

## OUTCOME OF PRIMARY PTERYGIUM SURGERY USING INFERIOR CONJUNCTIVAL AUTOGRAFT

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### ABSTRACT

### INTRODUCTION

Pterygium is a common ocular condition with prevalence varying from 0.7-39% in different population and particularly high in the tropics. Various surgical techniques including inferior conjunctival autograft are available for the treatment of pterygium. This study was done to determine the clinical profile and outcome of primary pterygium surgery using inferior conjunctival autograft.

### MATERIAL AND METHODS

This was a prospective, non-comparative interventional study conducted over a period of one year from January to December 2019 in patients with primary pterygium who presented at cornea department of Lumbini Eye Institute and Research Center, Bhairahawa, Nepal. All the patients with primary pterygium, a detail clinical history and examination were done. Pterygium was excised using inferior conjunctival auto grafting and followed regularly over a period of three months.

### RESULTS

We analysed 626 eyes in 619 patients with primary pterygium in which mean age was  $44.63 \pm 13.84$  years. There were 363 (58.64%) females. Majority of our patients were housewife 350 (56.54%) and farmer 170 (27.46%). Mean duration of presentation was  $3.59 \pm 2.87$  year. Pterygium was found mostly on nasal side 614 (98.08%). Depending on the size, maximum patients had type 2 pterygium (73.80%) followed by type 3 pterygium (18.69%). The commonest post operative complication was raised intraocular pressure which was seen in 43 (6.87%) eyes and recurrence rate was 0.64%.

### CONCLUSION

Primary pterygium was seen more commonly in adults in their 4<sup>th</sup>-5<sup>th</sup> decade of life with female predominance. Primary pterygium surgery using inferior conjunctival autograft is a safe and effective with very few complication and recurrence.

**KEYWORDS** Inferior conjunctival autograft, Primary pterygium, Recurrence of pterygium.

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## INTRODUCTION

Pterygium is a triangular wing-shaped, fibrovascular, fleshy growth that originates from the conjunctiva and can spread onto the cornea. Pterygium is a common degenerative ocular surface disorder, particularly seen in the tropics.<sup>1</sup> Prevalence of pterygium varies from country to country ranging from 0.7% to 39%.<sup>2-5</sup> There are multiple risk factors known for the development of pterygium like exposure to ultraviolet (UV) light, wind, dust, older age, male gender, outdoor occupation and living in rural environments.<sup>6-9</sup>

Surgical excision is the main treatment of the pterygium. Various surgical techniques are available for the excision of pterygium, but no single technique is universally satisfactory in terms of recurrence rate, complication, technical simplicity, and cosmetic outcomes. Highest recurrence rate has been reported up to 89% in bare sclera technique.<sup>1</sup> Kenyon et al described about free conjunctival autografting technique in 1985, which involves excision of the pterygium and closing of defect by harvesting of a conjunctival graft from the same eye.<sup>10</sup> It has reduced the recurrence rate to 5.3%.<sup>10</sup> Free conjunctival autograft is mostly taken from the superior bulbar conjunctiva.

In situations like trauma, post-infection, glaucoma filtering surgery and manual small incision cataract surgery (MSICS); it is difficult to take graft from the same place because of conjunctival scarring. In such situation the graft is harvested from inferior bulbar conjunctiva. Furthermore the superior bulbar conjunctiva should be reserved for future glaucoma filtration surgery, as well as for MSICS which is still popular in developing countries. There is a large amount of data available regarding conjunctival autograft taken from superior bulbar conjunctiva.<sup>11,12</sup> However, there is limited information available regarding the efficacy of a graft taken from the inferior conjunctiva.<sup>13,14</sup> With this background we have conducted this study to determine the outcome of pterygium surgery using inferior conjunctival autograft and preserving the superior bulbar conjunctiva for future surgeries.

