

Original Research Article

A comparative evaluation of conjunctival autograft and intra- operative mitomycin-C in the management of primary pterygium- our experience

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ABSTRACT

Background: Surgery is the treatment of choice in the management of primary pterygium. Recurrence following excision is frustrating to both the surgeons and patients alike. India being a tropical country is an ideal home for pterygium.

Methods: This study was carried out in a tertiary care hospital. A comparative prospective study was performed in 80 patients presenting with primary pterygium who fulfill inclusion and exclusion criteria were taken for the study for the period from January 2011 to December 2012. They were randomised in two equal groups to undergo primary pterygium surgery with conjunctival autograft and excision of primary pterygium followed by intraoperative use of Mitomycin-C for 3 minutes to study the effectiveness of adjuncts i.e. mitomycin -C and conjunctival autograft in preventing recurrence of pterygium after excision and complications following the procedure. Follow up visits were scheduled for the postoperative days 1, 7, 30 days and 3 and 6 months. mean follow up was for 9 months.

Results: No significant intra operative complications were noted except for 2 cases of button holing of the conjunctival graft. Recurrence was noted in 1 case after conjunctival autograft and 1 case in mitomycin C group.

Conclusions: The adjuncts in primary pterygium surgery as conjunctival autograft and pterygium excision with mitomycin-C significantly reduces the recurrence rates than bare sclera excision alone.

Keywords: Conjunctival autograft, Mitomycin -C

INTRODUCTION

Pterygium has been described as triangular fibrovascular connective tissue overgrowths of the bulbar conjunctiva onto the cornea. It is an acquired condition that occurs ubiquitously around the world and has been recognized since ancient times from India to Greece. Pterygium is a worldwide disease that causes chronic irritation, impaired cosmesis and decreased vision secondary to growth over the pupillary axis or induced astigmatism Pterygium has been known from ancient times.¹ In world literature, Sushruta was the first to mention about the pterygium in the 2nd century BC.^{2,4} Incidence of pterygium is more in tropical and subtropical areas. India being a tropical

country where heat and dust are an environmental synonym is an ideal home for pterygium.

Pterygium considered an ophthalmic enigma and certainly much is not known about this common condition. The two areas of greatest uncertainty about pterygium are its cause and treatment. Much has been speculated, believed and written about it but the definitive etiology and mode of development continues to elude the best of researchers. A true pterygium is a pathological encroachment of part of bulbar conjunctiva exposed in the palpebral fissure over the cornea.⁵ A wide variety of surgical methods have been employed in its treatment, with the aims of ensuring good cosmetic results, reduce the risk of recurrence, and

minimizing complications. Various methods of treatment are outlined to effectively tackle the pterygium. The high frequency of recurrence alone has been a problem leading to introduction of various treatment modalities including beta-radiation, laser, anti-metabolites and conjunctival grafting.

Intra operative Mitomycin C is one the novel adjuvant therapies to decrease the recurrence rate after surgery. Simple bare sclera excision has recurrence rate of 24-75%. Bare sclera excision with intra operative Mitomycin C has a reported recurrence of 5%-25%. Conjunctival autograft has a reported recurrence rate of 2% to 35% and minimal complications.

This study concerns itself with a Comparative evaluation of conjunctival autograft and Intra-operative Mitomycin-C in the management of primary pterygium worldwide.⁸

METHODS

Evaluation of effectiveness of adjuncts i.e. Mitomycin-c and Conjunctival autograft in preventing the recurrence of primary pterygium after excision. To Study the complications of Mitomycin-c and Conjunctival autograft in Pterygium surgery. It is a study conducted on patients presenting with Primary Pterygium to outpatient department of Ophthalmology at, Karnataka institute of Medical Sciences, HUBLI, Karnataka state from January 2011 to December 2012. 80 patients presenting with primary pterygium who fulfill inclusion and exclusion criteria were taken for the study for the period from January 2011 to December 2012.

After a short history pertaining to ocular complaints, patients were divided into 2 groups.

Group 1: included patients with excision of primary pterygium followed by Conjunctival autograft.

Group 2: included patients with excision of primary pterygium followed by intra-operative use of Mitomycin-C for 3 minutes.

Inclusion criteria

- Age more than 18 years.
- Primary fleshy pterygium.
- Growing pterygium, which has invaded more than 1mm into the cornea.

