograft Versus Mitomycin C. *Pak J of Ophthal* 2008; 24: 29-33.
6. **Sadiq MN, Arif AS, Jaffar S, Bhatia J.** Use of Supero-Temporal Free Conjunctivo-Limbal Autograft in the Surgical Management of Pterygium. *J Ayub Med Coll Abbottabad* 2009; 21.
7. **Rasool AU, Ahmed CN, Khan AA.** Recurrence of Pterygium in Patients Having Conjunctival Autograft and Bare Sclera Surgery. *ANNALS.* 2010; 16: 242-6.
8. **Kanski JJ, Bowling B.** *Clinical Ophthalmology - A systemic approach* 7<sup>th</sup> ed. Philadelphia Butterworth Heinemann; 2011; 5: 163.
9. **Rahman L, Baig MA, Islam Q.** Prevention of pterygium recurrence by using intra-operative 5-fluorouracil, *Pakistan Armed Forces Medical J.* 2008; 1.
10. **Ozer A, Yildirim N, Erol N, Yurdakul S.** Long-term results of bare sclera, limbal-conjunctival autograft and amniotic membrane graft techniques in primary pterygium excisions. *Ophthalmologica.* 2009; 223: 269-73.
11. **Han SB, Hyon JY, Hwang JM, Wee WR.** Efficacy and safety of limbal-conjunctival autografting with limbal fixation sutures after pterygium excision. *Ophthalmologica.* 2012; 227: 210-4.
12. **Young AL, Leung GYS, Wong AKK, Cheng LL, Lam DSC.** A randomized trial comparing 0.02% mmc and limbal conjunctival autograft after excision of primary pterygium. *British J of Ophthal* 2004; 88: 995-7.
13. **Chen PP, Ariyasu RG, Kaza V, LaBree LD, McDonned PJ.** A randomized trial comparing mitomycin C and conjunctival autograft after excision of primary pterygium. *Am J Ophthal* 1995; 120: 151-60.

14. **Luthra R, Nemesure BB, Wu SY, Xie SH, Leske MC.** Barbados Eye Studies Group. Frequency and risk factors for pterygium in the Barbados Eye Study. *Arch Ophthalmol.* 2001; 119: 1827-32.
15. **King JH.** The Pterygium. *Arch Ophthal.* 44:854:1950.
16. **Hirst LW.** The treatment of Pterygium. *Surv. Ophthalmology* 2003; 45: 145-80.
17. **Gifford H.** Treatment of recurrent Pterygium. *Ophthal. Soc. Rec.* 1909; 18: 1.
18. **Rao SK, Lekha T, Mukesh BN, Sitalakshmi G, Padmanabhan P.** Conjunctival limbal autografts for primary and recurrent pterygia: technique and results. *Indian J Ophthalmol.* 1998; 46: 203-9.
19. **Frau E, Labetoulle M, Lautier-Frau M.** Corneo-conjunctival autograft transplantation for pterygium surgery. *Acta Ophthalmol Scand.* 2004; 82: 59-63.
20. **Du Z, Jiang D, Nie A.** Limbal epithelial autograft transplantation in treatment of pterygium. *Chin J Ophth.* 2002; 38: 351-4.
21. **Al-Fayez MF.** Limbal versus conjunctival autograft transplantation for advanced and recurrent pterygium. *Ophthalmology* 2002; 109: 1752-55.
22. **Mejia LF, Sanchez JG, Escobar H.** Management of Primary Pterygia Using Free Conjunctival and Limbal-Conjunctival Autografts without Antimetabolites. *Cornea.* 2005; 24: 972-5.
23. **Ahmed I, Ahmed M, Ahmed W.** Comparison of Limbal Conjunctival Autograft with Conventional Bare Sclera Technique in the Prevention of Recurrence of Pterygium. *Pak J Med Health Sci.* 2012; 6 (3): 629-31.
24. **Al-Fayez MF.** Limbal versus conjunctival autograft transplantation for advanced and recurrent pterygium. *Ophthalmol.* 2002; 109: 1752-55.
25. **Young AL, Leung GY, Wong AK.** A randomized trial comparing 0.02% mitomycin C and limbal conjunctival autograft after excision of primary pterygium. *Br J Ophthalmol.* 2004; 88: 995-7.
26. **Kralj P, Ivekovic R, Novak- Laus K, Mandic Z.** Efficacy of limbal stem cell transplantation in the treatment of recurrent pterygium. *Acta Clin Croat.* 2008; 47 (suppl. 1): 35-7.