



Is Collagen Matrix Implantation Better Than Freshly Harvested Amniotic Membrane Transplantation Following Pterygium Excision?

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ABSTRACT

Aim: A study was conducted to compare the effect of collagen matrix implant surgery with freshly harvested amniotic membrane transplant following excision of primary Pterygium.

Method: 60 cases (48 males and 12 females, aged 22-54 years) were randomly allocated into two equal groups. Pterygia of all patients were excised using peel off technique followed by bare sclera which was covered up with collagen matrix implant or freshly harvested amniotic membrane graft held in position with sutures. Patients were followed up monthly for six months for complications.

Results and conclusion: study revealed that there is no significant difference in efficacy of the two techniques; recurrence was noted in 1 case in both groups.

KEYWORDS :

INTRODUCTION

Pterygium or Surfer's Eye is a common ocular disorder with prevalence rates ranging from 0.3 to 29% across the world. Studies propose an association with chronic exposure to UV band of light and an increased geographical prevalence within peri-equatorial 'pterygium belt' region (1). While there is currently no universal consensus for grading of pterygium, one of the current methods has graded pterygia as follows: stage 0: pinguecula posterior to the limbus; stage 1: pterygium restricted to the limbus; stage 2: pterygium marginally invades the cornea; stage 3: pterygium head lies between the limbus and pupillary margin; and stage 4: the pterygium is central to the pupillary margin (2).

Indications for surgical intervention include tear instability, occlusion of visual axis, discomfort, irritation unresponsive to conservative therapy, restricted ocular motility, anticipated keratorefractive or intra-ocular surgery and aesthetic (3).

Treatment of pterygium is excision combined with various adjunctive measures to prevent its recurrence (1), by countering fibrovascular activity; these include, β -irradiation, conjunctival and limbal auto-grafting, antimetabolic drugs like mitomycin C and amniotic membrane transplantation (4).

Recently, biodegradable collagen matrix implants have been introduced. It promotes regenerative and non-scarring wound healing by acting as porous scaffold. It also stimulates random growth of fibroblasts, thereby leading to normal wound healing. (5,6).

On other hand, human amniotic membrane has been advocated for the management of many ocular surface disorders, such as persistent corneal epithelial defects, ocular surface reconstruction for conjunctival neoplasms or scarring, chemical or thermal burns, advanced ocular cicatricial pemphigoid, Stevens-Johnson syndrome, corneal scarring following excimer laser photoablation, prevention of trabeculectomy failure, and coverage of conjunctival defects after pterygium excision.(7)

We performed this study to compare the efficacy of collagen matrix implant surgery with freshly harvested amniotic membrane transplant following excision of primary Pterygium.

METHOD

This prospective study was performed at a centre located in northern India with catchment of cases from perennially snow capped areas. We studied 60 eyes (48 males and 12 females, aged 22-54 years) randomly allocated into two equal groups. Group A underwent pterygium excision followed by collagen matrix implant, whereas Group B underwent freshly harvested amniotic membrane graft following Pterygium excision. Patients were included, if they had pterygium in stage 3 and above with either symptoms or aesthetic issues. Cases with history of ocular surgery including pterygium removal, presence of symblepharon, evidence of systemic diseases (e.g. diabetes, AIDS, hepatitis, etc.), past history of atopy and hypersensitivity, or traumatic injury to the anterior segment of the eye leading to surgical repair were excluded from the study.

All patients were administered peribulbar anaesthesia with Inj. Lignocaine 2% and Inj Bupivacaine 0.5%. The pterygium was peeled off cornea, separated from overlying conjunctiva and was excised with a pair of conjunctival scissors keeping the sclera, bare. The rent so formed was patched up either with freshly harvested amniotic membrane (maternal surface opposed to the globe) or collagen matrix implant held in position with 10-0 monofilament ethilon sutures, as the group may be. The eyes were patched for twenty-four hours under antibiotic cover and were administered with topical antibiotic steroid eye drops postoperatively. Cases were followed up monthly, for six months for complications.

Follow-up evaluation was done on the first day, one week, one month, three month and six month, postoperatively. Symptoms like pain, redness, itching, foreign body sensation and watering were enquired. Complications like dellen and pyogenic granuloma were looked for. Recurrence was defined as 1.0 mm or more re-growth of the conjunctival fibrovascular tissue toward the cornea in both vertical and horizontal diameters during the follow-up time and in such cases, its size was calculated from advancing edge in mm (6). Absence of recurrence and/or complications was considered as indicating the efficacy or safety of the procedure.