Exclusion criteria

- Other ocular diseases like scleral ulceration, conjunctivitis, corneal edema, uveitis or glaucoma.
- Recurrent pterygium.
- Major systemic diseases like collagen vascular diseases, uncontrolled diabetes mellitus.
- Patients with bleeding disorders and patients on anticoagulant therapy

Patient data

Age, Sex, Occupation, Past Ocular, Medical, Surgical History (Any H/O DM/ HTN), Indication for surgery

Pre- operative evaluation

- Vision and Refraction
- The visual acuity is recorded on Snellen chart and refraction was done with mydriasis and any astigmatism present was detected.
- Intraocular pressure
- Lacrimal Sac syringing
- Slit lamp examination is done in all cases to note the location of the pterygium – nasal or temporal, progressive / Non-progressive, extent of encroachment of pterygium on to the cornea.
- Keratometry

Surgical procedure

- All surgeries were performed using peribulbar block on an outpatient basis.
- After taking aseptic precautions, wire speculum is placed into eye.
- Then 2% xylocaine injected underneath the body of pterygium with 26 G needle.
- Dissection of pterygium usually started from the head side either sharp superficial keratectomy taking 1mm clear zone ahead of head of pterygium with No 15 BP knife upto the neck of pterygium or we can do Avulsion technique with toothed forceps shearing the pterygium head off the cornea in a circular fashion.
- The body of pterygium is lifted away from episclera, the loose adhesions between them is cut.
- The two radial incisions are placed on either side of body of pterygium about 5- 7 mm length.
- Depending on the size these incisions are united by another incision running parallel to limbus. The head, neck, and body of pterygium are removed in one piece, leaving behind the bare sclera.
- The conjunctival edges are retracted hemostasis is achieved by unipolar or bipolar thermal cautery, care is taken not to over treat the bare scleral bed with cautery.
- Further steps differ in conjunctival autograft and intra-op mitomycin-C groups.

Conjunctival autograft

- The bare sclera was resurfaced with a conjunctival autograft taken from the superotemporal bulbar conjunctiva.
- The Size of the conjunctival graft to be taken is measured using castroviejo's calipers in three different direction - extent across the limbus, maximum circumferential extent of the bed, and maximum distance from the limbus.

- The graft should be slightly larger than the host bed (about 1 mm larger than the measurements) to prevent contracture, shrinkage and gapping of the graft.
- Superior rectus bridle suture was pulled inferomedially to rotate the globe down to expose the donor area of the graft.
- The measured area of the graft to be taken is marked with several cautery spots or dye. With spring action scissors, the graft is dissected from the forniceal end towards the limbus as thinly as possible without making any button holing (by taking minimal subconjunctival tissue, the episclera and Tenon's capsule remain intact. The donor site requires no suturing and will heal rapidly without scarring.)
- The flap thus created was excised nearer to the limbus using vannas scissors
- The graft thus made was slid down to the bare sclera where the head of the pterygium was excised without lifting off the cornea, maintaining limbus to limbus orientation
- The graft was smoothened over the scleral bed using some fine non-toothed forceps avoiding inversion of the surface of the graft.
- The eye was abducted by pulling the superior rectus bridle suture laterally and clamping on to the towel. The graft was secured in place by suturing it with 10-0 nylon sutures.
- The four corners of the graft were sutured initially with 10-0 nylon sutures including the episcleral tissue on to the adjacent conjunctiva. No sutures were placed on the limbal side of the graft
- Around 2-4 additional sutures were placed on the conjunctival side of the graft, depending upon the size of the graft
- The donor area of the graft was left bare.
- 0.5 cc dexamethasone was injected subconjunctivally, at the conclusion of the procedure and the eye was patched firmly with antibiotic eye ointment.

Details of the surgical technique that are important are the retention of the conjunctiva over the body of the pterygium so that a smaller graft is required and the aggressive removal of subconjunctival tissue at the limbus to enable the proper placement of the graft. An adequately sized and shaped graft that fits well in the host bed is also important. The graft is dissected as thin as possible avoiding any button holing.

Excision with intraoperative mitomycin-C

Preparation of Mitomycin C solution: Mitomycin-c is available commercially as crystalline Mitomycin for injection. The vial contains 2mg of crystalline Mitomycin. To this vial 10 ml of distilled water is added to make its concentration to 0.02% (0.2mg/ml). The prepared solution can be kept under refrigeration for 1 week.