## MATERIAL AND METHODS

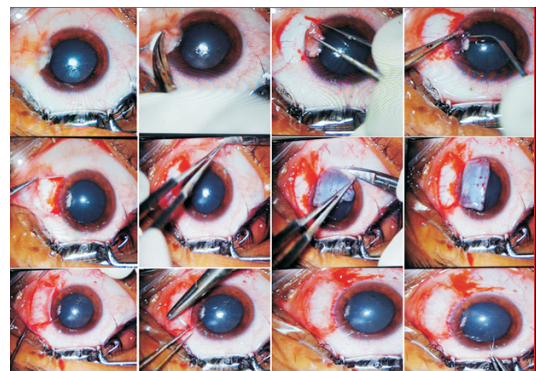
This was a prospective, non-comparative interventional study, conducted on patients presented to the department of cornea in Lumbini Eye Institute and Research Center (LEIRC), Bhairahawa, Nepal over a period of one year from 1<sup>st</sup> January 2019 to 31<sup>st</sup> December 2019. Study was ethically approved by the institutional review committee of LEIRC. Written informed consent was taken from all of the patients. All the patients who presented with the primary pterygium with  $\geq 16$  years of age, were enrolled in the study. We excluded the patient with  $< 16$  years of age, recurrent pterygium, history of ocular trauma, pseudopterygium, atypical pterygium, double headed pterygium, local inflammation or infection.

A detailed history including demographic data of age, sex, occupation, duration of presentation, history of any systemic diseases or ocular diseases were noted in all the patients. A slit lamp examination was performed to determine the pterygium size in millimetres, by measuring from the limbus to the corneal limit of the growth in the horizontal plane. Pterygium was classified as per classification mentioned by Popat et al. Type 1 - Pterygium encroaching 0-2 mm area on the cornea, i.e. crossing limbal margin but not reaching pupillary margin; Type 2 - Pterygium encroaching 2-4 mm area on the cornea, i.e. reaching upto pupillary margin but not crossing it; Type 3 Pterygium encroaching  $> 4$  mm area on the cornea, i.e. crossing pupillary margin and coming in visual axis.<sup>15</sup>

Blood investigations like random blood sugar (RBS), hepatitis B surface antigen (HBsAg) and human immunodeficiency virus (HIV) test were done. One day prior to surgery, patients were started with antibiotic eye drop Moxifloxacin 0.5% and Prednisolone acetate 1% four times in a day.

## SURGICAL TECHNIQUE

One of the first two investigators has performed the surgery under peribulbar block with 2 % lignocaine. After painting the lids and periocular area with 5% povidone iodine and draping, a lid speculum was applied. The pterygium was dissected from the cornea using Westcott scissors from one end to another end from limbus. The part of the pterygium on the cornea was removed with Colibri and the rough surface of the corneal bed was smoothen with crescent blade. Underlying Tenon's capsule were trimmed and subconjunctival fibrous tissue under the pterygium was excised much more widely than the area covered by the pterygium using Westcott scissors. A roughly appropriate-sized graft of bare sclera from the adjacent inferior bulbar conjunctiva after blunt dissection of the conjunctiva without the Tenon's capsule was taken and rotated over the excised area and sutured with 10-0 Nylon. Chloramphenicol 1% ointment was applied at the end of surgery and operated eye was patched.



**Figure 1.** Showing surgical steps of primary pterygium excision using inferior conjunctival autograft

### Follow up visits

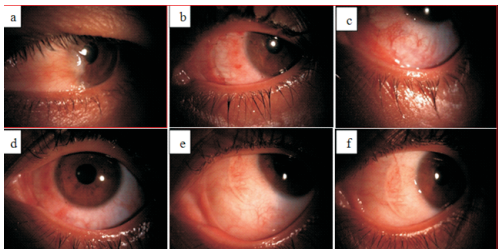
Slit lamp examination was performed on the first postoperative day and examined for graft, suture in place along with donor site of graft and topical Moxifloxacin 0.5% and Prednisolone acetate 1 % eye drops were administered as one drop four times a day for the two week and steroid was tapered until one month after 2 week. Patients also received Chloramphenicol 1% ointment two times in a day for the first 2 weeks. On postoperative day 15, we removed residual sutures if present with 26 gauge needle and plain forceps under topical anesthesia using 4% xylocaine eye drops. We also examined the patients at 1.5 month and 3 months postoperatively, and evaluated for graft retraction, graft odema, graft necrosis, granuloma, Tenon's cyst, and recurrence.

### Statistical analysis

All the data entered into Microsoft Excel spreadsheet were analyzed using SPSS ver 16.0(PC) / EpiInfo (CDC, Atlanta, GA, USA). Data were expressed as the frequency, percentage, mean, standard deviation, and range, as applicable. A p-value of less than 0.05 was indicative of statistical significance

## RESULTS

In this study, 652 eyes were operated for primary pterygium surgery in 645 patients. Twenty six patients were lost in the follow up, so they were excluded in the final analysis. Seven patients underwent primary pterygium surgery in both eyes. Final analysis was done of 619 patients who were operated in 626 eyes and completed 3 months follow-up visits (Figure 2).



