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Research Article

Comparative study of intraoperative application of daunorubicin and conjunctival autograft in primary pterygium surgery: an interesting followup study

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ABSTRACT

Background: The exact aetiology and pathogenesis of pterygium remains unclear but it is more common in people with excessive outdoor exposure to sunlight and wind, such as those who work outdoors. Pterygium is of great concerns to both surgeons and patients, as it has been shown to recur in up to 97% of patients within one year after surgical removal. Different adjuvant procedures like lamellar corneal graft, irradiation etc. to prevent recurrence is not encouraging. Of late a new anticancer drug named Daunorubicine (0.02%) has been used intraoperatively in pterygium surgery by one of the study 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.

Methods: The study was carried out on 60 patients who presented to the eye department at Darbhanga medical college and hospital, Laheriasarai (Bihar), India during the period from May 2005 to may 2006, & was analysed retrospectively. Efforts were made to select patients with primary fleshy pterygium.

Patients selected were divided into two groups group 1 & group 2. All patients under this study were suggested to a thorough general & ocular examination. Pterygium excision in all selected cases was done under topical 4% lignocaine drop & subconjunctival injection of 2% lignocaine with adrenaline; pterygium was slowly dissected out. After the pterygium was removed from over the cornea subconjunctival dissection of the fleshy mass was done. The graft, over the scleral bed, was smoothed & spread out; the suture is done with 10-0 nylon. Post – operative management was done. The subsequent checkups were on 15th post-operative day, at 1st month, 3rd month & 6th month & same procedures were followed up to 1 year. Data was compiled in MS-Excel and checked for its completeness and correctness. Then it was analyzed.

Results: Majority of patients was of age group ranged from 31 years to 50 years. 11 patients were less than 30 years of age. In group I, out of 30 eyes of 30 patients three eyes (10 %) had bilateral pterygium (both nasal and temporal). Two eyes (6.7%) had temporal pterygium. Rest 25 eyes (83.3%) had pterygium located nasally. In group II, out of 30 eyes of 30 patients two eyes (6.7%) had bilateral pterygium. Three eyes (10%) had temporal pterygium. Rest twenty five eyes (83.3%) had pterygium located nasally. Improvement of visual acuity in most of the patient after pterygium surgery. In group I, out of 30 eyes, two patients had developed recurrence, so the recurrence rate in group I is 6.6 %. In group II, out of 30 eyes, one patient had developed recurrence. So the recurrence rate in group II is 3.3%.

Conclusions: The present study concluded that both the procedures are equally effective adjuncts to prevent recurrence in pterygium surgery.

Keywords: Pterygium, Conjunctival autograft, Daunorubicin.

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.[1]

The exact aetiology and pathogenesis of pterygium remains unclear but it is more common in people with excessive outdoor exposure to sunlight and wind, such as those who work outdoors. Pterygium is of great concerns to both surgeons and patients, as it has been shown to recur in up to 97% of patients within one year after surgical removal.[2]

Additional evidence suggests that both spatial contrast sensitivity and glare disability are worsened in patients with Pterygium 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,[3, 4] transplantation of Pterygium head or McReyonld's operation[5,6,7] and excision by D' ombrain's techniques.[8]

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 is not encouraging. Pterygium surgery with application of anti proliferative agent Mitomycin-C was used for first time by kimotomonital et al in 1963.[9] It showed promising result. Later studies of application of Mitomycin-C by different authors like Juan Cano Parra et al[10] and Pada et al[11] also showed low recurrence rate following Pterygium surgery with varying results

Though Mitocmycin-C application in Pterygium surgery is a successful procedure, but due to its 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 one of the study 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%) and conjunctival autografting and their effectiveness, effects and rate of recurrence in patients attending in the department of Ophthalmology, D.M.C.H., Laheriasarai, Bihar, India.

METHODS

The study was carried out on 60 patients who presented to the eye department at Darbhanga medical college and hospital, Laheriasarai (Bihar), India during the period from May 2005 to may 2006, & was analysed retrospectively. Efforts were made to select patients with primary fleshy pterygium. Ethical considerations were met through intuitional ethical committee. Each patient was informed and consent was taken.

