

Clinical Presentation of Pterygium and Factors Responsible For Its Occurrence in Rural Kashmir

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Abstract: Pterygium (Wing) is a pathological encroachment of bulbar conjunctiva on to the cornea. It is found in sunny, hot and dusty regions of the world, the incidence varies with the amount of exposure to these climatic conditions.

Purpose: To find out the possible factors responsible for the occurrence of the pterygium and its clinical presentation

Observations: The present study included 120 patients – 50 males and 70 females, 92 progressive and 28 atrophic types. In both sexes progressive type was more common in younger age group (below 40 years) and atrophic in older age group. The incidence of progressive pterygium was 84.28% in females as compared to 66% in males, the association being of significant nature ($p < .02$). By occupation, housewives were found commonest to be involved (84.28%) followed by farming (19.16%). There was higher incidence among illiterates (58.33%) as compared to literates (41.67%). Positive family history was present in 21 cases (17.5%), which had no significance. The main complaints of patients were of irritation with visual disturbance in 48.33% (mostly in cases with progressive pterygium) followed by irritation alone in 16.67% (mostly in atrophic pterygium). All atrophic types were of duration > 12 months and 89 out of 92 cases of progressive pterygium were of duration < 12 months showing that as time progresses, progressive type takes up atrophic shape.

Conclusion: Since people from low socio-economic group living in remote areas are more susceptible to develop this disease, there is a need to improve their socio-economic status. Also they should be educated to use protective glasses during work.

Keywords: Progressive pterygium; Atrophic pterygium; Visual acuity (VA)

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I. Introduction

Pterygium (wing) is a pathological encroachment of bulbar conjunctiva on to the cornea. Interpreted in its widest sense, it occurs in two forms - a true pterygium and a pseudo-ptyerygium (*winther, 1856*). True pterygium is found chiefly in sunny, hot, dusty regions of the world, mostly between the latitudes of 37° north and south of the equator (*Poncet, 1881*). The incidence also varies with the amount of exposure conditions, thus most common in workers who work outdoors.

The geographical incidence makes it almost necessary to assume that environmental irritation must have something to do with the development of pterygium. Hot dry atmosphere, high winds and abundance of dust (*Fuch's, 1892*), decreased lacrimal secretion as adjuvant factor (*Gram, 1954*), above factors plus UV rays in solar radiation (*Darell and Bachrach 1963, Cameron 1964*). The influence on these factors fits best with the distribution of pterygium throughout the world more readily than any of the factors and explains its occurrence in damp climates and other environments from which dryness and dust can be excluded.

The clinical appearance of pterygium differs according to the stage in which it is seen and according to the degree of activity of the process that leads to its formation. Thus in its active and progressive stage, pterygium is fresh, opaque and vascular with halo of grayish white opacity surrounding the advanced head over the cornea with brownish pigmented line due to deposition of hemosiderin (stockler's line). Sooner or later, the condition begins to subside and regressive stage is reached in which the halo of opacity in the cornea stops short and begins to become absorbed and hyperaemia and engorgement begins to abate. Finally, atrophic stage is reached in which no halo of opacity is seen in the cornea, head thins out and becomes cicaterised, hyperaemia disappears and fold of conjunctiva becomes more translucent.

Regarding clinical picture, as long as pterygium is small, it does not give rise to any symptoms except for slight irritation and cosmetic problem but if it grows and involves major portion of cornea. Patient may get

disturbances of vision due to astigmatism and diplopia due to disturbances of motility of globe.

The present study was carried out to assess the possible role of various etiological factors in the formation of pterygium and its clinical presentation in the valley.

II. Material And Methods

This is a descriptive type of study. 120 cases from rural areas of Kashmir valley were included in the study. Patients having raised IOP and any anterior segment or corneal disease were excluded from the study. A careful history was taken in every case recording the name, age, sex, address, occupation, socio-economic status, duration of disease, past history of treatment, family history and reason for reporting to the hospital whether irritation, cosmetic, visual disturbances or diplopia. Examination included VA, IOP, Ocular movement measurement, complete slit-lamp examination to note the details of pterygium. Schirmer's test was done in every case.