Operative procedure: A 3×5mm pledget cotton is soaked in 0.02% solution of Mitomycin C solution and is applied to the prepared bare scleral bed for 3 min. The pledget is removed and disposed of safely. The area is thoroughly washed with normal saline for few minutes to clear the excess of Mitomycin C in the area. Suturing the edges of conjunctiva is optional. 0.5cc of dexamethasone injection was injected to sclera. Antibiotic steroid eye ointment is applied in to the conjunctival sac and eye lid are closed firmly.

In both groups, post operatively patients were prescribed antibiotic – steroid eye drops every 2 hours for the first operative week and then tapered over the next 3-4 weeks. Antibiotic ointment was used 2 times daily for the first week. In conjunctival autograft the sutures mostly fall off by themselves after the graft is taken up or were removed after 4 weeks.

Post operatively the patients were evaluated with respect to-

- Visual Acuity
- Condition of the graft [retraction, chemosis, hemorrhage, congestion]
- Complications at the site of surgery in Mitomycin-c group.
- Condition of the donor site in conjunctival autograft group.
- Presence or absence of recurrence at 1 month, 3months, 6 months.

Follow up

Follow up visits were scheduled for the postoperative days 1, 7, 30 days and 3 and 6 months. mean follow up was 9 months Recurrence of any fibrovascular tissue past the corneal limbus onto clear cornea in the area of previous pterygium excision was considered a treatment failure presented.

RESULTS

In the present study, it is observed that the maximum incidence of Pterygium is between 20 to 40 years of age, amounting to 71.25% (57 cases).

Table 1: No of cases showing extent of corneal involvement.

Corneal extent	No of cases	Percentage
>1 and <2 mm	11	13.75
2-4 mm	52	65
>4 mm	17	21.25
Total	80	100

The mean age at presentation was found to be 37.41 years. The youngest patient was 21 years old and the oldest was

64 years. The incidence of Pterygium is higher in males (63.75%) than females (36.25%). In present study, we observed that in 65% of Pterygia the corneal extent is between 2-4 mm (Grade II), in 21.25%, corneal encroachment is more than 4 mm (Grade III) while less

than 2 mm (Grade I) Corneal encroachment was seen in 13.75% of pterygia. This discloses that most of the patients seek advice when the pterygium is progressing over the cornea.

Table 2: Complications of conjunctival autograft noted in different studies and compared with the present study.

Complications	Allan BD ²⁹ study No. of cases	Rao SK ¹⁴ study No. of cases	In present study No. of cases
Total cases studied	93	53	40
Button holing	0	2	2
Repair of wound dehiscence	3	2	1
Conjunctival granuloma	1	0	3
Conjunctival cyst	1	0	0
Graft edema	0	Most cases	3
Recurrence rate (%)	6.5	3.8	2.5

Table 3: Success rates reported in literature following conjunctival autografting in pterygium surgery 31 compared to present study.

Authors	No. of eyes (primary; recurrent)	Average follow up (months)	Recurrence rate % eyes
Kenyon ²⁴	57 (16; 41)	24	5.3 (3)
Lewallen ²⁵	19 (17; 2)	15	21.0 (4)
Singh ²⁶	15 (14; 1)	6	6.6 (1)
Simona ²⁷	14 (13; 1)	13	35.0 (5)
Koch ²⁸	22 (18; 4)	8.7	9.0 (2)
Allan ²⁹	93 (NA)	20	6.5 (6)
Chen ³⁰	23 (23;0)	13.5	39.0 (9)
Rao SK ¹⁴	53 (36; 17)	18	3.8 (2)
Young AL ³¹	52 (52;0)	12	1.9 (1)
Narsani AK ³²	52 (52;0)	12	7.6 (4)
Present study	40 (40;0)	9	2.5 (1)

Table 4: Success rate of Mitomycin-C in different studies compared to our study.

