

ORIGINAL RESEARCH

A clinical study of efficacy of limbal stem cell transplantation in the management of pterygium

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ABSTRACT:

Background: Pterygium is a fairly common ocular condition. It appears as a triangular fold of vascularised conjunctiva drawn on to cornea, apex of which is towards the cornea and the base spreads out and merges with the subconjunctival tissue. The prevalence of pterygium varies from 1 to 15% depending on the geographical location of the population under analysis. Although in the early stage the condition is symptomless, bothering some patients cosmetically but in later stage, it may cause impairment of vision due to two reasons, one by covering the pupillary area of the cornea and second by altering the curvature of cornea due to fibrosis, with resulting astigmatism. For management of this condition surgery in the form of excision is done. Although surgery is claimed to be fairly effective treatment, no surgical technique is universally accepted. Recently it is proposed that limbal epithelial stem cells control corneal epithelial health. Limbal stem cell deficiency as one of the important cause for pterygium has been proved and use of limbal stem cells as a surgical technique for prevention of recurrence of pterygium and management is ubiquitous. This study concerns with a clinical study of pterygium excision with limbal stem cell transplantation.

StudyDesign: The study design is of case series.

Aim of the Study: To study the efficacy of limbal stem cell transplantation in the management of pterygium and to evaluate the postoperative outcome & recurrence rate after removal of pterygium combined with limbal stem cell transplantation.

Results: The present study is an analysis of 50 patients with progressive pterygium of more than 2mm needing surgical intervention; done in the Department of Ophthalmology, Regional Eye Hospital, Warangal, Telangana, between December

Conclusion:

1. Pterygium excision with limbal stem cell transplantation has low recurrence rates
2. There is lower incidence of serious complications.
3. Patients have good cosmetic results. Thus, pterygium excision with limbal stem cell transplantation might finally provide the solution for the effective management of pterygium.

Key words: Pterygium, Limbal stem cell transplantation, Superficial Keratectomy.

Key words: Tuberculosis, Prevalence

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INTRODUCTION

Pterygium is a greek word which means 'wings' in english, denoting the shape of this common problem. it is a fairly common ocular condition. it appears as a triangular fold of vascularised conjunctiva drawn on to cornea, apex of which is towards the cornea and the base spreads out and merges with the subconjunctival tissue. since the days of sushruta, the world's first ophthalmic surgeon, pterygia have been recognized

as triangular sheet of fibrovascular tissue that appears on the epibulbar conjunctiva and cornea, disturbing both the patient because of their unsightly appearance and the surgeon because of their tendency to recur. 1. the prevalence of pterygium varies from 1 to 15 % depending on the geographical location of the population under analysis 2. the main risk factors are the total exposure to ultra - violet (uv) light and increasing age 2 . one probable hypothesis for its

pathogenesis is that the effects of uv radiation cause actinic change in the conjunctival layers, resulting in abnormal growth. 3. those patients with life styles that have greater exposure to hot, dry, windy environmental condition like outdoor pursuits and residence in sunny environments, have a greater risk of developing pterygia 2, 4. although in the early stage the condition is symptomless, bothering some patients cosmetically but in later stage, it may cause impairment of vision due to two reasons, one by covering the pupillary area of the cornea and second by altering the curvature of cornea due to fibrosis, with resulting astigmatism. Rate of pterygium recurrence is rather high up to 60%. For management of this condition surgery in the form of excision is done. Bare sclera is left between limbus and rectus muscle insertion. Although surgery is claimed to be fairly effective treatment, no surgical technique is universally accepted. Recently it is proposed that limbal epithelial stem cells control corneal epithelial health. Their deficiency can be found in a number of corneal diseases. Limbal deficiency in corneas manifest poor epithelialization, chronic stromal inflammation, corneal vascularization, and conjunctival epithelial ingrowth and described the term "limbal stem cell deficiency". Because most of these clinical features can also be found in other corneal diseases, the sine qua non criterion for diagnosing lscd is the existence of conjunctival epithelial ingrowth onto the corneal surface (i.e. Conjunctivalization), reflecting poorepithelial barrier function. Based on the underlying etiology, corneal diseases manifesting lscd can be subdivided into two major categories, in the first category; limbal epithelial stem cells are destroyed by known or recognizable offenders such as a radiation therapy, Stevens-Johnson syndrome, etc. A second category is characterized by a gradual loss of the stem cell population without known or identifiable precipitating factors. In this situation, the limbal stromal niche is presumably affected and progressively deteriorates by a variety of etiologies that include lolo, loma, idiopathic limbal deficiency, pterygium, etc. Hence limbal stem cell deficiency as one of the important cause for pterygium has been proved and use of limbal stem cells as a surgical technique for prevention of recurrence of pterygium and management is ubiquitous. This study concerns itself with a clinical study of pterygium excision with limbal stem cell transplantation.