A progressive pterygium was taken as one in which the neck was hyperaemic, head voluminous and of gelatinous appearance, cap serrated with its borders infiltrating the healthy corneal tissue and presence of halo of opacity in front of the pterygium head. An atrophic or static type was taken as one in which vessels had disappeared and the pterygium was pale and halo of opacity absorbed. 35 cases of pinguecula were also registered in the study and followed for one year so as to see how many progress to pterygium.

All data was entered in Microsoft excel software. Statistical analysis was done using Chi-square test and Mann-Whitney test wherever required.

III. Results

Out of 120 patients included in the study, females were more as compared to males with male: female ratio of 1:1.4. Progressive pterygium was present in 76.66% (92/120) cases which was statistically significant. Pterygium was more predominant among younger age group below 40 years of age- 60%(30/50) and 74.3%(52/70) in males and females respectively. Progressive type of pterygium had higher preponderance in females 84.28%(59/70) as compared to males in it was 66.0%(33/50). On the other hand, preponderance of atrophic type was more in males- 34%(17/50) cases in comparison to females which was 15.72%(11/70) cases. The association is statistically significant ($p < .02$) (**Table 1**)

Majority, 57.50% (n=69) were housewives followed by farmers 19.16% (n=23). In housewives and farmers, 57 out of 69 and 13 out of 23 cases had progressive pterygium respectively. Of 120 cases, 41.67% (n=50) were literate and 58.33% (n=70) illiterate. No significant difference was seen in the type pterygia in two groups. There was no significant difference between the side involved and type of pterygia. All pterygia whether right, left or bilateral were on nasal side. Family history was seen positive in only 17.50% (n=21) cases. The relationship was found to be statistically insignificant ($p < .001$). Main complaints were Irritation /visual in 48.33%(58/120) cases and out of these 54 patients had progressive pterygium. It was followed by Irritation only in 16.67%(20/120), visual alone in 14.17%(17/120) and irritation/cosmetic in 12.50%(15/120). Complaints were more in progressive pterygia – 76.67%(92/120). All cases of duration below 1 year were of progressive type and above 1 year, majority of the cases were of atrophic type (28 out of 31). 27 out of 28(96.42%) cases of atrophic pterygium had VA < 6/6 (96.42%) compared to 44 out of 92 cases (47.82%) in case of progressive pterygium. (**Table 2**).

Extent of corneal involvement was found to various degrees – upto 1.5mm(27.50%), 1.5-2.5mm(54.17%) and > 2.5mm(6.66%) in unilateral cases and in some bilateral cases involvement was >2.5mm. In majority it was between 1.5-2.5mm which is statistically significant ($p < .02$) (**Table 3**).

Table 1: Distribution of males and females according to the age and type of pterygium Progressive

Age group	No. of cases		Types of pterygium			
			Progressive		Atrophic	
	Male(%)	Female(%)	Male(%)	Female(%)	Male(%)	Female(%)
0-20	-	-	-	-	-	-
21-30	17(34.0)	32(45.71)	17(34.0)	32(45.71)	-	-
31-40	14(28.0)	20(20.57)	13(26.0)	20(28.57)	1(2.0)	-
41-50	12(24.0)	9(12.86)	3(6.0)	6(8.57)	9(18.0)	3(4.29)
51-60	4(8.0)	8(11.43)	-	-	4(8.0)	8(11.47)
>60	3(6.0)	1(1.43)	-	1(1.43)	3(6.0)	-
TOTAL	50	70	33(66.0)	59(84.28)	17(34.0)	11(15.72)

Combined both i.e. males and females

Total cases = 120 (Progressive = 92 & Atrophic = 28)

Statistical inference: $x = 5.44$, DF = 1

$P < .02$ (significant)

