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An analysis to know the efficacy of hyalase in the treatment of early pterygium

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Abstract

Background: In recent studies Hyaluronidase (Hyalase) is playing a very important role in treating the Pterygium. It has been accepted for sometimes now that environmental factors are responsible for development of pterygium. More recently, it has been clear that UV light exposure is most important environmental influence. Majority of pterygia occurring on nasal limbus has been attributed to the fact that reflected sunlight is preferentially focused at this point. But exact way in which UV light interacts with limbus and cornea to produce a pterygium is unknown.

Aim and Objectives: To evaluate the efficacy of Hyaluronidase (Hyalase) in treatment of early Pterygium. The study was conducted to find out clinical effect of inj. hylase in the early pterygium at limbus upto 1 to 1.5 mm size in cornea.

Materials and Methods: The present study was a prospective study to analyze the role of Hyaluronidase (Hyalase) in the treatment of early pterygium In the Department of Ophthalmology, Varun Arjun Medical College & Rohilkhand Hospital, Banthara, Shahjahanpur Uttar Pradesh, over a period of 1 year from January 2018 to December 2018. A total number of 50 patients were assessed with regards to their clinical diagnosis, vital parameters and presentations. Patients having complain of redness foreign bodies sensations watering were examine on the slit lamp for the extension of pterygium on limbus. Visual acuity and fundus examination were done. 1500 i.u. of hylase injection was dissolved in 2 cc of d.w. out of this 0.25 cc of solution taken in insulin syringe and 1 cc of xylocaine 2% was also added and given at the neck of pterygium with 26 guaze needle by lifting the neck with tooth forcep. Eye speculum was applied and paracaine drops instilled on the cornea and conjunctiva before this.

Results: In our series females comprised of 2/3rd of the total number of patients studied (22 males to 28 females). 70% of the patients were in the age group of 21 to 50 years [Table - 2]. Inte-restingly 81% were in the occupation which exposed them to re-current local irritation [Table - 3]. This was consistent with the the-sis that pterygium is more common in people exposed to outdoor dusty work. Study of 50 patients were carried out between the age group of 1 to 50 years. Treatment was given to all in the form of s/c inj. of hylase for three days alternatively. Out of this 28 patients were female and 22 male. Patients having complain of redness foreign bodies sensations watering were examine on the slit lamp for the extension of pterygium on limbus. Visual acuity and fundus examination were done. 1500 i.u. of hylase injection was dissolved in 2 cc of d.w. out of this 0.25 cc of solution taken in insulin syringe and 1 cc of xylocaine 2% was also added and given at the neck of pterygium with 26 guaze needle by lifting the neck with tooth forcep. Eye speculum was applied and paracaine drops instilled on the cornea and conjunctiva before this. Antibiotic ointment was applied and pad was given over the eye ask the patients to seat for half an hour. Then take away the pad and see that there is no active bleeding from the conjunctiva. Ask the patient to go home with dark goggles and instilling astregent eye drops and antibiotic with non-steroid eyedrops 3 times a day. And advice to come after 48 hours for further treatment.

Conclusions: 50 cases of pterygium were studied after use of Hyaluronidase (Hyalase). Six bi-weekly injections of 0.25 cc of Hyaluronidase with 0.1 cc of 1% Novocaine solution were given at the neck of the pterygium. The drug was found to be of definite value in early cases of pterygium with disappearance of growth in 80% of the cases. Progressive and malignant pterygiums showed diminution in size and vascularisation in 60 and 70 % cases respectively. We did not encounter any morbidity or adverse effects in any of these patients.

Keywords: pterygium, hyaluronidase (Hyalase), novocaine, corneal limbus

Introduction

Pterygia, the wing shaped fleshy growth on corneal limbus have been known to physicians for thousands of years. Sushrutha (Circa 1000 BC) has recorded pterygium removal.

