Pterygium-Is the ‘P’ Silent or Premalignant? A Clinicopathological Study of 60 Cases of Pterygium

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Background

Pterygium is a common conjunctival degenerative lesion often excised for cosmetic reasons. Due to various reasons the biopsy material is often not submitted for histopathological examination.

Methods

A clinicopathological study of 60 cases of histopathologically diagnosed pterygium operated at the Regional Institute of Ophthalmology, Trivandrum during a period of one year was performed. Surgical excision of pterygium is done either for cosmetic reasons or when it encroached on to the cornea and caused visual difficulty. The clinical details such as site, duration of the lesion were noted. Both primary and recurrent cases of pterygia were checked separately for the differences in histological changes.

Results

Majority of patients with pterygia were in the 41-60 year age group, with a male to female ratio of almost 1:1. 68 % of the pterygia were located nasally. In the pterygia specimens many histological changes were observed, which include goblet cell hyperplasia, squamous metaplasia, dysplasia, carcinoma in situ, micro invasive squamous cell carcinoma, melanosis, scarring, calcification, implantation dermoid cyst and Jadassohn phenomenon etc. A spectrum of metaplasia, dysplasia and in situ carcinoma were noted.

Conclusion

These results highlight the premalignant nature of pterygium and the importance of careful histological examination of all cases of pterygium.

Introduction

A pterygium is an elevated, superficial, external ocular mass that usually forms over the perilimbal conjunctiva and extends onto the corneal surface. Pterygia can vary from small, atrophic, quiescent lesions to large, aggressive, rapidly growing fibro-vascular lesions that can distort the corneal topography and in advanced cases, obscure the optical center of the cornea.

Pterygium is a condition characterized by a triangular or wing-shaped mass which forms over the perilimbal conjunctiva and encroaches on to the cornea. Two clinical presentations of pterygium has been described. Pterygia³ can be a small, slow growing atrophic mass with low incidence of recurrence or can be an aggressive fibro vascular proliferation which rapidly progresses onto the cornea which may recur after an excision.(3) Pterygium³,⁴ is prevalent in periequatorial and tropical regions. Risk factors reported for pterygium include environmental influences such as dust, wind, particulate and chemical air pollution and solar
radiation. Within solar radiation, ultraviolet radiation seems to be most harmful.\textsuperscript{11,12,13} In the spectrum of solar induced\textsuperscript{3} lesions pterygia and pinguecula are considered to be in the most benign end, with solar induced carcinoma in the other end. Large number of studies on conjunctival biopsies have been published with similar findings.\textsuperscript{6,7}

Pterygium is found to occur twice as commonly in males as females with a higher prevalence in the age group above 40 years and an increased incidence rate\textsuperscript{5} in the 20-40 age groups. It is rare below the age of 20. Pterygium is more common on the nasal aspect but can also occur on the temporal side. The patients may be asymptomatic or present with redness, ocular irritation and foreign body sensation due to inflammation at the site of the pterygium. In advanced cases when the pterygium encroaches the cornea, there may be blurring of vision due to obstruction of the visual axis. It can also cause corneal astigmatism due to scarring of the corneal stroma. Being considered a benign condition, mostly pterygia need only observation with symptomatic treatment. But surgery is advised once it progress towards the cornea. While considered a relatively benign condition, pterygia can be locally invasive and can exhibit varying degrees of abnormality ranging from mild dysplasia to carcinoma in situ.\textsuperscript{1}

Pathophysiology\textsuperscript{5} of pterygia reveal it to be a case of elastoid degeneration of collagen and fibro vascular proliferation which underlies a normal conjunctival epithelium. The collagen at the region of elastoid degeneration gives a basophilia with haematoxylin and eosin staining. But recent studies consider it to be a growth disorder due to reduction in apoptosis\textsuperscript{8,9,10}. UV light\textsuperscript{11,12,13} and human papilloma virus\textsuperscript{5} were suspected aetiology for these lesions. Considering the proliferative nature of fibro vascular tissue, the treatment modalities have been altered which include radiation as well as local application of mitomycin etc.

In this clinical setting, a study was done to learn the prevalence of pterygia in our population and to evaluate changes in primary and recurrent pterygia by means of histopathological parameters. The specimens were investigated for any chance of premalignancy or malignancy arising in pterygia and to study whether the changes correlated with duration of the disease.

### Materials and methods

The records of 64 patients who underwent surgery at Regional Institute of Ophthalmology for conjunctival lesions, which were diagnosed histopathologically as pterygia in the past one year were analyzed. A detailed histopathological study was conducted and the findings were correlated with the clinical course of the disease. All the specimens underwent routine paraffin processing and were stained with haematoxylin and eosin stain.

### Results

**Clinical presentation**

All the cases which were diagnosed histopathologically as pterygium were included in the study. The clinical presentation was variable. Among the 60 reported cases of pterygium only 45 cases were clinically diagnosed as pterygium. Of the remaining fifteen cases, six cases were clinically described as limbal nodule. Conjunctival nevus were suspected in two cases and four cases were described only as a conjunctival lesion. In one case there was redness and pain and granulation tissue was doubted in this case. The remaining two case did not have a definitive clinical diagnosis.

