



DIFFERENT TECHNIQUES OF PTERYGIUM SURGERY AND PROSPECTIVE ANALYSIS

Ophthalmology

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ABSTRACT

Background : The term pterygium is derived from Greek word 'pteron' meaning wing. Pterygium is a triangular shaped growth onto cornea, usually nasally, of fibrovascular tissue that is continuous with conjunctiva.

Objectives : To compare between intraoperative application of Daunorubicin (0.02 %), conjunctival autografting and Bare sclera technique and their effectiveness, effects and rate of recurrence.

Material and Methods : Present study was conducted at Eye department at MGM Medical College and Hospital, Jamshedpur, Jharkhand was analysed retrospectively.

Results : When recurrence rates of groups I and II was compared. There was a significant difference between recurrence rate. When recurrence rates of group II and III were compared statistically the difference was not significant.

Conclusion: With excision of pterygium with bare sclera technique recurrence rate is very high and it should be avoided, but excision of pterygium with conjunctival autografting and intraoperative application of daunorubicin (0.02 %) for 3 minutes are both equally effective adjuncts to prevent recurrence in pterygium surgery.

KEYWORDS

Different Techniques, Pterygium Surgery, Prospective Analysis

INTRODUCTION

Pterygium is one of the oldest disease known in the history of Medicine. It is a degenerative condition of the subconjunctival tissue, which proliferates as a triangular sheet of vascularised granulation tissue to invade the cornea, destroying the superficial layers of the stroma and Bowman's membrane, the whole being covered by conjunctival epithelium.

Pterygium occurs either on nasal or temporal side or on both side. Besides the cosmetic appearance, the patient may complaint of discomfort with recurrent redness of eye, swelling, tearing, burning sensation and occasionally pricking or gritty sensation. When the axial area of the cornea is invaded, vision gets increasingly affected. This occurs even before the Pterygium itself has reached the area because of the irregular astigmatism produced by corneal folds. In advanced Pterygium ocular motility may be restricted leading to diplopia in certain field of gaze.

Additional evidence suggests that both spatial contrast sensitivity and glare disability are worsened in patients with Pterygia even when the snellen visual activity is minimally affected.

Though the disease is known from time immemorial, no satisfactory treatment has yet been evolved up till now. The treatment of Pterygium is mainly surgical. Common operations devised for Pterygium are excision with bare sclera technique, transplantation of Pterygium or McReynold's operation and excision by D'ombrain's techniques. However the operations done are marked with high failure rate due to recurrences. Different adjuvant procedures like lamellar corneal graft, irradiation etc. to prevent recurrence are not encouraging. Pterygium surgery with application of antiproliferative agent Mitomycin-C was used for first time by Kimoto et al in 1963. It showed promising result. Later studies of application of Mitomycin -C by different authors like Cano Pera F et al, Pand A et al also showed low recurrence rate following Pterygium surgery with varying results.

Though Mitomycin-C application in Pterygium surgery is a successful procedure, but due to it's varying recurrence rate and ocular toxicity there was need for search of another antiproliferative agent with less ocular toxicity and less recurrence rate of Pterygium.

Of late a new anticancer drug named DAUNORUBICINE (0.02 %) has been used intraoperatively in Pterygium surgery by Dadeya

Subhas et al with promising results. Pterygium excision with CONJUNCTIVAL AUTOGRAFTING is very popular technique to prevent recurrence with very few side effects. This is being tried out with success in different country.

In the present series an attempt was made to do a comparative study between intraoperative application of Daunorubicin (0.02 %), conjunctival autografting and Bare sclera technique and their effectiveness, effects and rate of recurrence in patients attending in the department of Ophthalmology, MGM Medical College and Hospital, Jamshedpur, Jharkhand.

Aim Of The Study

The aim of this study is to compare the efficacy, side effects and recurrence rates of Bare sclera technique, Conjunctival autografting and intraoperative application of daunorubicin (0.02%) in pterygium surgery.

MATERIALS AND METHODS

The study was carried out on 60 patients who presented to the Eye department at MGM Medical College and Hospital, Jamshedpur, Jharkhand was analysed retrospectively.

Efforts were made to select patients with primary fleshy pterygium.

Patients selected were divided into three groups Group I, Group II and Group III.

Group I : 20 patients were selected randomly with primary pterygium. The pterygium were excised with bare sclera technique.

Group II : 20 patients were selected randomly with primary pterygium. The pterygium were excised with bare sclera technique. Conjunctival autograft titalcen from superior bulbar conjunctiva is placed on the scleral bed and sutured with 10-0 Nylon in interrupted monnen.

