ORIGINAL ARTICLE

Amniotic membrane transplantation after pterygium excision

Nisar Ahmed Siyal, Nargis Ashraf, Sharjeel Sultan, M. Idrees Adhi

Abstract:
Objective: To assess the effectiveness of amniotic membrane transplantation in preventing pterygium recurrence.
Study Design: Interventional quasi-experimental study.
Place and duration of study: Eye unit 1, Civil hospital Karachi.Study was for 2 years from January 2009 to December 2010.
Patients and methods: Sampling Technique: Non-probability purposive sampling. Student's test was used to compare quantitative variables. Local infiltration anaesthesia was given with xylocaine.Head and adjacent portion of pterygium was excised with scissors.Remnants on the corneal surface were shaved off with a blade.Amniotic membrane was cut to the size of the defect and applied with 10/0 vicryl.
Results:amniotic graft was applied in 11 cases of primary pterygium and 7 cases of recurrent pterygium. Recurrence was seen in 2 cases in each group.
Conclusion: Recurrence being seen in 22.22 % patients, amniotic graft is not the preferred method for treating pterygia. Modifications in method of application have brought forward better results.

Keywords: pterygium, primary, recurrent.

Dow University of Health Sciences, Karachi.
NA Siyal
N Ashraf
S Sultan
MI Adhi

Correspondence:
Dr. Nargis Nizam Ashraf, Assistant Professor, Department of Ophthalmology, Dow University of Health Sciences, Baba e Urdu Road Karachi.
Email: nargis.ashraf99@hotmail.com
Telephone No. 03002712875.

Introduction:
Pterygium is a fleshy overgrowth from conjunctiva which extends variably over the cornea [1]. Recurrence is encountered especially in young patients after pterygium excision[1]. To overcome this problem various techniques have been tried out[1].Amongst these are bare sclera, conjunctival autograft, amniotic graft and mitomycin c application[1]. Other indications for pterygium excision include irritation and impaired vision[2].

Many studies were conducted and conjunctival autograft had the lowest rate of recurrence[2]. Amniotic membrane is also popular for pterygium surgery, alone or alongwith conjunctival autograft and MMC [3]. Each of the three target different aspects, MMC being an antimetabolite prevents fibrosis, amniotic membrane covers the denuded defect and the conjunctival autograft promotes epithelialisation[3].

Another factor involved in pterygium recurrence is increased vascularity[4].Amniotic membrane in addition to other substances releases antiangiogenic factors[4]. Recurrence is also promoted due to iatrogenic factors which cause fibrosis and increased vascularity[5].

Amniotic membrane acts as a scaffold for proliferation of limbal epithelial cells[5]. Also it has been found to contain a number of useful substances including collagen types III, IV, V and Vll[6]. Fibronectin, laminin, fibroblasts and growth factors were also detected in it[6]. By virtue of these substances amniotic membrane reduces inflammation and promotes healing [6]. Amongst other properties another very helpful one is that it does not initiate immune response[7]. Infection

rate after surgery is also relatively lower because of its antimicrobial actions[7].

Amniotic graft is preferred over conjunctival autograft in cases of double headed pterygia and large sized pterygiums [8]. This is because of reserves concerning leaving sufficient conjunctiva for trabeculectomy [8]. It is also a source of fetal hyaluronic acid which hampers differentiation of fibroblasts of conjunctiva[9]. Therefore scar tissue formation following pterygium excision is decreased[9].

Recurrence of pterygium may be inhibited by uptake of stem cells by the amniotic membrane[10]. At first fibrosed conjunctiva is excised then amniotic graft is placed over it[11].

By freezing the amniotic membrane for storage , we decrease its possibility of causing any immune reactions[12]. Meticulous preparation of the membrane also precludes transfer of prion and viral diseases[13].

Materials and methods:

It was an interventional quasi experimental study. Non-probability purposive sampling technique was adopted. Students test was used to compare quantitative variables.

Amniotic membrane stored at -80 degrees C was used. It was thawed to room temperature and washed with normal saline. Local infiltration anaesthesia with xylocaine and adrenaline was given into the body of the pterygium. Number 15 blade was used to separate the head of the pterygium from the cornea and underlying conjunctiva. Then separated pterygium was cut, fibrotic tissue was excised and cautery of bleeders was done.

Amniotic graft was applied stromal side down over the defect. 10/0 vicryl was used to apply anchoring sutures initially and then four to five sutures to secure the graft. Post-operatively antibiotic and steroid topical medication was given six hourly for two weeks. Oral analgesic was given for two days. Follow-up was done at day one, then first week, two weeks, one month, then three months and six months.

Results:

There were 14 patients of pterygium. Seven(50%) of these had primary pterygium while seven (50%)presented with recurrent pterygium. On immediate followup no discomfort was complained of by the patient and the eye was quiet.Recurrent pterygium was seen in 6 (42.8%)patients, 3 (21.42%)out of whom were operated for primary pterygium and three (21.42%)others for recurrent pterygium .At 8 weeks recurrence was observed in four (28.57%) patients and it was evident in three months in six (42.85%)patients.

Association between recurrence and invasion of cornea by the pterygium was not found.The extent of encroachment varied being less than 3mm in three (21.42%)patients and more than 3mm. in 3(21.42%) patients.

Association of recurrence was not found with pterygium excision in the past.There was history of pterygium excision in the past in seven patients(50%), being done two times in one (7%)patient.Recurrent pterygium was seen equally in both primary and recurrent pterygia i.e . amongst seven (50%)patients in both cases two (14%)patients had recurrence.