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The term pterygium meaning wing (pteryx – wing) was introduced by Walton in 1875. Despite being recognised for many years, very little is known about its pathogenesis. It has been accepted for some time now that environmental factors are responsible for development of pterygium. More recently, it has been clear that UV light exposure is most important environmental influence. Majority of pterygia occurring on nasal limbus has been attributed to the fact that reflected sunlight is preferentially focused at this point. But exact way in which UV light interacts with limbus and cornea to produce a pterygium is unknown. Genetic factors also are important. In particular environments some racial groups are more affected than others and there is tendency for pterygia to occur in families. Histopathology is nonspecific and does little to suggest an underlying cause. The usual picture is that of hyaline degeneration and low grade inflammatory reaction. Surgical excision remains principle mode of treatment for pterygium. Various techniques have been tried like simple excision, Bare sclera method, Transplantation of head of pterygium, mucous membrane or conjunctival graft or flap to cover bare sclera and Lamellar keratoplasty. Unfortunately none of these techniques are successful in all cases and recurrence still remains most enigmatic complication of pterygium excision. Many approaches have evolved as an alternative to or adjunctive to surgical excision. Ionising radiation, heat, laser, antimetabolites etc. have been advocated as adjuncts to surgery. Many of these techniques have either been unsuccessful or associated with serious complications. In recent years, focus has shifted to use of planned surgical repair with a flap of normal conjunctiva or limbus in treatment of pterygia. Improved results with this form of repair have encouraged the implication of limbal stem cells in aetiology and pathogenesis of pterygia. These cells are responsible for corneal epithelial regeneration and trans differentiation and serve as a barrier to prevent conjunctival ingrowth onto cornea. Localised damage to limbal stem cells at nasal or temporal limbus can be caused by UV light or other environmental factors. Damaged limbal stem cells lose their barrier function & allow conjunctival ingrowth. Furthermore they may release Vaso proliferative substance that encourage pterygium formation. According to this new concept, pterygium develops due to focal deficiency, absence or aplasia of limbal stem cells & therefore transplantation of limbal stem cells is considered as the most convincing approach for treatment of pterygia.

Materials and Methods

This is a prospective none randomized clinical study was carried out in the Department of Ophthalmology, Varun Arjun Medical College & Rohilkhand Hospital, Banthara, Shahjahanpur Uttar Pradesh, between January 2018 to December 2018. Patients having complain of redness foreign bodies sensations watering were examine on the slit lamp for the extension of pterygium on limbus. Visual acuity and fundus examination were done. 1500 i.u. of hylase injection was dissolved in 2 cc of d.w. out of this 0.25 cc of solution taken in insulin syringe and 1 cc of xylocaine 2% was also added and given at the neck of pterygium with 26 guaze needle by lifting the neck with tooth forcep. Eye speculum was applied and paracaine drops instilled on the cornea and conjunctiva before this. Antibiotic ointment was applied and pad was given over the

eye ask the patients to seat for half an hour. Then take away the pad and see that there is no active bleeding from the conjunctiva. Ask the patient to go home with dark goggles and instilling astregent eye drops and antibiotic with non-steroid eye drops 3 times a day. And advice to come after 48 hours for further treatment. The patients were randomly divided into three groups irrespective of their age and sex.

Group 1: Hitherto known as the Merest Sclera group, 16 eyes of 25 patients underwent surgical excision of pterygium by Merest Sclera technique (MST).

Group 2: Hitherto known as LCAT (Limbal Conjunctival Autograft Transplantation) group, 17 eyes of 17 patients underwent surgical excision of pterygium followed by LCAT.

Group 3: Hitherto known (Conjunctival closure with adjunctive Mitomycin C) group, 17 eyes of 17 patients underwent surgical excision of pterygium followed by adjunctive use in bare area followed by conjunctival closure with suturing.

Inclusion criteria

- Age > 18 years
- Progressive pterygia grade T2 and grade T3
- Primary & Stationary pterygia
- Eyes with no evidence of any ocular surface disorder, any disorder of ocular adnexa or any major surgeries.

Exclusion criteria

- Recurrent pterygia
- Atrophic pterygia and pterygia less than 2mm encroachment on cornea
- Eyes with evidence of any ocular surface disorder (eg. Dry eye) or any ocular adnexal disorders or evidence of any high intraocular pressure.