AIMS AND OBJECTIVES OF THE STUDY

- 1) to study the efficacy of limbal stem cell transplantation in the management of pterygium.
- 2) to evaluate the postoperative outcome & recurrence rate after removal of pterygium combined with limbal stem cell transplantation.

MATERIALS AND METHODS

The present study was conducted in the department of ophthalmology at regional eye hospital, warangal, telangana state for the duration of 18 months from december 2015 to june 2017. A total number of 50 cases with pterygium were selected from out-patient department.

The following points were tabulated according to name, age, sex, address, occupation, history, general examination, local examination in relation to specific examination of pterygium, investigation, surgical method and follow up for a period of one year.

SLIT LAMP EXAMINATION

Slit lamp bio microcopy is useful not only for studying the appearance of lesion but also for accurately localizing the extent of growth. For optical section of cornea, slit lamp and beam lamp arm is kept at an angle 45 degree to the surface of cornea of the observed eye. By this method, the depth of invasion of conjunctival tissue in the cornea, its level of infiltration and the neovascularization of cornea and the vascularity of the growth of pterygium was studied. Visual acuity in each eye is recorded with the help of snellen's chart and best corrected visual acuity is done each eye separately.

Material and instruments used in pterygium surgery

1. An illuminating micro scope.
2. Disposable syringe (2 ml)
3. Xylocaine injection 2% (solution)
4. Xylocaine solution 4% (topical)
5. Betadine and spirit.
6. Disposable needle no.26
7. Eye towel and cotton swabs
8. Universal eyes peculum
9. Bard-parker blade with handle
10. tooke's knife
11. Conjunctival scissor and needle holder
12. St martin's toothed forceps
13. castrovejo's forceps
14. Ciprofloxacin eye ointment.

Treatment: After taking detailed history and examination, the eyes with pterygium were selected and treated with excision of tissue and replaced with a strip of limbal conjunctival free graft and secured at the corresponding anatomic site by blood clot to the limbus and the sclera without sutures.

Preparation of patient: First of all xylocaine sensitivity was done in each patient, for which 0.1 ml 2% xylocaine was injected in the skin of forearm intradermally and the site of injection was watched after 15 minutes and any symptom, if reported was noted. In our Study no patient showed sensitivity to xylocaine.

Procedure: Peribulbar block was given using xylocaine 2% 4ml of 1:100,000 adrenaline and 2 ml of bupivacaine. After preparing and draping the eye in

normal sterile fashion, the lids were opened using a rigid universal eye speculum. Briefly, the head of pterygium is removed from the corneal surface by seizing the neck near the corneal margin with fixation forceps raising it, and shaving or dissecting it from the cornea, starting from apex, followed by superficial keratectomy with blunt dissection in the recipient eye. The pterygium was then freed from the sclera for about half the distance towards the canthus. The cicatrix is removed from the subconjunctival space, invariably resulting in the recession of the conjunctival edge to 3 - 5 mm from the limbus. One strip of limbal stem cell free graft, of adequate length, is removed by superficial lamellar keratectomy at 1 mm within the limbus from the superior or inferior limbal regions and by including adjacent conjunctiva from same eye of the patient. This free graft is transferred and secured to the recipient site at the corresponding anatomic sites by blood clot without sutures. Post-operatively the patients were started on,