Discussion:

Many techniques have been tried but still a method that definitely prevents pterygium recurrence has not been established yet[1]. After the surgery if steroid drops are not administered properly recurrence has been seen to occur in cases of conjunctival autograft also[1]. In a study reduced inflammation occurred with subconjunctival triamcinolone injections1. Inflammation after surgery, excessive multiplication of conjunctival fibroblasts and increased production of cytokines could contribute to increased rate of recurrence[2].

In this study amniotic graft stored at - 80 degrees C was used to prevent recurrence but a high rate of recurrence was seen.Compared to this better results were seen when amniotic membrane was used in which epithelium was removed[2].The benificial properties remain intact , also freezing at specific temperatures is not required[2].

Time period for recurrence is variable mostly being at 4 to 6 months but it has been seen one year after surgery too[2]. For good results with amniotic graft there is need for proper excision of fibrosis and the semilunar fold[3].Amongst other factors race also affects rate of recurrence[4].In some studies delay in recurrence with amniotic graft has been prolonged for upto a year compared to three months with conjunctival autograft[4]. This is because of the substances released by it and has been called the "barrier effect"[4].

With amniotic grafts recurrence was found to be 10.9% in cases of primary pterygium and 37.5% for secondary cases5.With innovations in surgery it came down to 3% and 9.5% respectively5.According to Ma et al there was no advantage of applying mitomycin C alongwith amniotic membrane, the graft being sufficient on its own[5]. Other benificial properties of amniotic membrane maybe increased proliferation of limbal epithelial cells[5] and decrease in photophobia and discomfort in patients with ocular surface disorders[6]. Also it inhibits fibroblast proliferation and hence scar formation is reduced[7]. Rate of infections after surgery are decreased owing to its antimicrobial properties[7].

The emphasis in pterygium surgery has mostly been on preventing recurrence but lately methods of graft application without sutures are being explored , so that problems associated with sutures can be minimised[8]. Fibrin glue is one such method but it maybe the harbinger of transfer of viral infections such as HIV and hep.b and c or Creutzfeldfeld -Jacob disease[8]. According to Hirst et al it is within one year that regrowth occurs following excision of primary pterygium[8].

Some complications related to amniotic membrane transplantation were also observed after surgery[9]. Hematoma formation was seen in some cases while in some early retraction of the graft necessitated redoing them[9]. Other minor complications seen were infections in 1.6% cases and calcification in 12.8%[9].

It was observed that amniotic graft, if removed about 5 days after surgery has better results than if it is removed a week or later[10]. The reason behind this rationale is that the inflammatory cells get attached to the stroma of amniotic membrane and therefore get removed alongwith the membrane[10].

With improved techniques of procurement of amniotic membrane and its application , better results have been seen as compared to previous studies[13].

Conclusion:

Amniotic grafting is not the preferred method of treatment for pterygium.This is because of the high rates of recurrence that were seen.Innovations in applying the graft are showing improved outcome.

References:

1. Kheirkhah.A, NazariR.,Nidkel M.,et. al.Postoperative conjunctival inflammation after pterygium surgery with amniotic membrane transplantation versus conjunctival autograft. A.J.O.2011,vol. 152, No. 5 733-738.
2. Memarzadeh F., Farid A.K., Shamie N. and Chuck R.S. Comparison of de-epithelialized amniotic membrane transplantation and conjunctival autograft after primary pterygium excision.Eye 2008 22, 107-112.
3. Yao Y.F., Qiu W.Y., Zhang Y.M., Tseng S.C.G. Mitomycin C, amniotic membrane transplantation and limbal conjunctival autograft for treating multirecurrent pterygia with symblepharon and motility restriction. Graefe's Arch Clin exp ophthalmol (2006) 244; 232-236
4. Kucukerdonmez Cem, Akova Y.A., Altinors D.D. Vascularisation is more delayed in amniotic membrane graft than conjunctival autograft after pterygium excision. A.J.O. 2007 vol. 143 no. 2; 245- 249.
5. Katbaab A., Ardekani H.R.A., Khoshniyat H and Hosseini H.R.J Amniotic membrane transplantation for primary pterygium surgery.J.ophthalmic Vis Res 2008; 23-27.
6. Hamza M.S., Rizwanullah M., Hashmi A.H.,and Sahaf I.A. Amniotic membrane transplantation in ocular surface disorders. Pak. J. ophthalmol 2011, vol. 27 no.3.138-141.
7. Thatte S. Amniotic membrane transplantation: an option for ocular surface disorders.Oman J. ophthalmol. vol.4. no. 2 2011 ;67-72.
8. Amniotic membrane transplantation using fibrin glue in pterygium surgery:a comparitive randomised trial. Kucukerdonmez C, Karalezli A, Akova YA and Borazan M.Eye(2010) 24, 558- 566.
9. Amniotic membrane transplantation: A review of current indications in the management of ophthalmic disorders. Sangwan V.S., Burman S.,Tejwani S., et. al. Indian J O 2007;55:251-60.
10. Temporary amniotic membrane patch for the treatment of primary pterygium: mechanisms of reducing the recurrence rate.Ye J, Kook K H, Yao K. Graefes arch clin exp ophthalmol(2006) 244: 583 588.
11. Amniotic membrane transplantation for ocular surface disease. Memerzadeh F.,Kandavel G R, Chuck R S. Contemporary ophthalmology Jan 2004;vol. 3: 1- 10.
12. Role of amniotic membrane transplantation in ocular surface disorders. Arya SK, Bhala S, Malik A, Sood S. Nep J Oph 2010;2 (4): 145-153.
13. Comparison of amniotic membrane transplantation with conjunctival autografting for the treatment of primary pterygium. Datta H.,Mukhopadhyay S, Basu S et. al. AIOC proceedings 2008.