Patients selected were divided into two groups group 1 & group 2.

Group – 1 – 30 patients were selected randomly with primary pterygium. The pterygium were excised with bare sclera technique after pterygium excision, conjunctival autografting was done & sutured with 10-0 nylon.

Group - 2 – 30 patients were selected randomly with primary pterygium. The pterygium were excised with sclera technique & the intraoperative 0.02% daunorubicin was applied.

All patients under this study were suggested to a thorough general & ocular examination including visual acuity, intra- ocular pressure, examination of adnexa anterior segment examination using slit lamp bio microscope which includes side & extent of pterygium over the conjunctiva, typing of pterygium, extent of involvement with respect to pupillary zone over cornea & depth of involvement of cornea, refraction & dilated fundoscopy.

Method of operation

Pterygium excision in all selected cases was done under topical 4% lignocaine drop & subconjunctival injection of 2% lignocaine with adrenaline; pterygium was slowly dissected out from over the cornea with the help of scalpel 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. 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 was pulled up with toothed forceps and was excised from its bare by the help of scissors.

Conjunctival autografting

The size of the conjunctival graft required to resurface the exposed scleral surface was determined by using

castroveigo callipers. A free conjunctival graft was taken from the superior bulbar conjunctiva.

The upper two corners of the graft were held with nontoothed forceps & from the upside down position the conjunctival flap is overturned so that the superficial conjunctival surface faces outward.

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 & lower corners of the nasal side of the graft & moved into the scleral bed with fine non toothed forceps. The limbal conjunctiva in the graft was placed over the limbus in the scleral bed.

The graft, over the scleral bed, was smoothed & spread out; the suture is done with 10-0 nylon.

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

In 30 patients belonging to Group 2, after excising the pterygium mass with bare sclera technique, Daunorubicin 0.2 mg/ml (0.02%) was applied with a sponge (3 x 4mm) to the bare sclera intraoperatively for 3 minutes & then washed off thoroughly with normal saline. Then pad and bandage applied after administration of antibiotic ointment.

Post – operative treatment

The pad & bandage were removed next day. A systemic antibiotic was given for a week & oral analgesic &H_2 blocker for 3 days. Patients were prescribed Dexamethasone eye drop (0.1%) four times daily for 1st week & twice daily for next one week. Ciprofloxacin eye drop 4 times daily for 2 week. Ciprofloxacin eye ointment at bed time for 2 week. Conjunctival remnants were removed on the 7th post operative day. After examining the patient on the 7th post operative day again patient was examined on 7th post – operative day.

The subsequent checkups were on 15th post-operative day, at 1st month, 3rd month & 6th month & some procedures were followed up to 1 year. Data was compiled in MS-Excel and checked for its completeness and correctness. Then it was analyzed.

RESULTS

In group I, 30 eyes of patients were treated, out of which twenty one patients (70%) were males and nine patients (30%) were females. Their age ranged from 24 years to 62 years (average age 39.12 years).

Table 1: Background characteristics of study subjects.

Treatment Group	No. of eyes	Average-Age (In yrs.)	Gender (M:F)
Group I	30	39.12	21:9
Group II	30	41.32	23:9

In group II, 30 eyes of 30 patients were treated, twenty three (76.59%) were males and seven (23.31%) were females. Their age ranged from 25 years to 60 years (average age 41.32 yrs [Table 1].

Table 2: Showing incidence according to age distribution.

Age incidence (in years)	Number of cases
0-20	1
21-30	10
31-40	11
41-50	18
51-57	8
58-65	12

Majority of patients were of age group ranged from 31 years to 50 years. 11 patients were less than 30 years of age [Table 2].

Table 3: Showing incidence according to type of ptergium in group 1.

Type of Pterygium	Number of cases	Per (%)
Nasal	25	83.3%
Temporal	2	6.7%
Both	3	10%

In group I, out of 30 eyes of 30 patients three eyes (10 %) had bilateral pterygium (both nasal and temporal). Two eyes (6.7%) had temporal pterygium. Rest 25 eyes (83.3%) had pterygium located nasally [Table 3].