**Primary or recurrent pterygia**

Among the 45 clinically diagnosed cases of pterygia, there were 42 cases of primary pterygia (93.3%) and 3 cases of recurrent pterygia (6.66%)

**Sex Preponderance**

Among the primary cases 17 occurred in males (40.47%) and 25 occurred in females (59.52%). Among the recurrent cases were seen in males. But the clinically undiagnosed cases were more common in males. Considering all the cases in the study the male to female ratio was 1:1.14

**Age and site**

Very few cases were seen below 20 years (2 cases) and recurrent cases were absent in this age group. The bulk of cases were seen in the 41-60 year age group (37 cases). Recurrent cases were mostly seen in the 51-60 year age group.
group. Most of the pterygia were located nasally 71.1%, (32 cases). One case was located in the temporal side (2.22%) and 10 cases limbal (22.2%). Bilateral nasal pterygia were detected in a patient.

**Histopathology**

On Histopathological examination, pterygia was diagnosed by the presence of basophilic degenerative material beneath the conjunctiva. Normally conjunctiva is lined by squamous epithelium comprising of three to four layers of cells. Goblet cells are normally seen in the conjunctival epithelium. All cases showed elastoid basophilic degeneration thus all the clinically diagnosed cases of pterygia were confirmed by histopathology. Pterygium was reported also from the rest 15 clinically undiagnosed cases.

1. **Findings in Recurrent Pterygia**

All the 3 cases of recurrent pterygia showed the scar of the previous surgery and was accompanied by inflammation and vascular proliferation. One case showed features of mild dysplasia.

2. **Clinically Conjunctival Nevus**

Two cases of conjunctival nevus diagnosed clinically showed the classical features of pterygium, among which one case showed pseudoepitheliomatous hyperplasia and mild dysplasia.

In 5 cases of pterygium, the clinical description given was conjunctival lesion or nodule. Two of these lesions which were black in color were found to have acquired melanosis and micro invasive squamous cell carcinoma along with pterygium. A conjunctival lesion of just three months duration had pterygium and implantation dermoid cyst.

3. **Clinically Limbal Nodule**

There were five cases described clinically as a limbal nodule/lesion. All these five cases were diagnosed as pterygium. Features of dysplasia, metaplasia, and actinic keratosis were noted in three of the above cases, with one of them showing the characteristic Jadassohn phenomenon.

4. **Clinically Primary Pterygium**

All the forty two clinically diagnosed cases of primary pterygia, were confirmed by histopathology. Among these cases six cases showed features of Squamous cell hyperplasia, metaplasia and dysplasia, dysplasia being of the severe nature in one case. Three cases of carcinoma in situ and a single case of micro invasive Squamous cell carcinoma were reported.

5. **Duration related changes**

In fourteen cases, duration of the lesion was 6 months. Among this, five cases showed proliferation of vessels in and around the degenerative material. One case showed hyperplasia and dysplasia of the epithelium. This case on subsequent biopsy showed micro invasive Squamous cell carcinoma. Histopathological examination of cases with duration of 6 months or more revealed proliferation of vessels in and around the degenerative material. One case showed hyperplasia and dysplasia of the epithelium which on subsequent biopsy showed micro invasive squamous cell carcinoma.

Among patients having pterygium for more than one year, seven had dysplasia of the overlying epithelium. All the four cases of carcinoma in situ had a duration less than two years. The average age for the appearance of squamous metaplasia and dysplasia in patients with clinical pterygia was forty nine years and that for carcinoma in situ was fifty two years. But the single case of Micro invasive Squamous cell carcinoma which was clinically diagnosed as pterygia, occurred in a 38 year old female with just six months duration. This case was chosen for surgery because there was irregularity on the surface of the lesion.

6. **Clinically Conjunctival Lesion**

Two of the cases clinically described as conjunctival lesion/nodule was reported to be pterygia. In one case a tiny dermoid cyst also was noted.

7. **Clinically redness and pain**

The case with redness and pain was diagnosed to have pseudoepitheliomatous hyperplasia and dysplasia with pterygium. Severe dysplasia of the overlying epithelium was reported from the doubted granulation tissue.

8. **Incidence of dysplasia**

There were fourteen cases of dysplasia, with nine case of mild, one case of moderate and four case of severe dysplasia, among which actinic changes were noted in three cases.
7. Sequence of events

There was a case of a 38 year old female who presented with pterygium of 6 months duration, surgical excision was done as the pterygium had an irregular appearance. The histopathology showed pterygium with hyperplasia and dysplasia with actinic changes of the overlying epithelium. A subsequent biopsy after 8 months showed microinvasive squamous cell carcinoma. Considering all the cases together, of all the total of 60 cases of pterygium diagnosed histologically, 45 presented with classical pterygium picture and 15 came with history of other complaints.

