

Outcome of different techniques of pterygium excision with conjunctival autografting in pediatric population: Our experience in central India

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Aim: To analyze surgical outcome of pterygium excision with conjunctival autografting in pediatric population ≤ 16 years. **Settings and Design:** Retrospective case series. **Materials and Methods:** A case sheet review of 145 patients (167 eyes) aged ≤ 16 years consecutively presented with pterygium from April 2008 to August 2014 in the single center was done. Twenty-six eyes of 25 children who underwent pterygium excision with conjunctival autograft were analyzed. Different techniques used to secure conjunctival autograft in a position were multiple interrupted 8-0 vicryl sutures, single 8-0 vicryl suture in the center of graft and sutureless glue free. Outcome measures were a failure of surgery and recurrence. **Results:** Of the total 167 eyes, 26 eyes of 25 children, mean age 13.07 ± 3.08 years (range 7–16 years) were managed surgically with pterygium excision and conjunctival autograft. The rest of the patients were managed conservatively. In 18 eyes, the graft was secured with multiple sutures, in 6 eyes with a single suture, whereas in 2 eyes, sutureless glue-free graft opposition was done. Mean follow-up was 8.03 months. No case of graft retraction, graft dehiscence or graft displacement was found. Recurrence occurred in 6 eyes and managed surgically. **Conclusions:** Occurrence of pterygium is not uncommon in the pediatric population. A single suture or sutureless glue-free technique may be good alternative for securing conjunctival autograft after pterygium excision in children.

Key words: Conjunctival autograft, paediatric pterygium, pterygium excision, single suture, sutureless glue free

Pterygium has been known as a triangular sheet of fibro-vascular tissue that appears on the epibulbar conjunctiva and cornea.^[1] It is more prevalent in adults after 20 years of age while its occurrence in children is rare.^[2] In all age group treatment of choice remains the surgical excision. The most common indications for surgery are persistent discomfort, chronic irritation, recurrent inflammation, visual distortion, irregular astigmatism, restricted ocular motility, and cosmesis.^[3] Out of all techniques conjunctival autografting is the best available option after pterygium excision to prevent recurrence.^[4-8] Different techniques to secure conjunctival autograft are multiple sutures, single suture, fibrin glue, and sutureless glue free. A previous study has compared sutureless glue-free versus sutured limbal conjunctival autograft in primary pterygium surgery in adults and showed sutureless glue-free limbal conjunctival autograft is safe, effective, economical and had greater patient satisfaction.^[9] However, data in the pediatric population are lacking in the literature.

Earlier in our practice, we were securing conjunctival limbal autograft in pediatric pterygium with multiple sutures, then we shifted towards single suture in center of graft and more recently we have shifted to sutureless glue-free conjunctival autograft. In this study, we have analyzed our results of different techniques of securing the conjunctival graft in pediatric pterygium.

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Materials and Methods

Medical records of 167 eyes of 145 consecutive patients aged ≤ 16 years, presented with primary pterygium at our tertiary eye care center in central India between April 2008 and August 2014 were analyzed. All patients with surgical excision of primary pterygium with conjunctival autograft and minimum 1-month follow-up were included in the study. Children with a diagnosis of pseudo pterygium, lime injury, associated symblepharon, history of ocular injuries, previous history of pterygium surgery (recurrent) and follow-up < 1 -month were excluded.

On slit lamp examination grading of pterygium was done based on extent of corneal involvement: Grade I - crossing limbus, Grade II - midway between limbus and pupil, Grade III - reaching up to pupillary margin, Grade IV - crossing pupillary margin. The main postoperative outcomes were a failure of surgery and recurrence. Failure of surgery was defined as any graft dehiscence, graft retraction and graft displacement as noted on slit lamp examination. Recurrence was defined as fibro-vascular proliferation invading the cornea more than 1.5 mm at the site of previously excised pterygium.

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Patient's demographic details, history, complete ocular examination including a grade of pterygium, refractive status, duration of follow-up, surgical procedure, recurrence, and resurgery (if required) were noted. In all surgically managed cases, indications of surgery were progressive nature of pterygium as reported by parents or documented by ophthalmologists or significant astigmatism or cosmesis.