1. Topical antibiotic - steroid combination eye drops (ciprofloxacin eye drops) - 6 times per day
2. Tear substitutes (Moi sol eye drops) 4 times a day. The steroids were stopped after a period of 4 weeks in tapering doses and the tear substitutes were continued. Postop follow ups done at 1st, 2nd, 4th, 6th, 12th week, 6 months postoperatively. At each visit - Complaints were enquired. Slit lamp examination - to monitor graft bed integrity & development of other complications.

Clinical photograph is taken on first day, first week, first month, third month, sixth month, one year with respect to vascularization at recipient site, status of graft site and donor site. Any recurrence of pterygium was noted.

RECURRENCE

RECURRENCE was considered as encroachment of the cornea by vascularization more than 1.5 mm along with presence of conjunctival drag. Vascularization without conjunctival drag was not considered as recurrence

OBSERVATIONS AND RESULTS

The present study is an analysis of 50 patients with progressive pterygium of more than 2 mm needing surgical intervention; done in the Department of Ophthalmology, Regional Eye Hospital, Warangal, Telangana state between December 2015 and June 2017. Each case was analysed in Detail with respect to history, clinical examination, investigative procedures and subjected to surgical intervention. The proforma containing information regarding the clinical data and the observations made was finally analysed.

1) Sex incidence

Of the 50 patients included in the study, 32 were females (64 %) and 18 were males (36 %)

2) Age distribution of the patients

Among the 50 patients included in the study maximum number of patients are between 31-50 (30 patients-60%). In age group 21-30- Number of cases 8 (16%), Age group 51-60- Number of cases 5 (10%), Age group >60- number of cases 7 (14%)

3) Presenting complaints

The most frequent complaints at initial presentation were burning sensation in 50 % of the cases and noticing mass growth on to the cornea in 58 % of the cases. Other complaints at presentation included redness in 30 % increased watering in 12 % and pain in 4 % of the cases. Out of 50 patients in the study, 23 patients (46 %) had a history of use of topical medications for the same complaints.

4) Incidence of side of pterygium the eyes

Among the 50 patients, right eye is involved in 25 patients (50%), Left eye in 21 patients (42%) both eyes involved in 4 patients (8%).

5) Incidence of duration of growth:

Among 50 cases duration of growth is between 0-1 year in 20 patients (40%), between 1-2 years in 15 patients (30%), 2-3 years in 10 patients (20%), 3-4 years in 4 patients (8%), 4-5 in 1 patient (2%).

6) Status of donor graft site:

In the present study donor graft site was healthy (100 %) in all the cases and in one year of follow up

7) Status of recipient graft:

In the present study graft was healthy in all cases up to first month but at third month 48 cases (96 %) were healthy and continued up to one year. Two cases (4%) were attenuated with associated vascularization and recurrence was noted at third month in one case and at 6 months in another patient

8) Recurrence

2 of the 50 eyes included in the study showed recurrence. Of the 5 eyes: 1 eye showed recurrence in 1st month. 1 eye showed recurrence by 3 months. None of the eyes with recurrences had any associated decrease in visual acuity.

9) Visual improvement following pterygium surgery

Significant visual acuity improvement (2 Snellen lines or more) was seen in 21 eyes (42%). 1 line improvement was seen in 12 eyes (24%). No improvement was seen in 17 eyes (34%). Of the 17 eyes, 12 eyes had a preoperative visual acuity of 6/6 or better, 2 patients had macular grade corneal opacities following pterygium surgery encroaching onto the visual axis and the remaining 3 patients had concurrent cataract accounting for no improvement in visual acuity.