Conclusion

To date there have been several studies on pterygium in literature. Most of them have been to study the aetiology and pathogenesis of pterygium. In the present study, emphasis was given to the altered presentations of pterygium and the associated lesions seen in the epithelium overlying the pterygium like premalignancy. It has been proved beyond doubt that it occurs in the tropical countries and sunlight is the contributing factor. India being a tropical country, the incidence and prevalence of pterygium is very high. This was reflected well in our study which was set in the southern city of Trivandrum. In our study most of the patients (75%) had presented with complaints of classical pterygium, but there were altered presentation in many cases (25%). This aspect could not be compared with previous studies because in the literature pterygium cases have been evaluated only on clinically diagnosed cases and in the present study contrary to the previous studies, the histopathological appearance of pterygium was the inclusion criteria. Pterygium occurs more commonly in males and it has been thought to be due to more exposure to sunlight. But in this study male to female ratio was 1:1.14. While primary pterygium was found to be more common in females, the clinically undiagnosed cases and altered presentations of pterygia were more common in males. As to the site of the lesion, as in the literature, pterygium was more common in the nasal side. Dysplasia, carcinoma in situ and microinvasive carcinoma were more common in males (12 cases) (60%). There were 8 cases (40%) in females. This closely relates to the rate in the literature. In a previous study on ocular surface changes in pterygium, impression cytology has been used as a technique. The author has posed the difficulty regarding decreased cell yield from the surface of pterygium. But in our study such difficulties have been bypassed by working on the histopathological material. Moreover subtle changes of dysplasia occur first in the basal layers of the epithelium and tend to be missed when study is done on impression cytology material. This could be a reason for the increased incidence of dysplasia seen in our study. Chan et al’s study showed a higher incidence of squamous metaplasia with reduction in the number of goblet cells. In our study there were only 2 cases of squamous metaplasia. Both of them associated with dysplasia. Goblet cell hyperplasia was noted as a separate feature in 2 cases. Our study correlates with studies in the field to date regarding the progression of dysplasia to squamous cell carcinoma in cases of pterygia. Such a sequence of events can be clearly found in one of our case. It is evident from our study that many cases of dysplasia and squamous cell carcinoma may be remaining dormant in pterygium cases. In Mc Kelvie’s study on 26 cases of squamous cell carcinoma, 7 of them arose in a clinical picture of pterygium (26.9%).

In the present study, incidence of frank squamous cell carcinoma in the form of microinvasive squamous cell carcinoma is 3.3%. The incidence of dysplasia is 21.6% and that of carcinoma in situ is 6.66%. Our study confirms the importance of a detailed histopathological study of all pterygia coming in the outpatient department. In the present study, cases with a history of even 6 months showed dysplasia on histopathological examination. This shows that surgical excision needs to be done in the early stage itself. All the excised specimens of suspected pterygia should be subjected to histopathological examination. Follow up is necessary for all cases of pterygia. Since the incidence of dysplasia increases with the duration of the disease, all cases of pterygia need to be excised very early in their course.

References

3. Pterygium:Prevalence,demography and risk factors. Saw and Donald Tan.. Ophthalmic Epidemiology

Does the leisurely practice of Ophthalmology give its practitioners time for other pursuits? Beginning a new series on famous people who were also Ophthalmologists……………

Little Known Ophthalmologist
SIR ARTHUR CONAN DOYLE
[Prof. Padmaja Krishnan, Calicut]

Which of us has not been spellbound by Sherlock Holmes and his deductive powers? Yet what do we know about the creator of this larger-than-life detective?

Arthur Conan Doyle was born in Edinburgh on 22 May 1859. His parents were Roman Catholics from Ireland. Charles, his father was a civil servant who painted pictures to supplement his income. After coming to Edinburgh, Charles, who had epilepsy, became an alcoholic and had to be institutionalized. His mother, Mary was interested in literature and encouraged Arthur to read books and to write. Conan Doyle started writing early in life and his first story was published when he was not yet 20 years old.

His early education was in a Jesuit preparatory school and he was deeply influenced by their teaching. However, by the time he left school at the age of 16, he had rejected Christianity and become an agnostic.

He studied Medicine at the University of Edinburgh and graduated in 1881. He was an all-rounder in sport, and played on the cricket team with P.G. Wodehouse and J.M Barrie, the creator of Peter Pan.

Immediately after graduation, he became a ship's doctor and travelled all the way to Africa. Returning to England, he set up Medical Practice at Plymouth in 1882 and moved to Portsmouth in 1884. The subject for his doctoral thesis in 1885 was Tabes Dorsalis. He was not a successful doctor and it was while waiting for the patients who never came that he began writing stories. His first significant work was “A Study in Scarlet”, published in 1887. This novel, in which Holmes and Dr. Watson first appeared was written in 3 weeks’ time in 1886.

He modelled Holmes on Dr. Joseph Bell, his Professor at Edinburgh, a popular teacher renowned for his deductive powers. His Sherlock Holmes stories quickly became very popular and he went on to write 56 short stories and 4 novels featuring Holmes.

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