Clinico-Pathological Correlation In Diagnosis of Pterygium

Thesis submitted for partial fulfillment of Master Degree in Ophthalmology

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القاهرة

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Aim of the work

To find out the correlation between the clinical picture of pterygium as regards its stage, degree of activity and its histopathological diagnosis, which may - or may not - come in agreement with clinical diagnosis. Also find out the specific histological characteristics of active and atrophic pterygia.

Introduction

Pterygium is a common keratoconjunctival degenerative lesion in tropical and subtropical region. Egypt is considered to be one of the areas in which pterygium is prevalent being present in temperate zone.

The name is coming from the Greek word "pterygion" which means "wing" as it resembles the wing of an insect in its appearance. ***(Duke Elder, 1977)***

It is a subconjunctival growth of fibro vascular tissue that extends from the conjunctiva onto the cornea, which appears as triangular fleshy growth encroaching onto the cornea, in the interpalpebral zone more common on the nasal side. ***(Karai and Horiguchi , 1984)***

One group of patients with pterygium can present with minimal proliferation and a relatively atrophic appearance. The pterygia in this group tend to be flatter and slow growing and have a relatively lower incidence of recurrence following excision of ptreygium. The second group presents with a history of rapid growth and a significant elevated fibrovascular component. The pterygia in this group have a more aggressive clinical course and a higher rate of recurrence following excision of ptreygium.

Treatment of choice in pterygium is surgical excision; however the recurrence rate of pterygium after excision without any additional procedure is quit high (30%-50%) unless some measures are taken after excision like the use of postoperative B-irradiation or mitomycin C. ***(Mahar and Nwokora, 1993)***

Geographic distribution and etiology of pterygium

Pterygium is a degenerative disease occurring throughout the world, but it is more common in tropical, subtropical areas. The map of the world distribution of pterygium shows a higher prevalence in the equatorial zone and correlation between the altitude and pterygium rates.

The incidence of pterygium varied between low incidence (2%-2.9%) at altitude 35 to 40 degrees and very high incidence (>10%) at altitude 0-30 degrees. ***(Aziz and Hannot 1986)***

Egypt is considered to be one of the areas in which pterygium is prevalent, being present in a temperate zone.

The exact prevalence rate in relation to the whole population in Egypt is difficult to attain but that percentage of operations represent 30% of all ophthalmologic operations.

Etiology of pterygium

The exact etiology of the pterygium is not known, however many theories have been proposed to explain the etiology of the petrygium.

1. The neoplastic theory.
2. The ultra-violet light theory.
3. Tear film abnormality theory.
4. The immunological theory
5. The inflammatory theory.
6. The mechanical theory.
7. The hereditary theory.

1- The neoplastic theory

Pterygium was considered as a polypoid growth of conjunctiva and was mentioned under the heading of "tumour of the eye" this opinion was based on the high rate of recurrence after successful excision. ***(Redslob, 1933)***

Kamel, 1953, was against this theory because if the pterygium is a tumor, it should extend in every direction.

2- The Ultra - violet light theory

Ultra- violet radiation is divided into three bands:

-Uv-A (400 to 320 nm)
-Uv-B (320 to 240 nm)
-Uv-c (240 to l00nm).

The Uv-c band does not naturally penetrate to the earth's surface; but the cornea would absorb almost 100% of any radiation below 240 nm. It has been suggested that exposure to sun light, specifically UV radiation may be associated with an increased risk of several corneal disorders, including pterygium, climatic droplet keratopathy and pinguecula, opacity of the lens and age-related macular degeneration. ***(Edward, 1989)***

Simple measures such as wearing a hat or spectacles protect the eye and could reduce the incidence of pterygium and climatic droplet keratopathy attributable to UV Radiation exposure.

Taylor et al, 1989 have pointed out that pterygium occurred more common in tropical or sunny areas been attributed to greater sun exposure, especially to UV-B radiation.

Coroneo, 1993 have explained the occurrence of the pterygium most commonly in the nasal side of conjunctiva and has proposed that the anterior eye acts as side on lens focusing light from the side of cornea then through the anterior chamber to other side. By using computer assisted optical ray tracing techniques, and had calculated that peak light intensity at the nasal limbus is approximately 20 times that of incident light intensity. ***(Fig.1)***