10) Complications

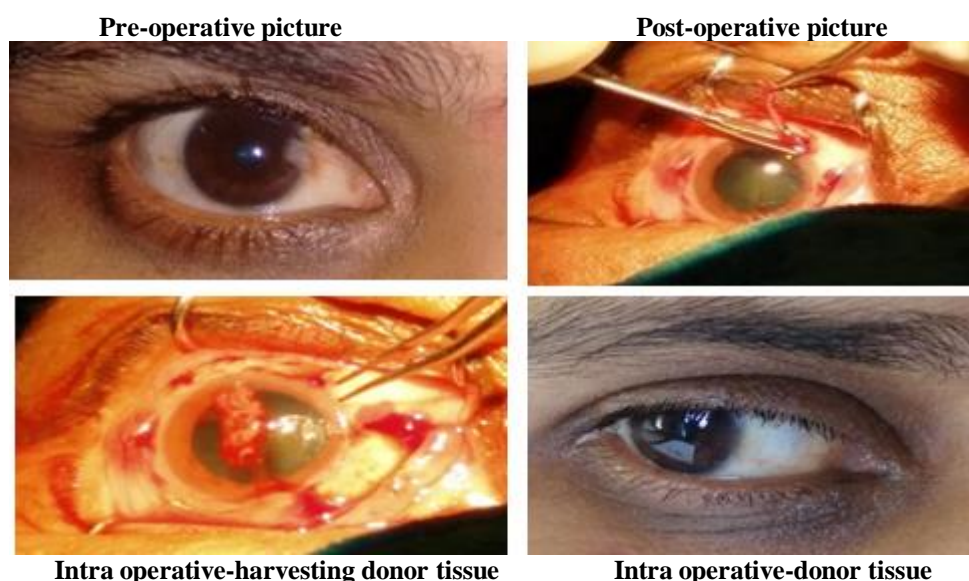
Post-operatively symptoms like pain, watering and discomfort were complained by most of the patients which disappeared within 1 month after surgery with the use of topical medications. Four patients out of 50 conjunctival auto grafting with stem cell transplantation developed graft edema (8%) in first post-operative day which resolved completely in 1-2

weeks. Five patients with conjunctival auto grafting developed subconjunctival haemorrhage (10%) which resolved spontaneously within one month of surgery. 3 patients (6%) showed graft retraction which resolved spontaneously in 1-2 weeks. one patient had graft dislocation (2%) within one month of the surgery which later resulted in a recurrence of the pterygium.

In two patients out of 50, pterygium recurrence was noted (4%). No other adverse effects or complications occurred throughout the study period. Commonest complaints are watering. No significant change in visual acuity or intraocular pressure is noted in post-operative period.

Table no: 1 Complications:

Complications	No of eyes	Percentage
Graft edema	7	14%
Subconjunctival Haemorrhage	5	10%
Graft displacement	1	2%
Recurrence	2	4%
Graft retraction	3	6%



DISCUSSION

This Clinical study of pterygium excision with fresh amniotic membrane graft is conducted between DECEMBER 2015 to JUNE 2017 included 50 eyes of 50 patients who attended ophthalmic OP at Regional eye hospital, Warangal, Telangana state. A pterygium is a multifactorial degenerative disorder. Pterygium (Wing shaped fold of conjunctiva) is disturbing both to the patient because of unsightly appearance and the surgeon for their tendency to reoccur. Multiple procedures for the removal of pterygium include bare sclera technique, Rotation flap, Limbal stem cell graft, Amniotic membrane graft, mucous membrane grafts, and conjunctival autograft. However, recurrence remains a common complication⁶. The mechanism of pterygium recurrence has been attributed to surgical trauma, post-operative inflammation, proliferation of fibroblasts and deposition of extracellular matrix protein. The recurrence is known to be highly associated with postsurgical inflammation. Any form of inflammatory insult to the ocular surface environment may activate the transformation of remaining pterygial body fibroblasts into an