Author	No. of eyes	Dose of MMC	Average follow up	Recurrence rate % eyes
Futch - Perry ¹⁹	40	0.02/5 min	16 months	5%
Cardillo JA ²¹	227	0.02/3 min	28 months	7%
Maestro Pasquo ²²	90	0.02/3 min	34 months	12%
Sharma ²⁰	21	0.02/2.5 min	36 months	14.5%
Raiskup ²³	43	0.02/5 min	11 years	6.9%
Young AL ³¹	63	0.02/5 min	12 months	15.9%
Narsani AK ³²	31	0.02/5 min	6 months	16.13%
Present study	40	0.02/3 min	9 months	7.5%

No significant intra operative complications were noted except for 2 cases of button holing of the conjunctival graft. After placing the graft in the bed, the button hole was repaired with 10-0 nylon suture which included the underlying episclera. 3 cases (7.5%) had moderate edema in the first 2 weeks, which resolved spontaneously. In 7 case (17.5%), sutures cut through with retraction of the conjunctiva at the graft - host junction. In 1 case repair of

wound dehiscence was done. In other cases, no active treatment was instituted and the exposed area epithelialized adequately on follow-up without compromising surgical or cosmetic results.

8 cases (20%) had suture irritation during first 3-4 days, which subsided with instillation of lubricating eye ointment.

3 Cases (7.5%) of pyogenic granuloma were noted and were easily rectified by further minor surgery. Recurrence was noted in 1 cases (2.5%) after conjunctival autograft.

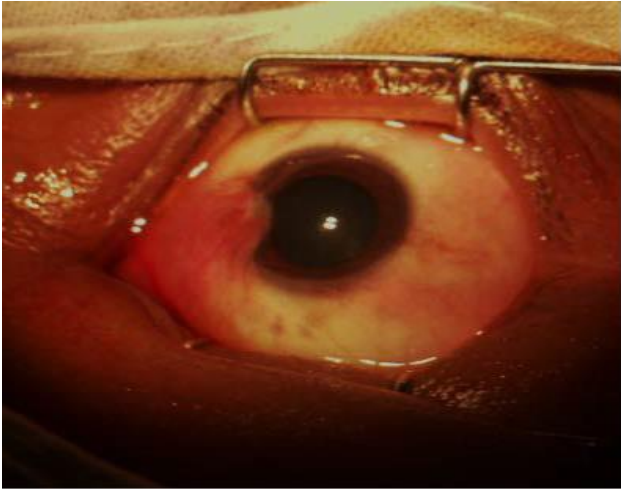


Figure 1: Type 2 pterygium.

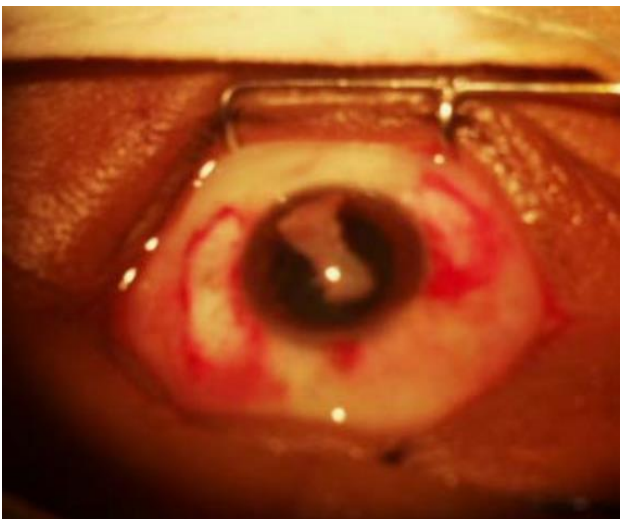


Figure 2: Conjunctival autograft taken from superotemporal site.



Figure 3: Preparation of mitomycin C.



Figure 4: Application of Mitomycin C.

DISCUSSION

The observations made in this study are discussed here and the results have been compared to previous studies. In the present study, maximum incidence of pterygium has occurred between age group of 20 to 40 years amounting to 71%. This shows clear preponderance of pterygium in younger people.

As per the results of our study the mean age of presentation was 37.41 years. Males were more affected than the females (63.75% male and 36.25% females). The higher incidence in males is probably due to the fact that males were mostly involved in outdoor activities, which predisposes them to the sunny, hot, dusty atmosphere for long time. The maximum incidence of pterygium was seen in outdoor workers (71.25%). The study has shown that pterygium is more common in people who are exposed to sunlight dust, winds for long periods are more likely to develop pterygium. 55 cases (68.75%) were from rural area, while 25 cases (31.25%) were from urban area.

