Management of Pterygium – A Brief Review

Dr. V.K. Raju 1 MD FRCS FACS, Dr. Abhishek Chandra 2 MS, Dr. Rahul Doctor MS

Pterygium is defined as a fibrovascular growth originating from subconjunctival tissue and encroaching the cornea. Histopathologically, it shows signs of elastotic degeneration.

Typically a pterygium appears as a fleshy mass over the nasal cornea. If not treated it may encroach the entire pupillary axis and thus cause a significant decrease in the visual acuity. The contractile forces of pterygium on peripheral horizontal cornea, leads to significant flattening of the horizontal meridian (with the rule astigmatism), which is proportional to the size of the pterygium. 1,2,3

Pterygium was first described by Susruta (India), the world’s first surgeon ophthalmologist before 1000 A.D. 4,5 In Susruta Samhita he describes:

“With the patient recumbent on an operation table, the pterygium is loosened and disturbed by sprinkling powdered salt into the eye. With the patient looking laterally, a sharp hook is used to secure the growth at its loosened upturned part, and is held up with a toothed forceps, or a threaded needle is to be passed from below the part which would be held up with the thread. The pterygium is then scratched with a sharp round –topped instrument. The root of the pterygium should be pushed as under from the black outline (cornea) of the eye to the medial canthus and then excised and removed”.

The next recorded study is of Celsus (Rome 50 A.D.) where he passes a needle and thread beneath the pterygium and with a sawing motion separates the tissue 4. It was then described by Vegabhatt (India-300 A.D.), Paul Aegineta (Greece – 7th century), Al Rhazes (Arabia – 932 A.D.), Avicenna (Greece 980-1036 A.D.) and Chakradatta (India -1060 A.D.). In the nineteenth century Scarpa, Travers, Desmarres, Knapp, Klein, Prince, Boeckman, Wright, Hobby, Alt, Mackenzie and others have all suggested various methods for the treatment of pterygium.

For more than thirty centuries, man has tried to conquer this little growth. But it is still a challenge for ophthalmologists. It has been incised, removed, split, transplanted, excised, cauterized, galvanized, heated, inverted, dissected, rotated, coagulated, repositioned, irradiated, excimer lasered, stripped and grafted; but it still remains an enigma for ophthalmologists. Despite the best techniques in the hands of the greatest surgeons there have been recurrences and when they recur they are much more aggressive. Various theories have been suggested for its etiology: ultra-violet light 6,7, genetic 8,9, allergic 10, windy environment, immunological 11 and infection 12,13.

Histopathology and Histochemistry

On histopathological examination pterygium shows features of fibrovascular proliferation and elastotic degeneration 14. It has been proven in almost all the studies and therefore we do not need to send the pterygium tissue for histopathological examination. On immunohistochemistry with antibodies, the markers for smooth muscle cells are positive while it is negative for nerve sheath marker 15. The presence of these myofibroblasts causes with the rule astigmatism in patients with pterygium. These myofibroblasts can

---

1Monongalia Eye Clinic, 3140 Collins Ferry Road, Morgantown, WV 26505, E-mail: vkr@vkraju.com, 2Banaras Hindu University, New G-7, Hyderabad Colony, Varanasi India 221005, India E-mail: abhishekbhuv@rediffmail.com 3Bay View Clinic & Research Center, E-mail: rahul.doctor@gmail.com
originates from the conjunctiva or migrate from the normal fibro-adipose tissue as hypothesized by Tseng et al.

Matrix Metalloproteinases present in primary or secondary pterygium are similar to that found in Tenon’s capsule and are not implicated in the genesis of recurrent pterygium. Primary and recurrent pterygium do not show any difference in MMP-9 expression. The recurrence maybe due to the incomplete excision associated with fibroblast proliferation and production of MMP under the influence of inflammatory cytokines.

Management

A variety of surgical techniques are being used currently for the management of pterygium. Bare sclera technique has been used since times immemorial but it has a very high recurrence rate. The use of thiourea, radiation, steroid drops, lamellar keratoplasty, excimer laser are no more used in routine practice.

The use of autologous conjunctival graft for the management of pterygium has been for more than fifty years now and even today it is the mainstay in the treatment of pterygium.

Naib K. was one of the first to introduce this technique. Starck T et al described the technique in detail. Various studies have shown the recurrence rate with this technique from 1%-10%22,23,24. Limbal-conjunctival autograft transplantation, a modification of this technique has been utilized by many who feel that the primary cause of pterygium is hypofunctioning of limbal stem cells. There have been various reports that suggest that amniotic membrane has a comparable result in the management of pterygium. The adjunct use of Mitomycin C has been shown to decrease the recurrence rate 29,30,31. But one should be aware of the potential complications like scleral melt especially with 0.04% eye drops. Sangwan et al and Miyai T et al advocate the use of conjunctival autograft, amniotic membrane and Mitomycin C in cases which have had multiple recurrences. Dr. Hirst, from Australia, reports a recurrence rate of 0.5% with his technique of conjunctival autograft. He does an extensive conjunctival autograft of approximately 15mm by 12mm.

The key to pterygium still lies in almost total removal of the fibro-vascular growth and large conjunctival autograft. Amniotic membrane and Mitomycin C serves important adjunct for recurrent pterygium but conjunctival autograft still remains the most accessible modality for its management. In patients with multiple recurrences a combined use of all the above modalities will give the best results.

Complications

Complications of pterygium include irritation, redness, diplopia, distortion/decrease in vision and scarring of the conjunctiva, cornea and medial rectus muscle.

Postoperative complications include infection, reaction to suture material, diplopia and scarring. Retinal detachment, vitreous hemorrhage and perforation of the globe though rare can occur.

The most common complication of pterygium surgery is recurrence. Simple Excision is associated with 50%-80% recurrence rate.

Although not usually vision threatening, a recurrent pterygium is disfiguring, uncomfortable and more difficult to treat. Without effective adjunctive therapy, there is a high risk of recurrence after repeated excisions. There is extensive data to support that the use of amniotic membrane transplantation in reducing the recurrence rates in both primary and recurrent pterygia. The surgery consists of thorough removal of abnormal tissue, restoring the matrix in the excision area through the use of amniotic membrane which provides a new basement membrane for rapid epithelialization. To further reduce inflammation, a subconjunctival injection of corticosteroids may be considered.

The main advantage of using amniotic membranes is its ability to restore large excised areas (double head or recurrent pterygia) where a conjunctival graft is not possible or in cases in which the conjunctiva is already scarred from previous surgery or has to be conserved for possible glaucoma surgery.

Reference

14 Austin P, Jakobiec FA, Iwamoto T. Elastodysplasia and elastodystrophy as the pathogenic basis of ocular pterygia and pinguecula. Ophthalmology 1983; 90: 96-109
18 Laughrea PA, Arentsen JJ. Lamellar Keratoplasty in the management of recurrent pterygium. Ophthalmic Surg; 17(2);106-8