invasive phenotype identical to that of the pterygium head fibroblasts thereby increasing the risk of pterygium recurrence⁷. Recurrence rates as high as 40%⁸ and 16.7%⁹ have been observed in the bare sclera and primary closure techniques, respectively. Among the procedures, to reduce this recurrence rate, adjunctive Limbal stem cell autograft or amniotic membrane graft or topical mitomycin C could be used. Kenyon et al reported a recurrence rate of 5.3% after pterygium excision with a conjunctival autograft¹⁰. Following pterygium excision with conjunctival autograft recurrence rates of 7%, 7.5% and 7.1% have been reported^{8,11}. Topical mitomycin C has been as a method of reducing recurrence^{12,13}. However, it has a recurrence rate of 38% which is comparatively high. Moreover, some vision-threatening side-effects such as scleral thinning, ulceration, cataract formation and glaucoma have been reported. Ocular surface describes the entire epithelial surface of the external eye encompassing the corneal epithelium as well as the bulbar and palpebral Conjunctival epithelium, initially considered as only an

anatomic classification that organised the physical continuity of stratified non keratinising epithelium of the conjunctiva, limbus, and cornea. The clinical and research insights of Friedenwald, Thoft and colleagues, and many others have offered compelling evidence of important functional relationships within this anatomic continuum. Crucial notion of the ocular surface as the functional unit has stimulated a complete reorganisation of our approaches to the pathogenetic concept and the clinical management of ocular surface disease. Although the conjunctiva and especially the limbus perform several functions, their contributions to the proper maintenance and integrity of the corneal epithelium are critical. Because corneal epithelium is highly differentiated cell type with rapid self-renewal abilities, its stem cells should be readily available. Davanger and Evensen were possibly the first to postulate that limbal papillary structure serves as the generative organ for corneal epithelial cells. Kenyon and Tseng ultimately postulated that the stem cells are the most qualified cell to differentiate into normal corneal epithelium. This stem cell hypothesis also has been extended to a pathogenetic concept of pterygium, where by the pterygium can be considered the consequence of "local stem cell deficiency". In particular, where as normal limbal tissue acts as a barrier between conjunctiva and cornea and thus prevents the invasion of subconjunctival tissue onto cornea. When this barrier function damaged by various insults like UV radiation or mechanical injuries, subconjunctival cell are allowed to stream onto adjacent cornea, resulting in pterygium formation. Re-establishing normal barrier function by transplanting healthy limbal tissue may prevent this process. Based on this concept, limbal autograft transplantation has recently been performed in cases with recurrent and advanced pterygia. Our study is mainly concerned with pterygium excision with limbal stemcell autografting onto the bare sclera.

SEX

In this study, 12 of the 50 patients were males and 38 were Females. Equal incidence of occurrence in males and females has been reported in Youngson studies¹⁷, while others report a male preponderance in some studies. Our study showed an incidence of pterygium occurrence more preponderance in females (76%). Pterygium is found to be more common in males than females because of their outdoor activities and thus more exposure not only to the ultraviolet lights but also other irritants as well. Abnormally high female preponderance in our study may be due to females being more concerned cosmetically, and even though males are more commonly affected with pterygium female patients seeks surgical intervention due to cosmetic reason. According to study done by Okoye et al,

Keklikci et al¹⁸, Tananuvat et al¹⁹ incidence of pterygium is more in females. In other studies-Hussein A.Alhammami et al 2012²⁰, Muhammad Aamir Arain et al 2012²¹, males are more affected. Sex incidence of present study was similar to that in studies conducted by Okoye et al, Keklikci et al¹⁸, Tananuvat et al¹⁹

AGE

In the present study, the patients were distributed under the following age groups, i.e., <20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years and >60 years. Maximum percentage i.e., 60% was noticed in the age group of 31-50 years, followed by 16% in the age group of 21-30 years and 10% were in the age group of 51-60 years. 14% cases were in both other age groups i.e. <20 years and >60 years. Highest numbers of cases were found between 31-50 years age. This is in close concordance with the findings of Michele Gerundo²² who reported the range of incidence of age between 30-56 years. Herbert E. Kaufman et al²³ in his book "The Cornea" had also shown that actively growing pterygia typically occur in the young age group i.e. 25-40 years.