Group III : 20 patients were selected randomly with primary pterygium. The pterygium were excised with bare sclera technique, and then 0.2 mg/ml (0.02 X) of Daunorubicin was applied with a sponge (3x4 mm) to the bare sclera area intraoperatively for 3 minutes and then was hed off thoroughly with normal saline.

All patients under this study were subjected to a thorough general and

ocular examination.

PATIENT WORK UP:- (PRE-OPERATIVE):

- (A) HISTORY
- (B) SYSTEMIC EXAMINATION
- © GENERAL OPHTHALMIC EXAMINATION
- (D) REFRACTION

(A) HISTORY:

- (1) Age, sex and chief complaints with duration were noted.
- (2) A detailed occupational history was obtained in all cases.
- (B) SYSTEMIC EXAMINATIONS : were also done for diabetes, hypertension, acute infections and asthma.

A complete haemogram, including haematocrit, haemoglobin, red blood cell count, white blood cell count and differential count, were performed. Special stress was laid on examination of bleeding time and clotting time.

© LOCALEXAMINATION:

It was done meticulously under the following format.

- (a) Visual acuity : It was recorded on Snellens chart before and after the operation at the 7th day and after 6 months.
- (b) Examination of Adnexa : Lids, blinking, ocular fixation and motility were recorded. Patency of the lacrimal passages were noted.
- (c) Anterior Segment Examination : (Using the slit lamp biomicroscope).
- (i) Conjunctiva : Pterygium with its extent, involvement of the cornea specially the pupillary region and location.
- (ii) Size and extent of pterygium over the conjunctiva.
- (iii) Typing of pterygium – progressive, stationary or atrophic.
- (iv) Any signs of conjunctival inflammation.
- (v) Conjunctival scarring, granulation tissue, bleb, follicular reaction at superior bulbar conjunctiva from where the graft will be taken.

Cornea :

- Extent of involvement with respect to the pupillary zone.
- Depth of involvement of the cornea.
- Any signs of corneal inflammation.
- Previous scarring/opacities which may interfere with vision.
- Transparency – with depth and topography of opacity, oedema, sub-epithelial precipitates, stocker's line etc.

Anterior Chamber :

Central and peripheral depth (Van Herrick method).

Pupil :

Reaction, size, shape, border, pupillary reaction to light, posterior synechiae etc.

Iris :

Atrophy, iridectomy, exfoliation, ectropion uveae, rubeosis, granulomata, heterochromia.

Lens : Special emphasis was laid on lens opacities, Lens position (subluxation and dislocation) and shape (intumescence) were also noted.

Fundus : Using direct ophthalmoscope.

- (a) Optic disc : Colour and regularity of neuroretinal rim.
 - Size of disc
 - Shape of the cup and its depth
 - Arterial pulsations, C : D ratio.
 - Optic disc margins.

- (b) Nerve fibre layer (using red free light) :

© Macula

- Foveal reflex
- Pigmentary atrophy and drusen.

- (d) Surrounding retina.

(D) Refraction :

Using retinoscopy (objective refraction) with the patient under cycloplegic followed by post-mydriatic test (Subjective refraction). This was done before and after the operation on the 7th post-operative

day. Next refraction was done after 6 months post-operatively.

METHOD OF OPERATION :

All the selected cases underwent the procedure as described below :-

After full preoperative assessment the excision of primary pterygium was done followed by conjunctival grafting in 30 cases.

Antiseptic dressing was done with 10 % Betadine for skin and 5 % Betadine drops for conjunctiva.

ANAESTHESIA : Topical 4 % Lignocaine drop was first instilled into the conjunctival sac before the insertion of lid speculum. Then after insertion of lid speculum 0.5 to 1 ml of 2 % Lignocaine with adrenaline was injected sub conjunctivally over the pterygium.

INSTRUMENTS : (i) Universal eye speculum (ii) Sclapel blade No. – 15 (iii) Plain forceps (iv) Fixation forceps (v) Curved fine pointed conjunctival scissors (vi) Cautery (vii) 10-0 Nylon (viii) Needle holder (ix) Operating microscope.

SURGICAL TECHNIQUE :

(I) BARE SCLERA TECHNIQUE (GROUP I):

In group I patients which included 20 patients pterygium was excised with Bare sclera technique.