**Figure 2.** (a) Pre op primary pterygium (b) 1<sup>st</sup> post op day showing the autograft in place with 10-0 nylon suture (c) 1<sup>st</sup> post op day showing inferior bulbar conjunctiva part from where graft was harvested (d) 2<sup>nd</sup> weeks post op showing graft with suture and inferior bulbar conjunctiva (e) 45 days post op showing graft and inferior bulbar conjunctiva (f) 3 months follow up

Basic characteristics of the patients are shown in Table 1. Mean age of our patients was  $44.63 \pm 13.84$  years ranging from 17 to 85 years. Age distribution shows that highest incidence of pterygium was found in age group of 31-40 years (26.33%) and least incidence was found in age group of >80 years (0.32%). There were 256 (41.36%) male and 363 (58.64%) female.

**Table 1.** Demographic and preoperative characteristics

Parameters	N (%)
<b>Age (yrs)</b>	
≤20	12 (1.94%)
21-30	99 (15.99%)
31-40	163 (26.33%)
41-50	155 (25.04%)
51-60	101 (16.32%)
61-70	74 (11.96%)
71-80	13 (2.10%)
>80	2 (0.32%)
<b>Sex</b>	
Male	256 (41.36%)
Female	363 (58.64%)
Male:Female	1:1.42
<b>Eye involved</b>	
Right eye	330 (52.72%)
Left eye	296 (47.28%)
<b>Site of pterygium</b>	
Nasal	614 (98.08%)
Temporal	12 (1.92%)

We had patients from both India and Nepal. There were 313 (50.56%) patients from Nepal mainly Rupendehi (194), Nawalparasi (51), Kapilvastu (29) and Syangja (8) districts. From India there were 306 (49.43%) patients from state of Bihar and Uttar Pradesh mainly from nearby Maharajgunj (71), Gorakhpur (44), Deoria (30), Siddharthanagar (26), Kushinagar (25) and Santa Kabir Nagar (18) districts. By occupation most of patients were housewife 350 (56.54%), followed by farmer 170 (27.46%), servicemen 52 (8.4%), students 32 (5.17%), and businessperson 10 (1.62%), driver 2 (0.32%), builder 1 (0.16%), helper 1 (0.16%) and tailor 1 (0.16%). Mean duration of presentation was  $3.59 \pm 2.87$  years ranging from minimum 6 months to maximum 22 years. Pterygium was operated in right eye 330 (52.72%) and in left eye 296 (47.28%). Pterygium was found mostly on nasal side 614 (98.08%) and less commonly on temporal side 12 (1.92%). Mean size of pterygium horizontally was  $3.1 \pm 1.14$  mm pre-operatively starting from 1 mm to maximum 10 mm. Morphologically, depending on the size of pterygium, maximum patients in the present study had type 2 pterygium (73.80%) followed by type 3 pterygium (18.69%) and least had type 1 pterygium (7.51%) (Table 2).

**Table 2.** Morphology of pterygium

Parameters	N (%)
<b>Morphological type of pterygium</b>	
Type 1 (<2 mm)	47 (7.51%)
Type 2 (2-4 mm)	462 (73.80%)
Type 3 (>4 mm)	117 (18.69%)
<b>Size of pterygium (mm)</b>	$3.15 \pm 1.14$

In this series systemic illness was found 74 (11.95%) patients which include hypertension 44 (7.11%) patients, diabetes mellitus 16 (2.58%) patients, diabetes and hypertension together 8 (1.29%) patients, hepatitis B 2 (0.32%) patients, asthma 2 (0.32%) patients, HIV 1 (0.16%) patient and leukaemia 1 (0.16%) patient. There were other associated ocular conditions seen in 184 (29.39%) eyes. Cataract was the commonest associated ocular condition found in 140 (22.36%) eyes. Type of cataract was immature senile cataract (IMSC) in 130 eyes, posterior subcapsular cataract (PSCC) in 9 eyes and mature senile cataract (MSC) in 5 eyes. Other associated ocular conditions seen were glaucoma suspect 19 (3.02%) eyes, pseudophakia 6 (0.96%), corneal scar 4 (0.64%) eyes, confirmed glaucoma 3 (0.48%) eyes, myopia 2 (0.32%) eyes and age related macular degeneration (ARMD) 2(0.32%) eyes.

