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Role of Conjunctival Limbal Autograft in Prevention of Pterygium Recurrence

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Abstract: ***Aim of the study was to evaluate the efficacy of conjunctival limbal autograft (CLAU) in preventing recurrence after excision of primary pterygium. Fifty eyes of 50 patients with grade 1 to 3 primary pterygium, who underwent pterygium excision with conjunctival limbal autografting at the Lions Eye Hospital, Ratnagiri, Maharashtra, between February 2025 and January 2026, were analysed. Surgery was performed under peribulbar anaesthesia, and a superotemporal conjunctival limbal graft, larger than the bare scleral bed, was sutured with the limbal edge adjacent to the cornea. Patients received topical antibiotics and tapering fluorometholone and were followed up for 12 to 24 months for recurrence and postoperative complications. Out of the 50 patients, 32 were male and 18 were female, and most were aged 40 to 60 years. Grade 1, 2 and 3 pterygium were present in 10, 15 and 25 eyes, respectively. Recurrence occurred in only two eyes (4%), while the remaining 48 eyes (96%) remained free of recurrence. No tenon granuloma, cyst, symblepharon or restriction of ocular motility was observed. So concluded that conjunctival limbal autograft is a safe, effective technique and the surgery of choice for preventing pterygium recurrence, although it is delicate and time-consuming.***

Keywords: Pterygium; Conjunctival limbal autograft; Limbal stem cells; Recurrence; Kenyon technique

1. Introduction

1.1 Definition

Pterygium, also known as surfer's eye, takes its name from the Greek word pterygios, meaning "wing". It is a wing-shaped fold of conjunctiva that encroaches upon the cornea from either side within the interpalpebral fissure.[1]

1.2 Etiology

Pterygium develops in response to prolonged exposure to sunlight, dry heat, high wind and dust, of which ultraviolet-B (UV-B) radiation is the most important. Outdoor occupations increase the risk of developing pterygium, whereas the use of protective glasses reduces it.[2]

1.3 Pathology

Ultraviolet radiation produces proliferative changes and elastotic degeneration of the subconjunctival tissue, with overexpression of p53 and damage chiefly to Bowman's layer. The central pathology is damage to the limbal stem cells, which normally act as a barrier that prevents the conjunctiva from growing onto the cornea; their failure permits conjunctival invasion.[3,4] Heparin-binding epidermal growth factor-like growth factor (HB-EGF) has also been implicated in its pathogenesis.[5]

1.4 Histology

The subepithelial tissue shows basophilic degeneration. A characteristic feature of pterygium cells is positive immunohistochemical staining for several matrix metalloproteinases, which is absent in normal conjunctiva.

1.5 Clinical features

Pterygium is commonest in elderly men who work outdoors, and the nasal side is more frequently involved. The main symptoms are foreign body sensation, cosmetic concerns and reduced vision due to induced astigmatism. The lesion appears as a triangular fold of conjunctiva extending onto the cornea within the palpebral aperture and has a head, neck, body and tail. It may be progressive or regressive, and complications include infection, cystic degeneration and neoplastic change.

1.6 Treatment

Surgery is the treatment of choice, with indications that include cosmetic, defective vision and diplopia. Recurrence after surgery, reported in 30–50% of cases, remains the main problem. Various methods have been used to prevent it, including excision with amniotic membrane grafting,[6] excision with topical mitomycin C (0.02%),[7] excision with conjunctival limbal autografting (CLAU),[8,9] excision with lamellar keratectomy, and the McReynolds technique of transplanting the pterygium into the lower fornix combined with beta irradiation. Complications associated with these adjuncts include corneal perforation, uveitis, scleral necrosis, cataract and glaucoma.[10,11]

CLAU, introduced by Kenyon,[8] is the most recent and effective method and is now the treatment of choice, although it is more time-consuming. Recurrences tend to occur early; about 50% occur within the first 3–4 months and 97% within 12 months of surgery.[12] CLAU is effective because limbal stem cells play an important role in the development of pterygium, and the transplanted limbal tissue acts as a barrier against conjunctival overgrowth onto the cornea.[13]

The aim of this study was to report the efficacy of limbal stem cells and conjunctival limbal autograft in the management of primary pterygium.

2. Materials and Methods

This prospective cohort study was conducted at the Lions Eye Hospital, Ratnagiri, Maharashtra. Case records of 50 patients (50 eyes) who underwent pterygium excision with conjunctival limbal autografting between February 2025 and January 2026 were analysed for recurrence and complications

during a follow-up period of 12–24 months. Written informed consent was obtained from all patients.