RESULTS

60 cases (48 males and 12 females) with primary pterygia with mean age of 32.4 (range: 22-62) years underwent surgery. 72% patients (n=43) were either located or in a profession with possibility of actinic

damage in high altitude sun. Preoperative refractive errors consisted of spherical component from -1.75 to +2.75 D (mean of +1.5 D) and cylindrical component from -0.50 to +3.50 (mean of -0.5 D). The extent of pterygium invasion beyond the limbus ranged from 3 to 6 mm (mean 3.9mm).

Preoperatively, best-corrected visual acuity for most patients in both groups was between 6/6 to 6/18 (0-0.4 logMAR). Improvement in visual acuity by two lines on Snellen's chart was noted following glass correction in 12 patients, visual improvement was less than 2 lines in 28 patients. No significant improvement with glass correction was seen in remaining cases. On the first postoperative day, all patients in both groups had corneal epithelial defects. By one week, all epithelial defects healed completely and there was no conjunctival staining with fluorescein. None of the patients had any significant change in

intraocular pressure any time during the follow-up period.

In the collagen matrix group (Gp A) one patient developed mild symptoms of recurrent inflammation, tearing, and foreign body sensation at the first month and had frank recurrence by the end of third month. In amniotic membrane group (Gp B) only two patients (6.66%) mentioned symptoms more prominently in the third month following surgery with recurrence of pterygium in one case (3.33%). Both underwent repetition of surgery and were advised to be evacuated from snow capped region. They did not show any further recurrence. (Table)

Trace anterior chamber reaction was seen in one (3.33%) patient on the first postoperative examination in Gp B. None showed dellen formation.

Table: Postoperative follow up (Figures mentioned are number of cases)

Symptoms/ Signs	Collagen matrix implant (Group A)					Amniotic Membrane transplant (Group B)				
	1 day	1 week	1 month	3 month	6 month	1 day	1 week	1 month	3 month	6 month
Pain	30	6	1	1	-	30	4	2	1	-
Photophobia	30	-	-	-	-	30	-	-	-	-
Watering	30	7	1	1	-	30	4	2	1	-
Redness	30	22	1	1	-	30	24	2	1	-
Foreign body sensation	30	13	1	1	-	30	12	2	1	-
Epithelial defect	30	-	-	-	-	30	-	-	-	-
Anterior chamber flare	-	-	-	-	-	1	-	-	-	-
Recurrence	-	-	1	1	-	-	-	1	1	-

DISCUSSION

Pterygium is a common multifactorial degenerative conjunctival disorders, especially evident in regions with high ultraviolet exposure and a dry climate (4,8).

Despite the introduction of several techniques for treatment of pterygium, recurrence is still an ophthalmologic challenge. Most ophthalmologists define pterygium recurrence as regrowth of fibrovascular pterygium-like tissue crossing the limbus on to the cornea, fibrovascular recurrence to the same degree of corneal encroachment as the original lesion, or regrowth exceeding 1 mm onto the cornea (1). There are many options for wound closure after pterygium removal such as simple closure, rotational or sliding flap, free flap, auto-graft, amniotic membrane transplant, collagen matrix implant and/or limbal transplantation (8-11).

In a non-randomized trial, Madrazo et al. deliberated the efficacy of a biodegradable collagen matrix implant following pterygium excision on 20 eyes, and followed up the patients for at least 3 months. They reported a pterygium recurrence rate of 5% without any complications or adverse effects (12).

Nakamura et al reported that amniotic membrane demonstrates excellent biocompatibility on the human ocular surface (13). Amniotic membrane, natural basement membrane contains various matrix proteins which facilitate the adhesion, migration and differentiation of epithelial cells and prevent their apoptosis. Amniotic membrane transplantation is believed to inhibit recurrence of pterygia by promotion of conjunctival epithelial wound healing, suppression of fibroblasts and reduced extracellular matrix production (14). The recurrence rate after amniotic membrane transplantation (AMT) was initially reported to be 10.9% for primary pterygia (15).

CONCLUSION

We compared the effects of implantation of a collagen matrix with amniotic membrane, respectively following pterygium removal by the bare sclera method and found no difference in the recurrence rate of the two groups.

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