PRESENTING SYMPTOMS

Majority of patients in this study had a complaint about growth on the inner side of eye and many of them came about the cosmetic problem caused by this growth. Some patients had redness and watering, irritation associated with the growth. Only few patients had complaints of diminution of vision, which on examination was found to be due to pterygium, as it produces astigmatism. These findings correlate well with the views of majority authors, that pterygium does not produce many symptoms especially in the early stage and majority of patients are either worried about the growth and consulted the doctor for cosmetic reason, but later on when it encroaches the pupillary area, it produces marked diminution of vision. This was supported by parson et al⁵. Generally pterygium excision is indicated if the visual axis is threatened or if the pterygium causes extreme irritation. This was supported by Albert and Jacobie in his book²⁴. Diminution in vision in the early stages can be attributed to astigmatism produced by causing stretch over the cornea and in the later stages due to covering of pupillary area and corneal opacity at the head of pterygium. Pull of the pterygium over the cornea causes flatte

ning of the corneal curvature in the horizontal meridian, was demonstrated by Ponico E. Carreras and Bedrossian, Robert M²⁵ also reported that marked changes in refractive status and corneal curvature may be produced by a pterygium before it enters the optical zone of cornea and removal of pterygium would result in a change in corneal curvature in about 45 % of the individuals.

SIDE OF PTERYGIUM

In the present study, 50 % cases right eye was affected and 42 % cases left eye was affected while in 8 % both the eyes were involved. Though the incidence is higher in right eye than left eye, there is no evidence available in the literature regarding affinity of pterygium for any side.

POSITION OF PTERYGIUM

In the present study, 96 % cases pterygium was present on nasal side and 4 % cases it was present on the temporal side. Higher evidence of pterygium on nasal side was attributed due to flow of tears towards medial canthus carrying with it sand and dust particles towards the nasal side as suggested by Arnold Sorsby²⁶.

DURATION OF GROWTH

In the present day study, majority of patients reported within first year of the onset of disease, i.e. 40 % while another 30 % reported within two years of onset of disease. Presenting time differs from person to person and majority of them who reported early came for cosmetic reason only.

STATUS OF DONOR GRAFT SITE

In the present study donor graft site was healthy (100%) in all the cases and in one year of follow up.

STATUS OF RECIPIENT GRAFT SITE

In the present study graft was healthy in all cases up to first month but at third month 48 cases (98 %) were healthy and continued up to one year. Two cases (4%) were attenuated with associated vascularization and recurrence was noted at third month in one case and at 6 months in another patient. Tsubota et al performed allograft limbal transplant in 14 cases and found no recurrence in any of the case. Tseng performed allograft transplantation in 21 cases and found limbal rejection in 3 cases. The other 48 cases were healthy is due to replacement of stem cells at the stem cell deficient site.

After the above study it can be concluded that since the above authors used allografts in their study which further needed use of immunosuppressants to prevent graft failure, and there were associated side effects of the drugs. In our study autograft was used hence all the patients were put on regular steroids with antibiotics and no complication was found related to drugs. Recurrence of pterygium is seen only in one case indicates failure of Replacement of stem cells at deficient site. The recurrence was seen in young patient and labourer by occupation may be attributed to irritation as he is constantly exposed to environment. Hence use of limbal stem cell transplant in case of pterygium is an efficient and easy technique and can be used in all cases of pterygium.