Preoperative assessment

Preoperatively uncorrected and corrected visual acuity were recorded in all cases. A baseline intraocular pressure measurement was done in all cases using schiottz tonometer. A slit lamp examination was performed and a careful assessment of the morphology, vascularity and size of the pterygium was made along with careful examination of ocular adnexa and anterior segment. The size of pterygium was recorded as millimetres of encroachment onto cornea from the limbus. Orbital anatomy and normalcy of lid closure were noted.

Surgical methods

The patients were all operated by a single surgeon under peribulbar block with 2% lignocaine. The merest sclera technique was done by dissecting the head of pterygium from corneal surface starting 0.5 to 1mm in front of its apex with a Bard Parker knife and no.15 blade upto the limbus. Then with the aid of spring action scissors the pterygium, after its separation from overlying conjunctiva and underlying sclera by blunt dissection, was excised. Hemostasis secured by wet cautery. Then the upper and lower free ends of conjunctiva were brought together and sutured with 10-0 nylon sutures. The adjunctive use of Mitomycin C was applied in concentration of 0.02% with

cotton tipped applicator for 3 minutes in the bare area after pterygium was excised by above said method, then irrigated thoroughly with normal saline and then the conjunctival free ends were sutured over the area with 10-0 nylon. The limbal conjunctival autograft was done after excising the pterygium as described above. Graft was obtained from superotemporal conjunctiva after marking the graft dimensions with the use of callipers with excision starting from forniceal end. Care was taken to obtain a thin graft without button holing. Once limbus was reached, graft was flipped over the cornea and tenon’s attachment at limbus was meticulously dissected. The flap was then excised with vannas scissors taking care to include the limbal tissue. Then graft was slid onto cornea without lifting and moved onto scleral bed maintaining the limbus orientation. The graft was smoothed out and secured using 10-0 nylon sutures. The eye was then patched with antibiotic ointment.

Postoperative care and follow up

Postoperatively topical dexamethasone eye drops was used every 2 hrs for the first postoperative week and then tapered over the next 5-6 weeks. Topical NSAIDS were used according to patient symptomatology. After the immediate postoperative period, patients were seen at 6 weeks, 3 months, 6 months and 1 year. During each visit patient was subject to visual acuity measurement, IOP measurement and careful slit lamp examination. A recurrence was defined as fibrovascular tissue crossing the corneoscleral limbus onto clear cornea in the area of previous pterygium excision.

Results and Observations

As majority of our patients are from poor section either they don’t have availability of medical facility or they are lacking with nutritional values in their foods. And also with unhealthy life style. This seems to be so because of improper nutrition in the poorer classes of people and prevalence of local irritating factors to the eye such as tropical sun, dusty dry season and occupation in the open fields. Table 1. Most of the patients are farmers daily wage laboures, factory workers and students. 27 cases are from 41-50 age group which shows the low immune system indication also.

