



A STUDY OF PTERYGIUM EXCISION WITH AMNIOTIC MEMBRANE TRANSPLANTATION

KEYWORDS

Pterygium, ultraviolet light, cosmesis, bare sclera, amniotic membrane transplantation, conjunctival auto graft, recurrence, efficacy, complications.

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ABSTRACT

Background: Pterygium is a common disorder seen in rural population of India. Occurrence of pterygium is due to dry and sunny climates with occupational exposure to ultraviolet radiation. The major problem in the management of pterygium is its recurrence. The various treatment modalities available now are associated with variable recurrence rates. The main purpose of our study is to analyze the results of pterygium excision with amniotic membrane transplantation in terms of recurrence and other common complications in rural population in Kurnool district.

Objective : To study the recurrence and complications like refection of graft ,thinning of sclera and loss of graft after excision of pterygium with amniotic membrane transplantation.

Methods: Our current study is a hospital based cross sectional study conducted in Regional Eye Hospital, Kurnool from June 2015 to June 2016. All the patients with pterygium who came to the outpatient department during the study period underwent pterygium excision with amniotic membrane transplantation. The number of patients who were operated by this procedure came out to be 60. A written and informed consent was taken from all the patients. After routine ocular examination and screening for comorbid diseases all the patients underwent surgical excision of pterygium with transplantation of amniotic membrane onto bare sclera. Patients were followed for 6months to 1year and the results were evaluated in terms of graft loss, need for repeat grafting, thinning of sclera, reaction and recurrence.

Results: 120patients including 72 males and 48 female patients with mean age of 41 ± 10.5 years were operated. Out of these 120 patients only 4 patients had recurrent pterygium till now. 2patients developed trace AC reaction. 6 patients needed repeat grafting. 6 eyes showed scleral thinning due to prolonged use of steroids. Only 2 patients had graft loss in the immediate postoperative period.

Conclusion: Our study showed that amniotic membrane transplantation is a safe and effective surgical procedure for patients with primary pterygium with lesser postoperative complications.

INTRODUCTION:

Pterygium (meaning 'a wing') is a triangular encroachment of the vascularized granulation tissue covered by conjunctiva in the interpalpebral area¹. It is a degenerative condition of the subconjunctival tissues which proliferates as a vascularized granulation tissue encroaching upon the cornea destroying the superficial layers of the stroma and Bowman's membrane. The condition is common in dry and sunny climates with sandy soils. Ultraviolet light is probably an etiological factor. Pterygium consists of a head, a cap towards the advancing edge and the body. Head is the active part of the pterygium which brings about changes in the cornea anterior to it, forming the cap and activates the subconjunctival connective tissue behind it forming the body. It is always raised from the corneal surface to varying extents presenting appearances ranging from fibrous, flat and avascular to the fleshy gelatinous type. Owing to the large fibrous tissue content, the head is always firmly adherent to the underlying cornea. The body is the part limbal to the head, which assumes the characteristic wing shape. It lies mainly over the sclera. The cap is the apex of the pterygium anterior to the head. It usually extends much anterior to the head of the pterygium and is usually avascular. The apex of the cap is bounded by a line either smooth or dentate, while beyond the margin may be seen peripheral extensions of the cap in the form of grey-white dots, the 'ilots de fuchs'. The iron pigment line called the stocker's line is seen at the advancing edge of the pterygium. This is due to the presence of lactoferrin in the tears. Irritation and grittiness are caused by a dellen at the advancing edge due to interference with the pre corneal tear film. Vision becomes impaired due to induced astigmatism with the effect of corneal flattening in the axis of the pterygium or progression into the pupillary area of the cornea. There may be intermittent inflammation similar to pingueculitis. Cosmesis may be a significant problem. Indications for surgical treatment are progressive pterygia encroaching pupillary area or causing excessive astigmatism, restriction of ocular motility and marked cosmetic deformity. Recurrence is a common problem after pterygium excision. Various modalities to prevent recurrence are application of anti-metabolites, beta irradiation, conjunctival autografting and amniotic membrane graft. The purpose of the present study is to analyze the results of pterygium excision with amniotic membrane transplantation.