Post operative complications were seen in 105 (16.77 %) eyes and are shown in Table 3. The most common problem seen was raised intraocular pressure (IOP) which was seen in 43 (6.87%) eyes. Raised IOP was controlled after tapering the steroids in the most of cases. Antiglaucoma drugs were used temporarily for two weeks in 8 (1.28%) cases and were discontinued later. Recurrence of pterygium was noted in 4 (0.64%) eyes. No symblepharon was found in our study.

**Table 3. Postoperative complications**

Complications	N (%)
Raised IOP	43 (6.87%)
Scar formation	23 (3.67%)
Conjunctival hyperemia	8 (1.28%)
Wound gapping	6 (0.96%)
Graft edema	5 (0.80%)
Subgraft hematoma	5 (0.80%)
Graft overlap	4 (0.64%)
Recurrence	4 (0.64%)
Conjunctival granuloma	3 (0.48%)
Graft retraction	2 (0.32%)
Cyst formation	1 (0.16%)
Dellen	1 (0.16%)

## DISCUSSION

The pterygium surgery is still challenging for cornea surgeons as various surgical techniques have variable outcome in terms of recurrence, complication, and cosmetic outcomes. In this study, we have operated 652 eyes in 645 patients for primary pterygium surgery using inferior conjunctival autografting. Patients were followed up for 3 months for looking any postoperative complications and recurrence. In our study mean age of patients was 44.63 years. Which is similar to the in study done in South Africa where the mean age was 46.4 years.<sup>16</sup> Whereas in the study done by Hwang et al. the mean

age of the patients was 53.5 years<sup>17</sup> and Kwon et al from South Korea where the mean age was 56.2 years<sup>18</sup> This difference can be explained due to variation in exposure of risk factors. People working as farmer in rural areas are more exposed to sun and UV light in comparison to people working in offices in urban areas. Furthermore there is increased awareness as well as improvement in availability of primary eye care facilities in rural municipalities. Government of Nepal has opened a primary eye care center in each local municipality. In our study pterygium was found to be most common between 31 - 40 years of age group (26.33%) which is similar to the study done by Marmamula et al, who have also found the same. In their study the most common age group 30 - 39 years (33.30%).<sup>19</sup>

In our study female (58.64%) were involved more than the male. Similarly result was found in other studies Kwon where women (54.3%) were involved more than men.<sup>18</sup> Popat KB et al have also found more female (56%) in their study.<sup>15</sup> Pterygium was seen most common in housewife 350 (56.54%), followed by farmer 170 (27.46%). In other study carried out by shrestha et al most patients were farmers (50%) and laborers (34%).<sup>13</sup> This can be explained by the fact that India and Nepal both are agriculture based country where majority of population lives in rural areas and works in farms. Females from rural areas are also equally involved in outdoor farming activities which make them exposed to wind, dust, hot climate and UV radiation. Pterygium was diagnosed in slightly more (53%) in left eyes.<sup>13</sup> Whereas in our study pterygium was operated slightly more in right eye ( 52.72%) than in left eye (47.28%) but difference is insignificant.

In our study, mean size of pterygium horizontally was  $3.1 \pm 1.14$  mm pre-operatively which is similar to the study carried out by Shrestha et al where the average size of the pterygium was  $3.2 \pm 0.60$  mm.<sup>13</sup> It is a bit larger in compare to other studies from developed countries. In our study there were patients who were presented with large 9-10 mm size pterygium. In the study carried out by Shusko et al pre-operatively, the average extent of horizontal growth of pterygium on the cornea was  $2.47 \pm 0.82$  mm which is smaller than our study.<sup>20</sup> This can be explained by the late presentation of diseases in rural areas of developing countries in compare to developed countries.

Recurrence rate was only in 4 eyes (0.64%) in the present study after 3 months of follow up whereas recurrence was found in 2 eyes (4%) by Shrestha et al in the 50 eyes after 3 months follow up.<sup>13</sup> Syam et al had 3.3% recurrence after inferior conjunctival autografting after mean follow-up duration of 27 months.<sup>14</sup> Koc et al have demonstrated that autografting from superior or inferior sites in primary pterygium cases showed no significant difference in recurrence rate.<sup>21</sup>

## CONCLUSION

Pterygium is seen more commonly in young adults in their 4<sup>th</sup> and 5<sup>th</sup> decade of life with slightly female predominance. Patients usually present late making the size of pterygium larger. Primary pterygium surgery using inferior conjunctival autografting is a safe and effective with very few complication and recurrence. This approach helps to preserve superior bulbar conjunctiva for future glaucoma filtration and cataract surgeries.

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