EFFECT OF VASCULARIZATION ON THE RECIPIENT SITE

In the present study, there was no vascularization in any of the cases on first day, first week, and one month. There was vascularization in only one case (2 %) at third month and it continued from third month to one year. Tsai et al performed allograft limbal transplantation in 16 cases of ocular surface disorder and found recurrent vascularization in one case. Vascularization is attributed to recurrence of pterygium due to failure of graft leading to limbal stem cell deficiency²⁷.

RECURRENCE

In the present study, pterygium excision with limbal stem cell transplantation successfully treated 50 eyes with primary pterygia. The recurrence rate after limbal stem cell transplantation is reported as 14 % in Krashmer book of cornea. The recurrence rate in the current study is 4% which is comparable to previous studies.

- There is a very good correlation in the success rate of present study (94 %) and the study of Sadiq MN et al study (95.84 %), thus demonstrating the efficacy of limbal stem cell transplantation in primary progressive pterygium.
- According to Sadiq MN et al²⁸ study, Recurrence of pterygium was noted in three out of 72 eyes (4.16%), after a minimum follow up of 12 months to maximum of 25 months (Mean 14.6 months). No major intra-operative or postoperative complications were encountered. This study suggested that Superotemporal free conjunctivo-limbal auto graft appears to be a safe and effective technique in the surgical management of pterygium. The inclusion of

limbal tissue in the conjunctival auto graft following pterygium excision appears to be essential to ensure low recurrence rate.

- Mohamed A. E. Soliman Mahdy and Jagdish Bhatia²⁹ compared the Role of
- Limbal stem cells and conjunctival autograft transplantation in treatment of primary pterygium. Out of 42 patients included in the study only 2 (4.75%) recurrences were observed. This study concluded that the cause of low recurrence is due to the use of a very thin conjunctival graft devoid of Tenon's tissue in addition to incorporating a part of the adjacent limbal stem cells in the graft.
- In a study by Du Z, Jiang D, Nie A 2002³⁰, A prospective randomized paired-eye trial was studied. There were 208 patients (229 eyes) with initial pterygium, and they were allocated to two groups: excision of pterygium with limbal epithelial
- Autograft transplantation surgery (A group, 106 cases and 124 eyes) and simple pterygium excision (B group, 102 cases and 105 eyes). The post-operative follow-up periods ranged from 18 approximately 28 (22.4 +/- 4.9) months. In the eyes followed up, 5 of 112 eyes (4.5%) in A group and 41 of 96 eyes (42.7%) in B group were recurred, the difference being very significant (P < 0.001). This study concluded that, To provide a new stem cell source, limbal epithelial autograft transplantation, for an injured limbus is a reasonable therapeutic method for the treatment of pterygium.
- In a study by prabakar SK³¹, out of 68 patients with primary pterygium treated with limbal stem

cell transplantation, no recurrence was observed in a follow up 18 months' period. Absence of recurrences was probably attributable to the smaller pterygium size of 1.67 mm (± 4.23), use of the autologous limbal conjunctival graft and treatable intra and post-operative complications successfully.

- In a study conducted by KN jha³², no recurrences were observed in 32 eyes with pterygium excision and limbal stem cell transplantation. He concluded pterygium excision plus CLAU transplantation surgery is a safe and effective procedure for treating primary and recurrent pterygia without major problems like scleral thinning, corneal edema, secondary glaucoma, corneal perforation, iritis and cataract formation as seen with adjunctive therapy like mitomycin (MMC) drop instillation.
- A study by salman AG and Mansour DE³³ "The recurrence of pterygium after different modalities of surgical treatment". The study included 36 males and 12 females of age ranged from 28 to 52 years. The recurrence rate was 2 eyes in group 1 (10%) (limbal stem cell transplantation + conjunctival autograft), 6 eyes in group 2 (30%) (AMT) and 4 eyes (20%) in group 3 (MMC + AMT). The rate of recurrence was significantly different between the three groups (P < 0.001). There conclude that Limbal stem cell transplantation together with conjunctival autografting proved to be more effective in prevention of pterygium recurrence and in rapid restoration of normal epithelial morphology. MMC in addition to AMT decreases the incidence of recurrence.