Table 2: Bio-social characteristics

	Total no. of cases (%)	Type of pterygium	
		Progressive N (%)	Atrophic N (%)
A. Occupation			
Housewife	69(57.50)	57(47.50)	12(10.0)
Farming	23(19.16)	13(10.83)	10(8.33)
Labourers	6(5.0)	3(2.50)	3(2.50)
Bus drivers & conductors	3(2.50)	3(2.50)	-
Carpenter	2(1.67)	2(1.67)	-
Traffic police	2(1.67)	2(1.67)	-
Shopkeepers	6(5.0)	5(4.17)	1(0.83)
Govt. servants exposed to sun	9(7.50)	7(5.83)	2(1.67)
TOTAL	120(100)	92(76.67)	28(23.33)
B. Literacy status			
Literate	50(41.67)	43(35.84)	7(5.83)
Illiterate	70(58.33)	49(40.83)	21(17.50)
TOTAL	120(100.0)	92(76.67)	
C. Laterality			
Right	54(45.0)	45(37.50)	9(7.50)
Left	52(43.33)	37(30.83)	15(12.50)
Bilateral	14(11.67)	10(8.34)	4(3.33)
TOTAL	120(100.0)	92(76.67)	28(23.33)
D. Complaints			
Cosmetic/visual	8(6.66)	4(3.33)	4(3.33)
Irritation/visual	58(48.33)	54(45.0)	4(3.33)
Irritation/cosmetic	15(12.50)	15(12.50)	-
Cosmetic	2(1.67)	2(1.67)	-
Visual	17(14.17)	9(7.50)	8(6.67)
Irritation	20(16.67)	8(6.67)	12(10.0)
TOTAL	120(100)	92(76.67)	28(23.33)
E. Duration(months)			
Up to 6	33(27.50)	33(27.50)	-
6 to 12	56(46.67)	56(46.67)	-
>12	31(25.83)	3(2.50)	28(23.33)
TOTAL	120(100)	92(76.67)	28(23.33)
F. Visual acuity			
6/6	49(40.83)	48(40.0)	1(0.83)
6/9-6/24	46(38.33)	36(6.0)	10(8.33)
6/18 -6/24	23(19.17)	8(6.67)	15(12.50)
< 6/24	2(1.67)	-	2(1.67)
TOTAL	120(100)	92(76.67)	28(23.33)

Table 3: Extent of corneal encroachment in relation to eye involved of course

Corneal involvement (mm)	UNILATERAL			BILATERAL	
	RE	LE	TOTAL	RE	LE
Upto1.5	16(13.33)	17(14.17)	33(27.50)	5(4.17)	8(6.67)
1.5 to 2.5	34(28.34)	31(25.83)	65(54.17)	8(6.67)	5(4.19)
>2.5	4(3.33)	4(3.33)	8(6.66)	1(0.83)	1(0.83)
TOTAL	54(45.0)	52(43.33)	106 (88.33)	14 (11.69)	14 (11.67)

RE= Right eye, LE= Left eye

Among 35 cases of pinguecula which were registered and followed to see if it is a precursor of pterygium, none developed pterygium during follow-up period. A slit-lamp finding of dry eye and schirmer's test was pathological only in 2 cases (1.66%) out of 120 cases studied.

IV. Discussion

Among males 66% had progressive pterygium 34% had atrophic type of pterygium (Table 1). On the other hand, among females 84.28% had progressive and only 15.72% cases had atrophic type of pterygium .The association being of significant nature ($p<.02$) (Table 1).The majority of progressive pterygium was found below 40 years of age i.e younger age group. On the other hand, atrophic pterygium was more common in older age group in both males and females. These observations correlate with the study made by *Khanna et al (1972)* , *Zuberman R. (1967)*, *Dematini DR (1987)* and *Lin A (1987)*

The commonest occupation observed to be more related to the occurrence of pterygium are housewives (57.50%) followed by farmers (19.16%), labourers and shopkeepers (5%), etc. (Table 2). The housewives in Kashmir, except of high socio-economic status, are exposed to dry atmosphere which also contains abundance

