RECENT ADVANCES IN PTERYGIUM

Essay

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LIST OF ABBREVIATIONS

5FLU	5-Fluro Uracil
AMT	Amniotic Membrane Transplantation
BFGF	Basic Fibroblast Growth Factor
BRT	B-Radiation
BUT	Break Up Time
CAT	Conjunctival Auto Transplantation
EGF	Epidermal Growth Factor
HB-EGF	Heparin Binding Epidermal Growth Factor
HPV	Human Papilloma Virus
IGF-BP	Insulin like Growth Factor-Binding Proteins
IL	Interleukin
LOH	Loss Of Heterozygosity
MI	Microsatellite Instability
MMC	MitomycinC
MMP	Matrix Metalloproteinase
OSSN	Ocular Surface Squamous Neoplasia
PDGF	Platelet Derived Growth Factor
PERFECT	Pterygium Extended Removal Followed by Extended Transplantation.
PLD	Phospho Lipase D
RC	Residual conjunctiva
RH	Residual to Horizontal ratio
ROS	Radical Oxygen Species
TGF-B	Transforming Growth Factor-B
TGM	Trans Glutaminase
TNF	Tumor Necrosis Factor
UHROCT	Ultra High Resolution Ocular Coherence Tomography
UVR	Ultra Violet Radiation
VEGF	Vascular Endothelial Growth Factor

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INTRODUCTION

A pterygium is a very common conjunctival degenerative condition.it has been well established that there are different interrelated factors involved in the growth of pterygia. Historically described more as a degenerative process, inflammation and fibro vascular proliferation have proven to be very important factors. Many studies have shown vascular Endothelial Growth Factor (VEGF) to be increased in the pterygium. (Maura and Foster, 2009)The messenger RNA levels for VEGFA and Fibroblast Growth Factor (FGF) 2 were significantly higher in pterygium, compared with conjunctival specimens. (Detorakis and Spandidos, 2009.)

Short-term use of topical anti VEGF, bevacizumab, seems to be a safe and effective means for delaying recurrence of impending recurrent pterygia. (Razeghinejad, et al, 2010)

While in another study, a single intraoperative subconjunctival bevacizumab injection had no effect on recurrence rate, early postoperative conjunctival erythema, lacrimation, photophobia or healing of corneal epithelial defects following pterygium excision. (Fallah, et al, 2010)

Strontium/Yttrium-90 beta irradiation of pterygia is very efficient and well-tolerated treatment, and rehabilitative results in comparison to conventional treatments, especially for recurrent lesions that have undergone prior surgical excision.(Vastaridis, et al., 2009.)

Although limbal stem cells and conjunctival autograft transplantation is a time consuming procedure, it is a safe and effective technique for the treatment of different grades of pterygium. It is useful in prevention of pterygium recurrence,

which is a major problem in pterygium surgery.(Mahdy and Bhatia, 2009.)

Pterygium Extended Removal Followed by Extended Conjunctival Transplantation (P.E.R.F.E.C.T) for pterygium was reported to result in a zero recurrence rate with few complications and a good cosmetic appearance. This suggests that PERFECT for pterygium seems to provide the best surgical answer for recurrent pterygia at this time. It also raises the possibility that P.E.R.F.E.C.T for pterygium may now permit the inclusion of cosmetic concerns as an indication for pterygium removal. (Hirst, 2010.)

AIM OF THE WORK

Review of literature to assess recent advances in pathology, diagnosis and treatment of pterygium.

Anatomy of the conjunctiva

The conjunctival sac includes the bulbar conjunctiva, a fornix on three sides, a medial semilunar fold and the palpebral conjunctiva. Smooth muscle fibers from the levator muscle maintain the superior fornix, and fibrous slips extend from the horizontal rectus tendons into the temporal conjunctiva and plica to form cul-de-sacs during horizontal gaze. The caruncle is a fleshy tissue mass containing hairs and sebaceous glands. The tarsal conjunctiva is tightly adherent to the underlying tarsus, and the bulbar conjunctiva is loosely adherent to the Tenon's capsule. These tissues blend at the limbus, where a series of radiating ridges called the palisades of Vogt appear. This area contains corneal stem cells.The cell morphology of the conjunctival epithelium varies from stratified cuboidal over the tarsus to columnar in the fornices to squamous on the globe. Multiple surface folds are present. Goblet cells account for up to 10% of basal cells of the conjunctival epithelium; they are most numerous in the tarsal conjunctiva and the inferonasal bulbar conjunctiva.The substantiapropria of the conjunctiva consists of loose connective tissue. Conjunctiva-associated lymphoid tissue (CALT) consists of lymphocytes and other leucocytes, especially in the fornices. Lymphocytes interact with mucosal epithelial cells through reciprocal regulatory signals mediated by growth factors, cytokines and neuropeptides.The palpebral conjunctiva shares its blood supply with the eyelids. The anterior ciliary arteries, branching from the ophthalmic artery, supply the bulbar conjunctiva. These capillaries are fenestrated and leak fluorescein just like the choriocapillaris. Sensory innervation is

through the lacrimal, supraorbital, supratrochlear and infraorbital branches of the ophthalmic division of the trigeminal nerve. (Krachmer, et al,2005)

Epidemiology

A pterygium is a conjunctival degenerative condition. The word pterygium originates from the Greek “ptery”, which means “wing”, hence the word pterygium meaning “wing like”.