Surgical technique

All surgeries are done under general anesthesia. Pterygium was dissected from cornea with No. 15 Bard-Parker blade then separated from underlying sclera and excised. The remaining subconjunctival degenerative part of pterygium was excised with Westcott scissor. The corneal and limbal surfaces were smoothed by scraping with a Bard-Parker blade. For harvesting conjunctival autograft, the eyeball was rotated down and in. An area measuring 1 mm greater than the bare sclera was demarcated. In supero-temporal bulbar conjunctiva 1cc of the balanced salt solution was injected to facilitate separation of conjunctiva from Tenon's capsule. Blunt dissection of the conjunctiva was carried out using Westcott scissor. The autograft was cut and gently slide into place over the bare sclera in its correct anatomical orientation. Different techniques were used to secure the graft in position. In multiple suture technique four interrupted sutures used at all four corner of graft and one suture used at center of the graft with 8-0 vicryl, in single suture technique only one suture was used in center of graft with 8-0 vicryl [Fig. 1]. In sutureless glue-free technique, no suture was used [Fig. 2]. In this technique, hemostasis was allowed to occur spontaneously without cautery to provide autologous fibrin to glue the graft naturally in position. Ironing of graft was done with iris reposer. After making host conjunctiva as envelop, graft was placed beneath it [Fig. 3]. The scleral bed was viewed through transparent conjunctiva to ensure residual bleeding does not relift graft. In the end stabilization of graft was ensured. Eye was patched for 24 h.

Postoperatively 0.3% tobramycin sulfate eye drop 6 times for 15 days, 1% prednisolone acetate eye drop 4 times in a day for 1-week, followed by tapering dose for subsequent 3 weeks and 0.5% carboxymethylcellulose sodium eye drop 4 times a day for 1-month were given. Patients were instructed to avoid rubbing their eyes. Postoperatively all patients were asked to follow on 1-day, 1-month, 3 months then every 6 monthly for graft opposition and recurrence. All those conservatively managed cases were advised regarding regular follow-up.

Results

There were total 167 eyes of 145 patients ≤ 16 years with mean age 13.07 ± 3.2 years (range 5–16 years). Ninety (62%) were males and 55 (38%) were females. Total 123/145 patients had pterygium in 1 eye while 22/145 (15%) patients presented with pterygium in both eyes and 2 eyes had double-head pterygium. The majority of the patients (145 eyes) were kept under observation.

Twenty-six eyes of 25 children operated for pterygium excision with conjunctival autograft met the inclusion criteria. Mean age of surgically managed patients was 13.07 ± 3.08 (range 7–16 years). 19 (76%) were males while 6 (24%) were females. 23 children had unilateral involvement while two had pterygium in both eyes, out

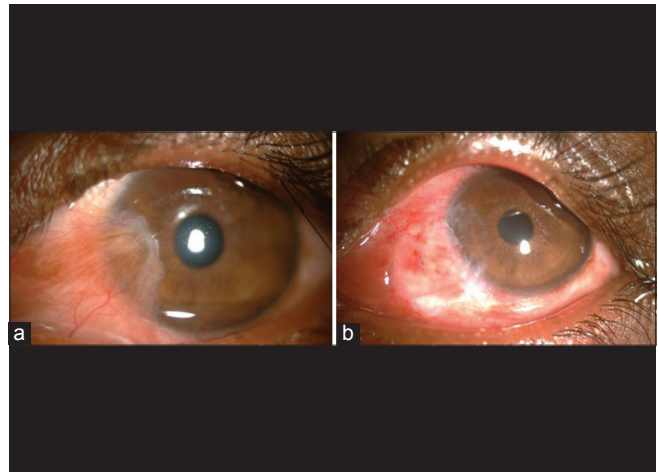


Figure 1: Photograph of right eye (a) Nasal pterygium preoperatively (b) Single suture conjunctival limbal autograft on the 1st postoperative day

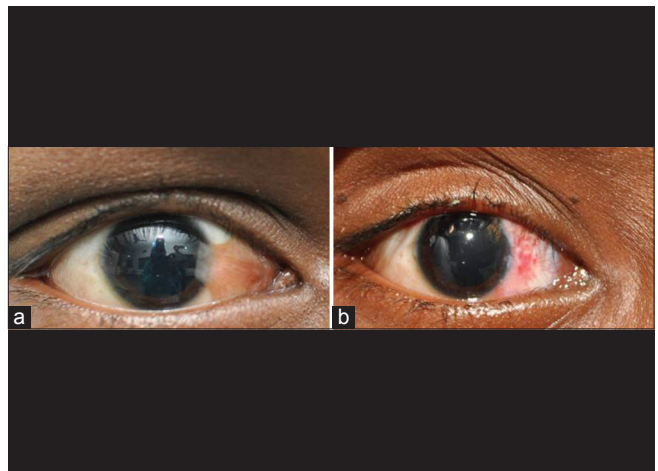


Figure 2: Photograph of right eye (a) Nasal pterygium preoperatively (b) Sutureless glue free conjunctival limbal autograft on the 1st postoperative day



Figure 3: Photograph of right eye showing envelope of conjunctiva graft under host conjunctiva (sutureless glue free technique) on postoperative 2 months follow-up

of which 1 child was operated for both eyes. Maximum eyes (19 eyes) had Grade II, 5 eyes Grade III pterygium while only 2 eyes had Grade I pterygium. Clinical characteristics of surgically managed pterygium patients are given in Table 1. Refractive astigmatism was present in 13 eyes (range +3.0D to -4.5D) [Table 1]. No significant family history of pterygium was found in any patients.