First of all 4 % Lignocaine was instilled into conjunctival sac after that universal eye speculum was inserted for better exposure. After that 0.5 to 1 ml of 2 % Lignocaine with adrenaline was injected sub conjunctivally at the site of pterygium to obtain local anaesthesia. An operating microscope was employed to facilitate the resection of pterygium. The neck of pterygium was grasped with fixation forceps and it was slowly dissected out from over the cornea with the help of scalpel blade (No. 15). The dissection was started from just in front of the head of the pterygium. After the pterygium was removed from over the cornea subconjunctival dissection of the fleshy mass was done. Subconjunctival dissection of the fleshy tissue was carried on with curved pointed scissors. After having split the subconjunctival thick tissue from the overlying conjunctiva into two distinct layers the subconjunctival tissue was made free from all attachments to the sclera and was pulled up with toothed forceps and was excised from its base by the help of scissors. Before excising the subconjunctival mass it was thoroughly checked that medial rectus is free from it. The cut stump of the subconjunctival tissue recedes back deeply into the orbit. Then about 6 mm of the apex of the conjunctiva was cut.

Cautery was applied to exposed area of the sclera adjacent to the limbus and to any bleeding vessels on the sclera.

2. CONJUNCTIVAL AUTOGRAFTING (GROUP II):

After that to the patients belonging to group II, conjunctival autografting was done with following procedure in 20 patients.

The size of the conjunctival graft required to resurface the exposed scleral surface was determined by using castroviejo calipers in 3 directions –

- (a) Extent across the limbus
- (b) Maximum circumferential extent of the bed vertically.
- (c) Maximum distance from the limbus to the medial margin of excised conjunctiva.

The globe is then rotated downward and slightly inward by means of a stay suture passed through the conjunctiva adjacent to the superotemporal limbus and traction executed by attaching the suture to the face mask with an artery forceps. This exposes wide area of bulbar conjunctiva in the superior.

The upper two corners of the graft were held with non toothed forceps and from the upside down position (deeper surface of the conjunctiva facing outwards) the conjunctival flap is overturned so that the superficial conjunctival surface faces outwards. Care should be taken not to disturb the medio-lateral orientation of the graft.

Now the conjunctival graft is spread over the cornea with the limbal part of the graft facing temporally, without lifting the graft from the cornea it is pulled by holding the upper and lower corners of the nasal (non-limbal) side of the graft and moved into the scleral bed (area of resected pterygium) with fine non-toothed forceps. The limbal

conjunctiva in the graft was placed over the limbus in the scleral bed. The spreading of the graft prevented scrolling and inversion of the surfaces. The use of non toothed fine forceps also prevented this complication, as also did meticulous handling of the graft and the identification of the superficial surface by Gentian violet marks.

The graft, over the scleral bed, was smoothed and spread out. Care was taken to prevent and smoothen any folding of the edges. The patient was asked to abduct the eye to give maximum exposure to the area of the scleral bed.

The suture is done with 10-0 Nylon. Initially the two corners adjacent to the limbus i.e. upper and lower corners of the limbal position of the graft were sutured to the adjacent conjunctiva. This serves to stabilize the graft. Next, the upper and lower corners of the canthal side (Medial side of the graft) were sutured to the adjacent conjunctiva. Deep bites were taken to include part of the episclera within the sutures. This helps to prevent a post-operative wound dehiscence. Before taking each bite care was taken to prevent infolding of the edges. Further, sutures were placed in between the previous anchoring sutures. Approximately two sutures were needed in between the previous four sutures for the upper, lower and canthal sides respectively. No sutures were placed on the limbal edges of the graft except for the corners.

The donor site was covered by undermined and supero-temporal areas. The dimensions of the intended conjunctival graft (including limbal conjunctiva) were measured and marked with gentian violet. The gentian violet marks have two advantages.

- (a) Aid in excision of an adequately sized graft over the scleral bed, with no tractional elements and iatrogenic gaps caused by traction.
- (b) Aids in preventing inadvertent upside down orientation of the graft in recipient bed. The coloured surface always remains superficially.

A 1 : 1 solution of Lignocaine with adrenaline was injected subconjunctivally by a 26 G needle outside the gentian violet marks to serve two purposes .

1. Anaesthesia of the graft area.
2. Elevation of the conjunctiva from the deeper tissue to aid in conjunctival dissection using a non-toothed forceps and scissors, dissection was started from the fornical end. The conjunctiva is undermined carefully and dissection is carried out in the undermined positions.

The lateral borders of the conjunctival donor graft are outside the gentian violet markings so that the markings are prominent and can serve for orientation as outlined above in (II). In the final graft, the limbus remains as the edge without any violet markings. Care is taken to make the donor graft only conjunctival without button holing. This graft heals post operatively with minimum shrinkage. Now, the dissection which had started from the fornix reaches the limbus. Once the limbus was reached, the graft was turned over and spread out over the cornea so that, the underside faces upward. Any minor amount of subconjunctival tissue was removed from the underside of the graft to maintain uniform thickness, reduce fibrosis and prevent any nidus for recurrence. The graft was taken as much closure to the limbus as possible, to include maximum amount of limbal tissue, which prevents recurrence.