Most of the patients presented with multiple symptoms. 75% of the patients presented with complaint of growth in the eye while 30% patients complained of foreign body sensation, 25% patients came with complains of redness and watering, 18.75% with complains of diminution of vision while 12.5% complained of pain. Pterygium occurred in right eye in 32.5% of cases while left eye was affected in 38.75% of cases. Both eyes were affected in 28.75% of cases. Most authors believe that though initially pterygium affects one eye, it may involve the other eye also after some period. 82.5% had nasal pterygium which is in accordance with the literature documentation of nasal preponderance of pterygium. In Rao SK et al study pterygium was nasal in 46 (86.8%) eyes, temporal in 4 (7.5%) eyes and both nasal and temporal in 3 (5.7%) eyes.

Majority of patients (69 eyes; 86.25%) had pterygium with corneal extent of more than 2 mm (Grade II or more). This shows the patients have not presented early may be due to

lack of knowledge of availability of services, illiteracy and ignorance.

Only fleshy, progressive pterygium was taken for the study. Stationary and atrophic pterygium was excluded from the study. 80 patients presenting with primary pterygium, after a short history pertaining to ocular complaints were divided into 2 groups.

Group 1 - includes patients with excision of primary pterygium followed by conjunctival autograft.

Group 2 - includes patients with excision of primary pterygium followed by intra-operative use of 0.02% mitomycin-C for 3 minutes.

The results were studied for Complications associated with both methods, effectiveness of adjuncts i.e. Mitomycin-C and Conjunctival autograft in preventing the recurrence of primary pterygium after excision. Corrective surgery for minor complications after Pterygium excision and conjunctival autografting was required in five cases out of 93 cases in the study conducted by Allan BD et al Kenneth KR et al noted no intra operative or major postoperative complications in his benchmark study.^{8,9} A no suture approach to pterygium surgery, a new technique developed with the objective to lessen patient discomfort by using glue rather than sutures when securing the autologous conjunctival autograft.¹⁰

Tisseel Duo quick is a two-component tissue adhesive which mimics the natural fibrin formation. This glue has two components. One consists of fibrinogen mixed with factor xiii and aprotinin. The other component is a thrombi-CaCl₂ solution.¹¹ Koranyi G et al conducted a randomized prospective clinical trial to compare the pain and the surgery time for sutured and for glued autologous conjunctival transplants in pterygium surgery.¹¹

They found the average pain was significantly lower when glue had been used, $P < 0.05$. Average surgery time was 9.7 minutes (range 6-13) for glue and 18.5 minutes (range 12-30) for sutures, $p < 0.001$. No complications were noted in the study. It was concluded that using glue instead of sutures when attaching the conjunctival transplant in pterygium surgery causes significantly less post-operative pain and shortens surgery time.

In the present study, no significant intraoperative complications were noted except for 2 cases of button holing of the conjunctival graft. After placing the graft in the bed, the button hole was repaired with 10-0 nylon suture which included the underlying episclera. 3 cases (7.5%) had moderate edema in the first 2 weeks, which resolved spontaneously.

In 7 case (17.5%), sutures cut through with retraction of the conjunctiva at the graft - host junction. In 1 case repair of wound dehiscence was done. In other cases No active treatment was instituted and the exposed area

epithelialized adequately on follow-up without compromising surgical or cosmetic results.

8 cases (20%) had suture irritation during first 3-4 days, which subsided with instillation of lubricating eye ointment. 3 cases (7.5%) of foreign body granuloma were noted and were easily rectified by further minor surgery.

Recurrence was defined as fibrovascular tissue crossing the corneoscleral limbus onto the clear cornea in the area of previous pterygium excision.^{14,15} Recurrence was noted in 1 case each (2.5%) in conjunctival autograft and Mitomycin-C group. Recurrence may occur at the superior and inferior margins of the conjunctival autograft, suggesting that either inadequate peripheral excision of pterygium tissue or insufficient graft sizes are contributing factors. Early breaking of sutures will lead to localized graft retraction and a site for localized recurrence. It should be noted that certain cases a well aligned and sutured, thin conjunctival graft may itself subsequently transform into a recurrent pterygium at the region of the limbus suggesting that a corneal or limbal factor may be responsible for recurrence in this instance.¹³

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Ethical approval: The study was approved by the institutional ethics committee

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