METHODS:

The present study was conducted in Regional Eye Hospital, Kurnool from June 2015 to June 2016. The study is a hospital based cross sectional study which included 120 eyes of 120 patients presenting to our outpatient department. Patients with primary pterygium extending more than 1mm onto the cornea were included. Patients with pseudo pterygium, elderly patients more than 55years and patients with recurrent pterygium were excluded from the study. A written informed consent was taken from all the patients. Visual acuity testing was done for all patients by using snellen's visual acuity charts. Pre-operative refractive statuses of all patients were noted down to compare later with the postoperative refractive status. Slit lamp bio-microscopy was done to rule out associated ocular surface disorders. Intraocular pressure measurement using schiotz tonometry and lacrimal syringing were done along with routine fundus examination. Blood pressure recording was done and blood sugar levels were checked to rule out hypertension and diabetes respectively. On the next day surgery was planned. Peribulbar anesthesia was given with 2% xylocaine and 0.5% bupivacaine. The eye was painted with betadine and draped with sterile drapes. The head of the pterygium was grasped with a fine-toothed forceps and it is dissected off from the cornea with a crescent blade up to the limbus. The body of the pterygium was dissected and excised using Wescott's scissors. Residual degenerative tissue over the cornea was detached using toothed forceps or by gentle scraping with a #15 surgical blade. Subconjunctival fibrovascular tissues and tenon's capsule were separated from the underlying episcleral tissue and excised extensively upwards and downwards towards the fornices. Caution was taken not to damage the medial rectus while dissecting medially. Bleeding vessels were gently cauterized. The cut ends of the conjunctiva were trimmed to create a rectangular area of bare sclera. Amniotic membrane of required size was cut with a scissors and placed on the bare sclera with the basement membrane side facing up. The graft was sutured to the underlying episcleral tissue using 10-0 polyglactin sutures and the eye was patched. From the first postoperative day moxifloxacin and loteprednol eye drops were administered 6 times a day along with lubricating eye drops. The patients were discharged on 2nd postoperative day and were followed weekly for 2weeks, once in 2weeks for 1month and then monthly for 6months to 1year. Visual acuity testing using snellen's

chart and auto-refractometry were done during every visit. Complications such as graft loss, thinning of sclera, recurrence and development of any corneal opacities were recorded.

RESULTS:

Out of 120 patients who underwent primary pterygium excision with amniotic membrane transplantation only 4 patients (3.3%) showed recurrence in the follow-up period of 6 months to one year. Two patients (1.6%) developed trace anterior chamber reaction. 6 patients (5%) had graft loss in the postoperative period requiring repeat grafting. Scleral thinning was observed in 6 patients (5%) during the follow-up period. Postoperative refraction also improved in almost all patients after surgical excision of pterygium.

Distribution of study population showing complications after 6 months to 1 year:

Complications	Number	Percentage
Recurrent pterygium	4	22.22%
Anterior chamber reaction	2	11.11%
Repeat grafting	6	33.33%
Scleral thinning	6	33.33%

DISCUSSION:

The fact that numerous different techniques exist for the surgical treatment of pterygium underscores the point that no single approach is universally successful. Various techniques originated to prevent recurrences after surgery. Earliest of those techniques is burying the pterygium head underneath the normal conjunctival edge inferiorly or superiorly after surgical dissection of the head from the cornea (Desmarres 1855, McReynolds 1902). Such transplantation procedures have been largely abandoned secondary to high recurrence rates (30-75%) in addition to poor postoperative cosmetic results. Later numerous authors (Scarpa 1811, D'Ombrian 1948) advocated a bare sclera technique in which the resultant scleral and corneal defects would be left to epithelialize postoperatively. It was theorized that a pterygium recurrence would be prevented if the corneal epithelium could heal before the conjunctival epithelium reached the limbus. Unfortunately, controlled studies were not performed to validate the reports. Indeed using a similar bare-sclera technique, Krag and Ehlers reported a pterygium recurrence rate of 91%. Later various surgical strategies for the treatment of pterygium have been developed using the premise that close approximation of healthy conjunctival tissue at the denuded limbus after pterygium excision prevents recurrences. The three basic variations on this theme include excision with primary conjunctival closure, excision with conjunctival flap formation and conjunctival autografts. Primary conjunctival closure is achieved by undermining adjacent normal superior and inferior bulbar conjunctiva and pulling the cut conjunctival edges together to achieve primary conjunctival closure after pterygium excision (Arlt 1850, Arruga 1956). Rotational conjunctival flaps to cover the pterygium excisional site have been employed since 1940's. Beta irradiation from strontium 90 with an average energy of 0.21 MeV per disintegration have been tried to prevent recurrence. Recurrence rates after pterygium excision with beta irradiation have varied widely from 0.8% to as high as 80%. The mechanism of action of beta irradiation in reducing recurrences is through the inhibition of mitosis in rapidly dividing cells such as vascular endothelial cells. The optimal dose is between 1000 and 3000 rad given at the time of surgery or within a few days after surgery. But complications such as scleral necrosis, corneal epithelial defects, radiation induced cataract and iritis have been reported. Later Kunimoto and Mori first used mitomycin C to treat pterygia. Mitomycin C is an antibiotic that was isolated from *Streptomyces caespitosus* by Hata in 1956. 0.4 mg/ml was used 4 times a day for a period of 1-2 weeks. Following reports of complications a low dose of 0.2 mg/ml 2 times daily for 5 days was established with a recurrence rate of 6.9%. Typically, a 5mm×5mm pledget was soaked in solution of 0.25mg/ml mitomycin C and applied to the bare sclera directly for 1-3 minutes. Though it reported low recurrence rates between 5% and 9%, complications like scleral necrosis, severe secondary glaucoma,

corneal edema and perforation, iridocyclitis, cataract and infection prevented the use of mitomycin C as a routine practice in pterygium surgery. Auto-conjunctival graft with limbal stem cells sutured at the limbus to cover the defect produced by excising the pterygium is an effective method to prevent recurrences. Limitations of this method are large double headed pterygia requiring large sized autografts, in previous multiple failed surgeries or in the context of preserving superior bulbar conjunctiva for future glaucoma surgeries. Hence amniotic membrane graft is emerging as an alternative to auto-conjunctival graft in recent times. Nakamura et al² reported that sterilized freeze-dried amniotic membrane demonstrates excellent biocompatibility on the human ocular surface. This biomaterial may be considered as an alternative to conjunctival grafting in the treatment of pterygia. The recurrence rate after amniotic membrane transplantation (AMT) was initially reported to be 10.9% for primary and 37.5% for secondary pterygia, which was much higher than recurrence rates of conjunctival autografts³. These values were reduced to 3% and 9.5% respectively, after modifying the surgical technique⁴, which compared favorably with the results of conjunctival autografts⁵ and were superior to that of the bare sclera technique⁶. In our present study also the recurrence rate is 3.3%. In a study conducted by Arain MA et al Recurrence rate after bare sclera technique was 37.5% and 12.9% with AMT.⁷

CONCLUSION:

The low recurrence rate and favorable safety profile of pterygium excision with AMT in the current study (3.3%) attest to the efficacy of this treatment modality and compare favorably with previous reports on mitomycin-C augmented pterygium excision (between 5 and 9%). With AMT there was faster healing time, lesser complications and acceptable recurrence rate, and believe that amniotic membrane transplantation is an appropriate treatment modality for the surgical management of primary pterygia. This may be particularly advantageous for patients with glaucoma who require intact conjunctiva for future glaucoma procedures.

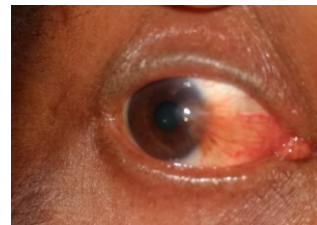


Figure 1 Pterygium encroaching pupil



Figure 2: Bare sclera after pterygium excision



Figure 3: Amniotic membrane graft



Figure 4: Post-operative Day 2



Figure 5: Post-operative 1 month



Figure 6: Recurrence of pterygium



Figure 7: scleral thinning

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