Now, the Tenon's attachments at the limbus were meticulously dissected. The flap is then excised with a vannas scissors, taking care to include the limbal conjunctiva. The stay suture may be removed if it interferes with dissections of conjunctiva. It usually takes a maximum of 4-5 days to heal.

At the end of the procedure, a mixture of 0.5 cc gentamicin and 0.5 c.c Dexamethasone was taken in the 2 cc syringe and injected subconjunctivally by a 26 G needle. Then, an antibiotic ointment was applied over the conjunctiva and the eye was patched with eye pad firmly, over which a bandage was applied.

3. Bare Scler Technique With Intraoperative Instillation Of 0.02% Daunorubicin (group III) :

In 20 patients belonging to group III, after excising the pterygium mass with bare sclera technique, Daunorubicin 0.2 mg/ml (0.02 %) was applied.

Method of Preparation of Daunorubicin :

Daunorubicin is available in 20 mg vials as powder. It is reconstituted by diluting with distilled water. First 10 ml distilled water is added in to the vial, then 1 ml of the reconstituted drug is drawn in a 10 ml syringe and lastly it is diluted with 9 ml of distilled water 1 ml of this reconstituted solution contains 0.2 mg of Daunorubicin.

After that. In group II patient, after excision of pterygium with bare sclera technique Daunorubicin 0.2 mg/ml (0.02 %) was applied with a sponge (3 × 4 mm) to the bare sclera intraoperatively for 3 minutes and then washed off thoroughly with normal saline. Then pad and bandage applied after administration of antibiotic ointment.

Post-Operative Treatment :

The pad and bandage were removed next day. A systemic antibiotic was given for a week and oral analgesic and H₂ blockers for 3 days. Patients were prescribed Dexamethasone eye drop (0.1 %) four times daily for 1st week and twice daily for next one week. Ciprofloxacin eye drop 4 times daily for 2 weeks and ciprofloxacin eye ointment at bed time for 2 weeks. Conjunctival stitches were removed on the 7th post-operative day.

After examining the patient on 1st post operative day again patient was examined on 7th post-operative day. Eye was stained with 2 % freshly prepared Fluorescein and examined under slit lamp using cobalt blue filter light for superficial punctate keratitis. The subsequent check ups were on 15th post-operative day, at 1st month, 3rd month and 6th month and same procedure was follow up to 1 year.

RESULTS

Pterygium often causes cosmetic blemish as well as visual disturbance. Though operation of pterygium is not very difficult yet it sometimes gives rise to recurrence and become surgical excision of pterygium with bare sclera technique is associated with high degree of recurrence of pterygium. along with conjunctival autografting is an effective procedure to prevent recurrence of pterygium. A new anticancer drug daunorubicin (0.2 mg/dl) has been applied intra-operatively in pterygium surgery to prevent recurrence with very good result and fewer side effects. The aim of this study is to compare the efficacy, side effects and recurrence rates of Bare sclera technique (Group I), Conjunctival autografting (Group II) and intraoperative application of daunorubicin (0.02%) (Group III) in pterygium surgery.

The present study was conducted on 60 patients, who presented to the eye department at MGM Medical College and Hospital, Jamshedpur, Bihar were analysed. The patients in the age group of 20 years to 65 years were randomly selected for the study.

Patients selected were divided into three groups –

Group I : Bare sclera technique was done.

Group II : Conjunctival autografting was done.

Group III : Intraoperative daunorubicin were applied.

Following observations were seen in present study :

- It was found that pterygium was more prevalent in between 3rd and 5th decade and beyond this range of age the incidence declines.
- The disease was more common in males than females.
- In symptomatology growth of red mass or fleshy mass was the predominant presenting symptom. This was followed by redness and irritation of the eye.
- In most of the patients improvement of visual acuity occurred after pterygium surgery.
- In group one patients, (Bare sclera technique) was done recurrence rate was 40 % (8 of 20).
- In group two patients, (Conjunctival autografting) recurrence rate was 10% (2 of 20).
- In group three patients (Intraoperative application of daunorubicin) recurrence rate was 5% (1 of 20).

When recurrence rates of groups I and II was compared. There was a significant difference between recurrence rate. When recurrence rates of group II and III were compared statistically the difference was not significant.

CONCLUSION

So it was concluded that with excision of pterygium with bare sclera

technique recurrence rate is very high and it should be avoided, but excision of pterygium with conjunctival autografting and intraoperative application of daunorubicin (0.02 %) for 3 minutes are both equally effective adjuncts to prevent recurrence in pterygium surgery.

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