The pterygia were graded from 1 to 3 according to corneal involvement:[1] 10 patients had grade 1, 15 had grade 2 and 25 had grade 3 disease. Most patients were between 40 and 60 years of age and most had occupations with high sun exposure. There were 32 males and 18 females (Table 1).

2.1 Surgical Procedure

All operations were performed under peribulbar block using 2% lignocaine and 0.5% bupivacaine. The pterygium was excised starting from the head and proceeding to the body and tail, and superficial keratectomy was performed to clear the cornea over the area covered by the head. The area of bare sclera was measured. A superotemporal conjunctival limbal graft, with no or minimal Tenon's capsule and 0.5 mm larger than the recipient bed, was harvested from the same eye. The graft was placed on the recipient bed so that its limbal stem cells layer adjacent to the cornea and was secured with 8-0 vicryl sutures. Postoperatively, patients received antibiotic and fluorometholone eye drops in a tapering dose schedule and were followed up for recurrence and complications.

3. Results

During follow-up, recurrence of pterygium was noted in 2 of the 50 eyes (4%). The remaining 48 eyes (96%) remained free of recurrence. No other complications, such as Tenon's granuloma, cyst, symblepharon or disturbance of ocular motility, were seen. The characteristics of the patients and outcomes are summarised in Table 1.

Table 1: Patient characteristics and outcomes (N = 50)

Characteristic	N	%
Total patients (eyes)	50	100
Male	32	64
Female	18	36
Grade 1 pterygium	10	20
Grade 2 pterygium	15	30
Grade 3 pterygium	25	50
Recurrence	2	4
No recurrence	48	96

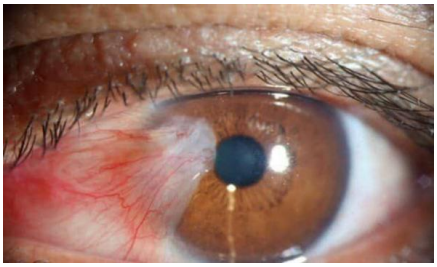


Figure 1: Pre-operative

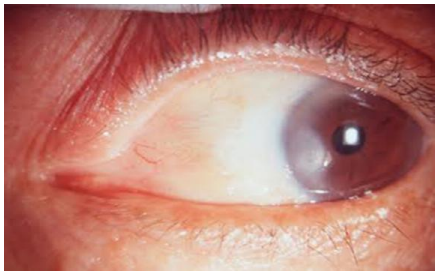


Figure 2: Post-operative

4. Discussion

This study included 50 patients with pterygium treated surgically with conjunctival limbal stem cell autograft. During a follow-up of 12–24 months, 96% of cases were treated successfully without recurrence or any serious complications, and only 4% showed recurrence.

Many procedures exist for the treatment of pterygium, but the ideal technique is one that prevents recurrence without causing complications. At present, pterygium excision with conjunctival limbal autografting as described by Kenyon is the most commonly used procedure with the lowest recurrence.[8] It lowers recurrence compared with other methods such as mitomycin C or beta irradiation, although recurrence remains possible in patients with high ultraviolet exposure.[14] Because of the role of the limbus and its stem cells in the pathogenesis of pterygium, conjunctival limbal stem cell autografting was developed; in this procedure a small portion of limbus is included with the conjunctival autograft without added complications.

Complications reported with conjunctival autografts include tenon's granuloma, graft oedema, limbal dellen, epithelial cyst and graft necrosis.[15] Shimazaki et al. reported a recurrence rate of 7.4% with limbal autograft,[16] and Gris et al. reported no recurrence or complications in 7 patients.[17] Fallah et al. compared two groups after pterygium excision: group 1 underwent conjunctival limbal autograft with amniotic membrane transplant and group 2 underwent mitomycin C with amniotic membrane transplant. No recurrence occurred in group 1, whereas group 2 had a 20% recurrence rate.[18]

The recurrence rate of 4% in our study is among the lowest reported. This may be due to proper placement of the graft in an avascular bed, a thin graft with minimal Tenon's tissue, and the inclusion of limbal stem cells.

5. Conclusion

Conjunctival limbal stem cell autografting is a fine and time-consuming procedure, but it is safe and effective in the management of pterygium, particularly in preventing recurrence. It is the surgery of choice for prevention of pterygium recurrence.

Source of Support
Nil.

Conflict of Interest
None.

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