Table 4: Showing incidences according to type of ptergium in group II.

Type of Pterygium	Number of cases	Percentage (%)
Nasal	25	83.3 %
Temporal	3	10 %
Both	2	6.7 %

In group II, out of 30 eyes of 30 patients two eyes (6.7%) had bilateral pterygium. Three eyes (10%) had temporal pterygium. Rest twenty five eyes (83.3%) had pterygium located nasally [Table 4].

In group I, during 1st postoperative week, 6 patients had foreign body sensation, 4 patients had lacrimation and in 2 patient photophobia was present. During 2nd postoperative week after removal of stitches foreign body sensation was absent in all six patients, but lacrimation and photophobia was present which is much reduced in severity. After one month post-operatively, when patients came for check-up these symptoms were absent.

Table 5: Showing distribution of postoperative subjective symptoms

Postoperative Subjective Symptoms	
Group I	**Group II**
Foreign Body sensation – 6 patients Lacrimation – 4 patients Photophobia – 2 patients	Conjunctival congestion – 4 patients Lacrimation – 3 patients Photophobia – 3 patients

In group II, during 1st postoperative week. 4 patient had conjunctival congestion, 3 patients had lacrimation, 3 patients had photophobia. During 2nd postoperative week, the above symptoms were present, but very much reduced in severity. These symptoms were very less than group I. All symptoms subsided within one month [Table 5].

Table 6: Showing distributions of postoperative complications.

Postoperative Complications	
Group I	Group II
1. Loose Graft – One patient (3.33%) 2. Graft oedema – One Patient (3.33%) 3. Graft displacement – One patient (3.33%) 4. Pyogenic granuloma – one patient (3.33%) 5. Vascularisation of graft – 6 patients (20%) 6. Graft rejection - Nil	Chemosis- Three Patients (10%) Delayed Epithelialisation – 4 patients (13.3%)

In Group I, Complication like loose graft was seen in patient (3.33%). In one patient (3.33%) graft became displaced. One patient (3.33%) developed Pyogenic granuloma. The granuloma was excised after detection (4 week postoperative). One patient (3.33%) developed graft oedema, which gradually resolved. Vascularisation of graft was common problem occurring in 6 patients at the end of 2nd week.

In Group II patients, corneal wound had healed within 1st post-operative week in all patients. Three patient (10%) developed chemosis of conjunctiva, which gradually subsided. After completion of 2nd weeks bare sclera was still present. But in most of the cases bare sclera got covered by epithelium within 3 months, excepting few i.e. 4 cases (13.3%), where it took more than three months for bare area of the sclera to be covered by epithelium. After 6 months in all the cases bare area was covered by epithelium [Table 6].

Table 7: Showing comparison of pre and post-operative visual acuity.

No. of Patient	Pre-operative visual Acuity	Post-operative Visual Acuity
2	Finger Counting	6/60
7	6/60	6/24
10	6/24	6/12
12	6/18	6/9
13	6/12	6/6
16	6/6	6/6

Above table shows improvement of visual acuity in most of the patient after pterygium surgery [Table 7].

Table 8: Showing recurrence in study group.

Treatment group	No. of eyes	No. of eyes with Recurrence	Recurrence Rate
I	30	2	6.6 %
II	30	1	3.3 %

In group I, out of 30 eyes, two patients had developed recurrence, so the recurrence rate in group I is 6.6 %. In group II, out of 30 eyes, one patient had developed recurrence. So the recurrence rate in group II is 3.3%. The difference of recurrence rate between two groups is statistically significant or not was tested by following formula. The standard error of difference is 5.6, whereas observed difference (6.66-3.33) was 3.33. The observed difference between the two groups is less than twice the S.E. of difference i.e. 25.6. Therefore observed difference between recurrence rates was not significant [Table 8].