Different techniques were used to secure the graft in position. In 18 eyes, graft was secured with multiple sutures, in 6 eyes with single suture in the center of graft, while in 2 eyes, sutureless glue-free graft opposition was done. All surgeries were uneventful. Mean follow-up after surgery was 8.03 months (range 2–30 months) [Table 1]. No case of graft retraction, graft dehiscence or graft displacement was noted.

Recurrence was seen in 6/26 eyes between 1 and 6 months of surgery [Table 2]. These cases were managed by resurgery in 3 patients while 3 patients refused the surgery.

Discussion

Pterygium is ocular surface disorder which is more common in tropical and subtropical areas between the latitudes 30 north and south of the equator.^[1] Increased ultraviolet light exposure, dust, dryness and wind have been consistently documented

as risk factors for the occurrence of pterygium. Today a variety of options are available for the management of pterygium. Conventional bare sclera pterygium excision is out of favor because of high recurrence rate.^[4] Several adjunctive therapies have been tried with pterygium excision to reduce the fibro-vascular activity aiming to prevent recurrence. Use of beta irradiation or thiotepa eye drops, lamellar keratoplasty, conjunctival limbal autograft, conjunctival rotation autograft surgery, cultivated conjunctival transplant, anti-mitotic drugs (mitomycin C and 5-fluorouracil) and amniotic membrane transplantation have been used.^[5] Severe complications of mitomycin-C have been noted like prolonged punctate keratopathy, corneal melting, scleral necrosis, corneal perforation, cataract, and secondary glaucoma.^[6,7] Amniotic membrane is costly, not freely available and requires preservation. Studies have reported higher recurrence with amniotic membrane compared to conjunctival grafting.^[8]

Previous studies had shown the good surgical outcome of pterygium with conjunctival autograft in adults,^[4] but limited data are available in the pediatric population. The existing literature on the surgical outcome of pediatric pterygium is restricted to a few isolated case reports and small case series.^[10-13]

Table 1: Clinical characteristics and outcome of surgically managed pediatric pterygium

Age (year)	Duration of pterygium (months)	Site	BCVA (logMAR) (operated eye)	Refractive astigmatism (operated eye)	Spherical equivalent (operated eye)	Pterygium management technique	Follow-up (months)	Recurrence
15	24	Nasal	0.3	3/180	0.5	Multiple suture	14	Yes
13	24	Nasal	0	-0.5/180	-0.25	Multiple suture	30	No
16	24	Nasal	0	0	0	Multiple suture	20	No
15	12	Nasal	0	-0.5/180	-0.25	Multiple suture	13	Yes
7	2	Nasal	0	0	0	Multiple suture	3	No
14	12	Nasal	0.3	-4.5/10	-1.5	Multiple suture	4	No
14	36	Nasal	0.2	0.5/180	0.25	Multiple suture	5	No
12	24	Temporal	0	0	0	Multiple suture	16	Yes
16	24	Nasal	0.2	-2/180	-1	Multiple suture	4	No
16	24	Double head	0.2	-2/180	-1	Multiple suture	3	No
7	48	Double head	0.2	1.5/90	0.75	Multiple suture	2	No
15	18	Nasal	0	0	0	Multiple suture	3	No
13	3	Temporal	0	0.5/80	0.25	Multiple suture	5	No
16	48	Nasal	0	0	0	Multiple suture	23	No
16	36	Nasal	0	-0.25/180	-0.12	Multiple suture	3	Yes
13	7	Nasal	0	0	0	Multiple suture	6	No
13	24	Nasal	0	0	0	Multiple suture	5	No
15	36	Nasal	0	-0.75/90	-0.37	Multiple suture	10	No
7	3	Nasal	0	0	0	Single suture	9	Yes
9	6	Nasal	0	0		Single suture	5	Yes
16	6	Nasal	0	0	0	Single suture	4	No
13	12	Nasal	0	-0.5/50	0	Single suture	5	No
14	24	Nasal	0	0	0	Single suture	8	No
15	12	Temporal	0	0	0	Single suture	3	No
7	3	Nasal	0.6	-1.5/90	-4.75	Sutureless glue free	4	No
13	12	Nasal	0	0	0	Sutureless glue free	2	No