As pterygium is an ocular surface disease characterized by lesion of corneal limbus, altered stem cells of corneal limbus induced by conjunctivitis, trachoma, and UV radiation may contribute to the onset of pterygium.

It is a common ophthalmic disease and an important public health problem. This disease occurs all over the world and the prevalence rates vary widely from 1.2 to 23.4%. It may be affected by many factors such as age, gender, ultraviolet (UV) radiation exposure, and time spent outdoors. (Detorakis, et al 1998)

UV radiation has been suggested as an etiological factor in the pathogenesis of pterygium. (DI Girolmo, et al. 2004)The prevalence of pterygium is high in tropical areas. Low latitude, low precipitation, intensive UV, and strong wind and dust are the high risk factors of onset of pterygium. In order to cut down the occurrence of pterygium, peasants who work in intensive sunlight for a long time should be strongly encouraged to wear sunglasses, sunscreen hat and sunshade to protect them from the UV radiation.

Pterygium is common in so-called “Pterygium zone” In countries within this area, prevalence of up to 22% in the general population has been reported. In countries outside this area (in either northern or southern latitudes), reported prevalence rates usually do not exceed 2% of the general population and lesion affects mostly patients with an increased exposure to solar light, such as people working outdoors.(Mackenzie, et al. 1992)

Pterygium prevalence increased with age among both male and female. A recent study in Sumatra, Indonesia, showed an increase in prevalence from 2.9% in those aged 21–29 years, to 17.3% for those above 50 years. Another study in Central Sahara in Africa demonstrated a statistically significant increase in age, from 1.1% in those aged 2–19 years to 13.0% in those aged 40–87 years.(Tan et al., 2006)

Gender is another risk factor; it may mix other factors, such as the lifestyle, exposure to environment and so on. Most of the studies proved that the prevalence was higher in male, whereas others found no significant difference. In a study, the prevalence among the male (5.13%) which was significantly higher compared with the female (3.17%). It may be attributed to different life-styles between genders (males spending more time out-door) in rural areas.(Liang et al., 2010)

Pathology

Gross picture

Apart from the triangular shape, often described as having a head, body and tail, the pterygium is characterized by its location along the inter-palpebral fissure (along the horizontalaxis of cornea, usually nasally but occasionally temporally or both nasally and temporally (Fig.1).

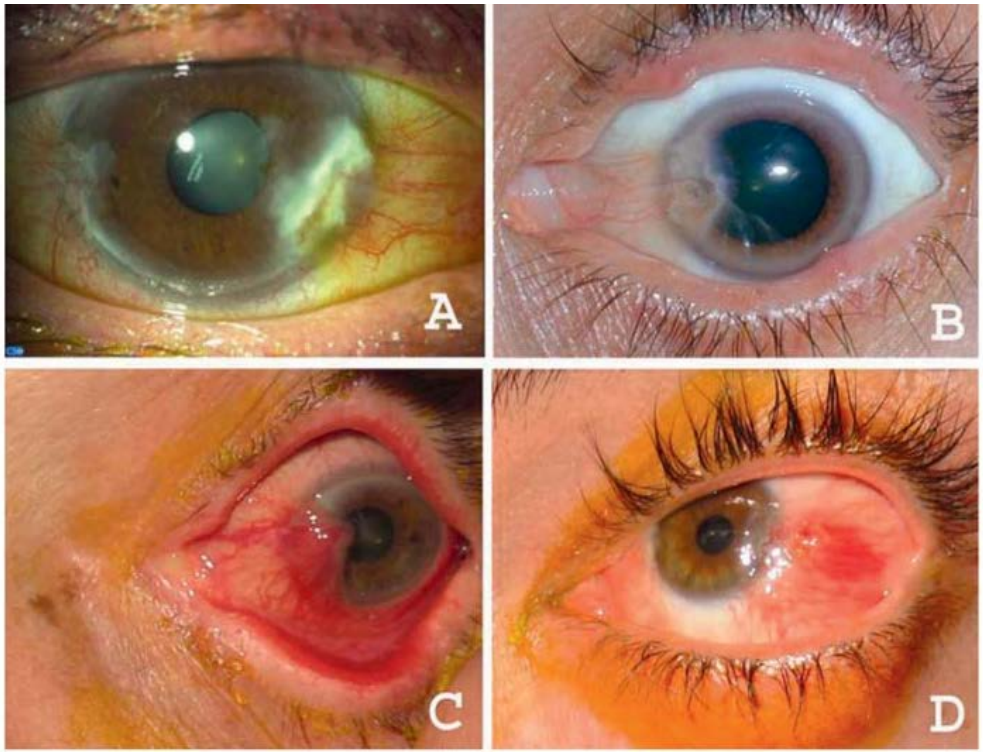

Figure.1: (A), various forms of pterygium, including simultaneous nasal and temporal pterygia,(B), quiescent nasal pterygium,(C),inflammatory nasal pterygium and (D),inflammatory temporal pterygium (Diaz et al., 2008)

This was considered an important indication of the role of environmental factors such as solar light on its development. In