DISCUSSION

In present study pterygium was more common in males than females. In group I out of thirty patients, twenty one patients (70%) were males nine patients (30%) were females. In group II, out of thirty patients, twenty three (76.59%) were males and seven (23.31%) were females. Parthasarathy et al (1967) had a similar observation in rural India in pterygium and found prevalence of pterygium higher among the males. Out of total of 98, 790 male patients of eye diseases, they found pterygium in 1728 persons (1.74%) and out of 93,991 females, 1120 (1.19%) were suffering from pterygium.[12]

Gerundo (1951) in his series of 25 patients of pterygium in Hawii found most patients were within the age limits of 30 to 60 years. Parthsarathy et al in their study in rural

India found that after the age of 25 years, there is sudden increase in prevalence of pterygium in both sexes. The prevalence shoots up from 0.9 % to 6.1 % in males and from 0.65 % to 3.85 % in females.[12,13]

In present study, in group 1 patients, complications like loose graft were seen in one patient (3.33%). In one patient (3.33%) graft became displaced, one patient (3.33%) developed graft oedema, which gradually resolved. Vascularisation of graft was present in six patients (20%). Kenyon et al described the conjunctival autograft in pterygium surgery. In his study minor complications like conjunctival graft oedema, Pyogenic granuloma, epithelial inclusion cyst formation, retraction and necrosis of graft was present,[14] which almost matches with my study. Dadeya et al (2002) conducted a study on conjunctival autograft. In their study, they found complications like pyogenic granuloma in 5.5%, graft oedema in 2.77% loose graft in 2.77 % and dellen formation in 2.77%.[21] In group2 patients three (10%) patients developed chemosis and four (13.3%) patient had delayed epithelialisation.

Dadeya et al first used intra-operative daunorubicin (0.02%) after excising the pterygium. They found complications like chemosis in 21.42% and delayed epithelialisation in 4.76 % patients.[20]

In present study improvement of visual acuity occurred in most of the patients after pterygium surgery. The improvement was mainly in the group who had significant loss of visual acuity due to progressive pterygium involving cornea more than midway between limbus and nasal pupillary margin. The group, which had stationary pterygium, had almost equally good visual acuity pre and post operatively because the head of the pterygium had just crossed the limbus.

Group 1: In group 1, out of thirty eyes, two (6.6%) eyes had developed recurrence in the present study.

The low recurrence rate (6.66%) in present study probably resulted from the surgical technique of incorporating limbus tissue in the grafts as much as possible. Kenyon et al first described the conjunctival autograft as a method to reduce recurrence of pterygium. The recurrence rate was 5.3% using this approach. They have included limbus conjunctiva within the graft and found low recurrence rates.[14] Simona et al reported a recurrence rate of 35% after autografting in 14 eyes and advocated that procedure should not be used as a standard primary surgical procedure for the pterygium. They have not included limbus conjunctiva within the graft.[15] Allan BDS achieved low recurrence rate using conjunctival grafting in a large series.[16] Kotch and Guler also found low recurrence rate in their study.[17,18] They all had included limbus tissue in the graft. Figueiredo et al in his study also stressed the importance of limbal cells in the transplant. They used immunohistochemical techniques to demonstrate altered limbal basal cells invading normal cornea at the advancing edge of the pterygium.

In group 2 patients I have used 0.02% daunorubicin intra-operatively for 3 mins in pterygium surgery. Out of thirty eyes, one eye (3.3%) had developed recurrence. Daunorubicin has been used in pterygium surgery to prevent recurrence rate for first time by Dadeya et al (2001) at Guru –Nanak eye centre, Maulana Azad medical College, New Delhi. In their study they had applied 0.02% of daunorubicin intra-operatively for 3 mins in pterygium surgery. They found recurrence rate 6.67% with no serious complications.[20] A comparative study of intra-operative daunorubicin and conjunctival autograft in pterygium surgery was done by dadeya et al (2002).[21] In their study, group A patients underwent bare sclera excision along with conjunctival autograft and group B patients underwent bare sclera excision with intra-operative daunorubicin (0.02%) for 3 minutes. They found recurrence rates of 8.33% in group A and 7.14 % in group B (21) in present study, when recurrence rates of the two groups were compared statistically, the difference was not significant. So, single intra-operative application of daunorubicin (0.02%) for 3 mins and conjunctival autograft are both equally effective adjuncts to pterygium surgery.