BCVA: Best corrected visual acuity

Table 2: Clinical characteristics and management of eyes with recurrent pterygium

Age/sex	First surgery (suture technique)	Recurrence (months)	Management	Follow-up (months)
12/male	Multiple	5	Re surgery	18
7/male	Multiple	1	Advised surgery	2
16/male	Multiple	1	Advised surgery	2
15/female	Multiple	6	Re surgery	14
7/female	Single	1	Re surgery	12
9/female	Single	2	Advised surgery	5

This case series includes 167 eyes of patient's age ≤ 16 years presenting with pterygium over a period of 7 years. We could not find a larger case series than this in pediatric population (PubMed search, English literature, accessed, January 16, 2015). There is only one descriptive analysis of childhood pterygium by Monga *et al.* that included 19 patients (aged 2–15 years).^[13]

In our study, mean age at presentation of 145 patients was 13.07 ± 3.2 years (range 5–16 years) with male preponderance (male:female = 3.2:1) while Monga *et al.* did not find any specific sex trend.^[13] Similar to Monga *et al.*, we did not find family predisposition for the occurrence of pterygium.^[13]

In our series, 26 eyes of 25 patients managed surgically with pterygium excision and conjunctival autograft using different techniques while the rest (151 eyes) were managed conservatively.

Available techniques to secure conjunctival autograft are sutures, fibrin glue, and sutureless glue free. Though fibrin glue is considered safe and has the advantage of patients comfort, but cost remains a major barrier for its universal use moreover, it has a risk of transmission of infectious agents such as parvovirus B19 and prion.^[14]

In our study, different techniques like multiple sutures (18 eyes), single suture (6 eyes) and sutureless glue-free (2 eyes) were used for securing autograft.

All surgeries were done by four equally experienced surgeons. The technique used was based on surgeon's choice or preference which changed with time and surgical experience.

In our study, some patients were managed with multiple sutures after pterygium excision. In literature, various suture related complications mentioned were an infection, prolonged operating time, postoperative discomfort, suture abscess, button holes, and pyogenic granuloma which usually require a second surgery for removal and chronic inflammation.^[15,16] We did not encounter any major suture related complications.

Because of the retrospective analysis we could not comment about minor suture related complications such as patient's discomfort, pain, watering, and irritation.

After getting encouraging results of using single suture technique in adults (unpublished data) after pterygium excision, we started using single 8-0 vicryl suture in the center to secure the graft in children. None of our case had graft retraction, graft dehiscence or graft displacement with a single suture.

In adults, previous studies had shown the good outcome of sutureless glue-free autografting.^[9,14,17] A randomized control trial by Singh *et al.* concluded that conjunctival grafting using the patient own blood as bioadhesive can be used for pterygium surgery safely.^[18]

However, even after thorough literature search we could not find a single report on the use of this technique in pediatric pterygium. Our initial experience with this technique is encouraging. In our case series, there are two cases with sutureless glue-free technique.

However, a larger study with longer follow-up may provide further insight to the effectiveness of this technique in the pediatric population. Monga *et al.* in the pediatric population used fibrin glue for conjunctival autografting in four cases with good graft stability.^[13]

There are chances of high recurrence after pterygium excision in pediatric population. Monga *et al.* reported recurrence in 1 eye out of 4 eyes (25%)^[13] we have comparable recurrence rate 6/26 eyes (23%). In our study, the mean follow-up of 8.03 months (range 2–30 months) which is comparable to others.^[10-13] Out of these 6 eyes with recurrence, 3 eyes were managed with re-surgery and there is no further recurrence till last follow-up [Table 2] while 3 patients refused the surgery.

In this study, we tried to find outcome of different techniques for securing the graft in pediatric pterygium. We found that the single suture and sutureless glue-free techniques were equally effective for securing graft as multiple sutures.

However, our study has some inherent limitations of being retrospective in nature, nonrandomized, small sample size (rarity of the disease in pediatric population). We cannot directly compare between our three techniques due to unequal sample size and variable follow-up. Although a prospective randomized case series with a longer follow-up is required for better understanding of outcome of childhood pterygium and recurrence with different techniques.

Conclusion

Pterygium is a rare but not uncommon in the children below 16 years of age. A single suture or sutureless glue-free technique may be a good alternative for securing conjunctival autograft after pterygium excision in children.

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Conflicts of interest

There are no conflicts of interest.

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