Table no: 2

	Recurrence rate
Present study	6%
Sadiq MN et al ⁵	4.16%
Mohamed A. E. Soliman Mahdy and Jagdish Bhatia ⁷⁶	4.75%
Du Z, Jiang D, Nie A 2002. ⁷⁷	4.5%
Prabakar SK study ⁷⁸	0
KN jha ⁷⁹	0
Salman AG and Mansour DE ⁸⁰	10%

VISUAL ACUITY

Significant visual acuity improvement (2 Snellen's line or more) was seen in 21 eyes (42%) while 1 line improvement was seen in 12 eyes (24%) and no improvement in 17 eyes. Among these 17 eyes, most of them have good vision before surgery and so there is no improvement and some have cataract with pterygium. One patient did not show any improvement in visual acuity even after reduction in astigmatism due to the formation of macular grade corneal opacity following the pterygium excision.

COMPLICATIONS

The complications following pterygium excision were minor and none were sight threatening. The most common complication in our study was the Graft odema. This was seen in 7 eyes (14%) and resolved spontaneously without any sequel. Graft retraction, was seen in 3 eyes (6%) in our series which disappeared once the chemosis was controlled. It did not affect the final position of the graft. Minor complications such as conjunctival epithelial inclusion cyst formation, caused by embedded conjunctival epithelium, occur more frequently with

conjunctival autografts as compared to Amniotic membrane transplantation. Vascularization of the cornea at the site of the excised pterygium was seen to encroach up to 1.5mm into the cornea at first follow up (1 month) and these eyes were followed closely. Antibiotic-steroid drops combination and artificial tear substitutes were continued for 6 weeks. These showed no evidence of progression of the vascularization and there was no evidence of subconjunctival tissue encroachment with conjunctival drag at the end of second follow up and later in the follow up period. The low recurrence rate and no major post-operative complication following limbal stem cell transplantation graft with pterygium excision in the present study agrees with other reports that this procedure is effective and safe. The basic idea of limbal stem cell transplantation is to promote reepithelialisation, to reconstruct ocular surface and promote symptomatic relief.

SUMMARY

- this clinical study of pterygium excision with limbal stem cell grafting is conducted in 50 eyes of 50 patients, who attended regional eye hospital, warangal, telangana state, during the period december 2015 to june 2017. patients with
- primary pterygium with symptoms of redness, foreign body sensation, pain, watering, defective vision. all patients underwent comprehensive eye examination. after surgery patients are followed for 6 months. at each follow up, patient is looked for graft position,
- visual acuity and any other graft related complications.
- in our study, there is female preponderance (76%) which are comparable to the values in studies.
- there is maximum incidence of pterygium in age group of 31-50 years (60%).
- recurrence rate of pterygium excision with limbal stem cell transplantation (4%) is considerably less than other modes of treatment.
- recurrence rate as related to pterygium length is found statistically significant (p value :0.0072).
- there is significant vision improvement in 21 eyes and no improvement in 17 eyes. out of these 17, there is good vision 6/6 initially in 12 eyes, macular corneal opacity in 1 eye and cataract in remaining eyes.
- complications after pterygium excision with limbal stem cell transplantation are not serious and they resolved spontaneously with antibiotics

and steroid eyedrops.

CONCLUSION

1. pterygium excision with limbal stem cell transplantation has low recurrence rate.
2. There is lower incidence of serious complications.
3. patients has good cosmetic results. thus, pterygium excision with limbal stem cell transplantation might finally provide the solution for the effective management of pterygium.

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