Table 1: Patients occupation, age group

Occupation	Pts.
Farmers	22
Laboures	18
Factory workers	06
Students	04

Age	Patients
1-10	2
11-20	6
21-30	6
31-40	9
41-50	27

Table 2: Sex Distribution in our study

Male	22
Female	28

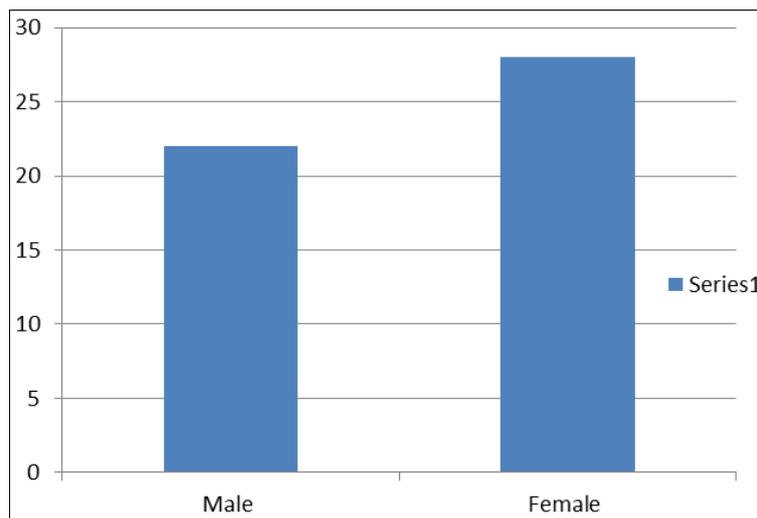


Fig 1: Sex Distribution

We have taken majority of females in our study. Table 2 and Figure 1. In advancement of the ophthalmic era, this study has an indication of clarify that the socioeconomically weaker section has a vital impact because of non-availability of the medical facility, personal hygiene and social awareness at cell level.

Table 3: Group Segregation of the patients post giving the Hyalase injection

Type	Changes happens post treatment in the patients (in %)
Group 1	Growth reduced in 35(70%)
Group 2	Appex& neck become pale(10) 20%
Group 3	No change (5) 10%

In Table 3, in group 1, 35 patients (70%) growth reduced post giving Hyalase injection and 10(20%) patients show pale face and rest 80% gets recovery positively causing multiple factors vice-versa, like improper nutrition, unawareness, unavailability of medical facilities. Similarly in group 3, in 5 (10%) cases no impact happens, but 90% has got some impact positively either as group 1 or 2.

Discussion

Since pterygium and its recurrence are the constant problems in the tropics and there is acute shortage of hospital beds and technical man power in a country like ours it was felt that development of non-surgical treatment should be of value in the management of this condition.

Carricker ^[1] and others have observed beneficial effect of Hyaluronidase (Hyalase) in early cases of pterygium.

Meyer and Palmer ^[3] were the first to isolate the main intercellular substance, Hyaluronic acid. Duphie and Chain ^[2] demonstrated that the enzyme Hyaluronidase liquified the tissue cementing substance, Hyaluronic acid. This occurs by the depolymerisation of Hyaluronidase through hydrolysis of the linkages with the decrease in the viscosity of the polysaccharide, Hyaluronic acid, allowing more rapid spread of fluids through the connective tissue.

Pterygium being a problem for treatment, people have been trying to find out some medicinal treatment. Drugs like Thioepa in the form of drops and hyalase in the form of sub-conjunctival injections have been tried with variable results. Rohatgi ^[4] *et al.* and Shukla ^[5] *et al.* tried in 50 cases with good results in early pterygium but without a single side effect. In this case with the first injection retinal oedema with slight hyperaemia of the disc took place, which may be due to impurities in the enzyme, but the pterygium disappeared more or less completely even with one injection.

Hyaluronidase is enzyme is found naturally in your body that breaks hyalurenic acid down. It is very common in tropical region. Improper nutrition in poor class and prevalence of local irritation factors to the eye ^[6]. Meyer and palmer first to isolate hylurenic acid. Duphie and chain state that enzyme hyaluronidase liquified the tissue cementing substance hyaluronic acid. pterygium is most common between latitudes 40deg north and 40deg south, paralleling local atmospheric ultraviolet energy intensity. Confirmatory evidence for the involvement of ultraviolet radiation has been gained ^[7, 8].

Bowman's membrane and the underlying corneal stroma to the destructive effects of sun's light and of ultraviolet radiation too ^[9, 10, 11]. This occurs by the depolymerisation of hyaluronic acid through hydrolysis of linkage with the decreasing viscosity of the poly sacharide hyaluronic acid allowing more rapid spread of fluids through the connective tissues. One elderly patient have amblyopia was treated with loading dose of tablet prednisolone 40mg and tapered along with antihistaminics. The action of hyloronidase is reversible with complete restoration of the inter cementing substances in 24 hours ^[12].

Treatment options

In fleshy pterygium one should go for surgery. Auto graft surgery, 1) Suturing of conjunctiva, 2) Use of patient's own plasma, 3) Amniotic membrane transplantation. One should use topical antibiotics with non-steroidal drops with astrigent drops for period of three months.

Conclusion

In tropical area non-surgical treatment of early pterygia is useful by this method along with topical therapy. Chances of recurrence is very less. Hence Hyalase injection is very useful to treat the pterygium.

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