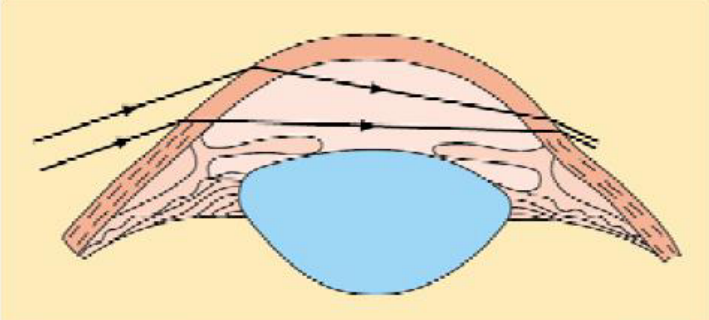

Fig. 1: The ultra - violet light theory, proposed pathway by which peripheral refraction by the anterior eye results in a limbal focus. ***(Coroneo, 1993)***

This focal limbal irradiation may be particularly injurious to the corneal epithelial stem cells, which are not protected by the superficial cells. The stem cells lose their regular arrangement and the cells become rounded or distorted. The degree of limbal focusing is determined by control shape and anterior chamber depth, and this may explain why particular individuals in a common environment are more affected than others.

3-Tear film abnormality theory

Goldberg and David, 1967 reported that tear function abnormality have been proposed as an etiological factor. It has been observed that a pterygium is further exacerbated by dryness of the tear in areas of light humidity if the individual are exposed to constant wind.

Taylor, 1980 reported that drying of the interpalpepral tear film occurs most readily in the medial third of the interpalpebral fissure, because this part of conjunctiva is farthest from the lacrimal gland and nearest to puncta, and because, with the eyes partially closed against glare or wind the medial third of conjunctiva remains relatively more exposed than the lateral third.

Coroneo, 1993 reported that it is probable that drying of the interpalpebral tear film is an important factor. This exposes the peripheral corneal stroma to the destructive effect of light.

4 - The immunological theory

The presence of lymphocytes and plasma cells in stroma of the pterygium indicate that an immunological process may be involved in pathogenesis of pterygium also the localization of immunoglobulin G and E.

Pinkerton et al, 1984 reported that an immunological process may be involved. It is type 1 hypersensitivity in which the antigenic stimulation by exogenous irritant such as dust and pollen containing antigenic material stimulated localized IGE. The cell bound IGE complex may then irritate the release of the active pharmacologic mediator and these mediators lead to development of pterygium.

5- The inflammatory theory

Kamel, 1953 reported that pterygium formation was the result of chronic irritative exposure conjunctivitis in the exposed part of the palpebral fissure. The following factors are in favor of this chronic inflammatory theory:

1. The marked increase of goblet cells of conjunctiva in cases of pterygium.
2. The constant presence of inflammatory cells especially lymphocytes and plasma cells infiltration in the superficial part of cornea.

Saif, et al, 1967 suggested that pathogenesis of pterygium was due to local axon reflex. This reflex included the red reaction, the spreading flare and local exudation. If this process was repeated, an inflammatory response would take place in form of cellular infiltration, visualization and exudation in every attack of congestion, the cycle was repeated and lead to formation of pterygium.

6- Microtrumatic theory

Coroneo, 1993 reported that Mechanical irritation by dust particles are enhanced by tear follow from lateral to nasal side of conjunctiva has been proposed as a mechanism. However, pterygium occurs in dust free areas.

7- Hereditary theory

An inherited predisposition to pterygia seems to exist. Some pedigrees shown an apparent transmission through several generations suggesting that is an autosomal dominant mode of inheritance.

Coroneo, 1993 was against this theory because this most simply reflects a common environmental factor of occupation.

8-Chronic irritation

Whatever the cause of irritation: this produce chronic inflammatory cell infiltration resulting in inflammatory edema.

Pathology of pterygium

The earliest changes in the pterygium pathology started in the cornea by the appearance of small vesicles at the point where the corneal nerves pierce bowman's membrane and the epithelium. A mass of dense tissue appears followed by disappearance of Bowman's membrane. ***(Gerundo, 1951)***

The fully developed pterygium is covered by conjunctival epithelium, stratified with flat cells on the surface of the head and neck, cylindrical in the body and base. ***(Duke Elder, 1965)***

At the apex the transition from conjunctival to corneal epithelium is usually Sharp-cut. Usually the apex itself is covered by epithelium of corneal type, but some times the conjunctival type extends into the cornea.

The histology of pterygium were divided into three morphological types: ***(El-Naggar, et al, 1977)***

1. ***Fibrous***: The stroma is predominantly fibrous with few scattered vascular element
2. ***Angiomatous***: The stroma contains a significant number of vascular channels with edema in the intravascular space.
3. ***Mixed***: The stroma contains both vascular & collagen tissue in equal proportion.

Khalil et al, 1982 showed that the stroma looks very dense and compact with closely packed collagen fibers which have a uniform diameter.

Demartini and Vastine, 1987 founded that the elastotic degeneration is fundamental characteristic of pterygium pathology.