CONCLUSION

In our present study it was concluded that either excision of pterygium with bare sclera technique along with conjunctival autograft or intra-operative application of daunorubicin (0.02%) for 3 minutes are both equally effective adjuncts to prevent recurrence in pterygium surgery.

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REFERENCES

1. Parsons diseases of the eye, Elsevier publication, 19th edn, 193.
2. Hirst LW, Sebban A, Chant D, Pterygium recurrence time, Ophthalmology 1994,101:755-8.
3. Adamis AP, Starck T, Kenyon KR. The management of pterygium. Ophthalmol Clin North Am. 1990;3:611–23.

4. Tan Donald TH, Chee S-P, Dear Keith BG, et al. Effect of pterygium morphology on pterygium recurrence in a controlled trial comparing conjunctival auto grafting with bare sclera excision. Arch Ophthalmol. 1997; 115:1235–40.
5. Desmarres LA. TraiteTheoriqueetPratique des Maladies des Yeu, 2nd ed. Paris: G. Baillere; 1855:128.
6. Knapp H. A new plastic conjunctival operation. Arch Ophthalmol.1868;14:270–2.
7. McReynolds JO. The nature and treatment of pterygia. JAMA. 1902;39: 296–299.
8. D'Ombrain A The surgical treatment of pterygium. Br. J. Ophthal 1948;32:65-71.
9. Kunitomon et al. Studies on the pterygium,a treatment of the pterygium by mitomycin-C instillation. Nippon GankkaiZasshi. 1963:67:601.
10. Cano-Parra J, Diaz-Llopis M, Maldonado MJ, Vila E, Menezo JL. Prospective trial .of intraoperative mitomycin C in the treatment of primary pterygium, British Journal of Ophthalmology. 1995;79:439-41.
11. Pada A, Das GK, Tuli S.W., Kumar AR. Randomized trial of intraoperative mitomycinC in surgeryforpterygium. Amj Ophthal. 1998:125(1):59-63.
12. Parthasarathy NR, Gupta UC. Prevalence of pterygium in rural India. orient Arch Ophthal. 1967;5:139-147.
13. Gerundo. The etilogy and pathology of pterygium, American journal Of Ophthalmology. 1951;34,851-6.
14. Kenyon KR, Wasoneu MD, Hethinger ME. Conjunctivalautograft transplantation for advanced and recurrent Pterygium. Ophthalmology. 1985;92:1461-70.
15. Simona F, Tabatabay CA, Leunberger PM. Preliminary results of the pterygium excision technique with conjunctival autograft. 1990;196(5):295-7.
16. Allan BDS, Short P. Pterygium excision with conjunctival grafting: an effective and safe technique. Br J Opthalmol. 1993;77:698-701.
17. Kotch JM, Mellin KB, Waubke TN. Thepterygium autologous conjunctiva- limbus transplantation as treatment. Ophthalmology. 1992:89:143-6.
18. Güler M, Sobaci G, Ilker S, Oztürk F, Mutlu FM, Yildirim E. Limbal-conjunctivalautograft transplantation in cases with recurrent pterygium. ActaOphthalmol (Copenh). 1994;72:721–6.
19. Figueiredo RS, Cohen EJ, Gomes JAP, Rapuano CJ, Laibson PR. Conjunctival autograft for pterygiumsurgery. How well does it prevent recurrences. Ophthalmic Surgery Lasers. 1997;28:99.
20. Dadeya et al. Intraoperative daunorubicin to prevent the recurrence of pterygium after excision. Cornea. 2001;20(2):172-4.
21. Dadeya et al. Intraoperative daunorubicin versus conjunctivalautograft in primary pterygium surgery Cornea. 2002;21(8):766-9.

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