of dust and smoke especially while working in kitchens where dried dung, grass and wood are used as fuel. They are exposed to bad kitchen conditions daily for several hours. The condition gets more worsened during winter when doors and are closed due to severe cold. Also, during summers, they have to work along with men in the fields where they are exposed sun, dust and wind. The valley being about 5000 feet above the sea level, the quantity of UV rays in the sunlight is also higher. Thus, it is evident that the atmosphere, to which a person might be exposed to, has a significant bearing in the occurrence of the disease. Exposure to these conditions leads to chronic conjunctival inflammation which might be the cause of degenerative changes in the subconjunctival tissue. Dry dusty atmosphere and high winds have been incriminated as etiological factors for the pterygium by *Poncet (1981)*, *Fuch's (1892)*, *Doherty W B (1941)*, *Parathasarthy (1967)*, *Maharjan IM et al (2014)* and *Ashok et al (2009)*. *Hilger's J H (1960)* also observed above factor to be responsible for pterygium formation and sex to be unimportant in its etiology. These observations are quite consistent with the observation made in the present study. *Elliott (1961)* and *Darell R W et al (1963)*. *Parathasarthy (1967)*, *Rohatgi S (2013)* and *Dematini DR et al (1987)* in their experimental, clinical and epidemiological studies postulated that pterygium is related to the effect of UV radiation on the eye that has been exposed to sunlight and the drying effect of constant winds. *Portney G L C (1969)* conducted a study on Navajo Indians, who comprise the largest the largest tribe of American Indians and live on a reservation in north eastern Arizona. The elevation of the reservation ranges from 4000 to 10,000 feet above the sea level. According to US weather beareau, this area has more UV rays than anywhere else in the country due to southern latitude and great altitude. In the Navajo Indians pterygium is quite common. *Vorkas A P (1981)* has studied pterygium in Cyprus, where there are more than 340 sunny days in a year and has reported high incidence of pterygium there. Also, *Viso E (2011)* conducted a study in Spain and reported strong relationship between pterygium and UV radiations. These observations coincide with the one made in the present study.

The socio-economic status revealed higher incidence of the disease (58.33%) among illiterate as compared to literate patients (41.67%) (Table 2). Poor socio-economic status might be forcing a person to get exposed to dry, dust, smoke, pollution and sunny atmosphere while working in open field to liquidate his needs and demands. So, it is not the socio-economic status which might be contributing to the occurrence of pterygium directly but may be the atmosphere to which the person of low socio-economic status is forced to adopt which is involved in the etiology of pterygium.

In the present study it was observed that hereditary factors may have some role in the etiopathogenesis of pterygium as evidenced by family history in 21 cases out of 120 cases (17.5%) (Table5). Same observations have been made by *Hilger's J H (1960)*, *Jacklin H N (1964)* and *Duke Elder (1965)*. According to *Jacklin H N (1964)* pterygium has a dominant mode of inheritance whereas *Duke Elder (1965)* is of the opinion that it is not the actual lesion which is transmitted but the tendency of the eye to react in this way to environmental stimuli.

Out of 120 cases studied 106 cases (88.33%) were unilateral and the rest bilateral and all were on nasal side. Nasal predilection can be explained by the fact that dust particles and foreign material accumulates on the nasally by the flow Pterygium (wing) is a pathological encroachment of bulbar conjunctiva on to the cornea. Interpreted in its widest sense, it occurs in two forms - a true pterygium and a pseudo-ptyerygium (*winther, 1856*). True pterygium is found chiefly in sunny, hot, dusty regions of the world, mostly between the latitudes of 37° north and south of the equator (*Poncet, 1881*). The incidence also varies with the amount of exposure conditions, thus most common in workers who work outdoors.

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Out of 120 cases studied 106 cases (88.33%) were unilateral and the rest bilateral and all were on nasal side. Nasal predilection can be explained by the fact that dust particles and foreign material accumulates on the nasally by the flow of tears. This finding is consistent with studies by *Kamel S (1946)*, *Rachmid et al (1995)*, *Shimazdu et al (1996)* and *Maharjan (2014)*.

In our study, patients have mostly problems of irritation with visual disturbance (48.33%) followed by irritation alone (16.67%) and very few reported for cosmetic problem .Among 92 cases of progressive pterygium, majority 54 cases (45%) had irritation with visual disturbance and out of 28 cases of atrophic pterygia, majority of cases (10%) had irritation only. This shows that cases with atrophic pterygia have mostly no visual disturbances.

Duration of pterygia was found to have remarkable association with the type of pterygium (Table 2). In our study, only 2.50% of cases of progressive pterygia were of duration > 12 months and rest were of < 12 months of duration, whereas, all 28 cases of atrophic pterygia were of > 12 months duration. This shows that as the pterygium advances, progressive type take up atrophic shape.

Nearly half the cases with progressive pterygia (47.83%) revealed disturbance in visual acuity which ranged from 6/9 to 6/24 whereas, nearly all cases (27 out of 28) of atrophic pterygia had VA ranging from 6/9 to 6/24 (table 2). Greater the extent of corneal involvement more was the VA affected. It was also noted that during inflammation of pterygium, VA was reduced even if there was less extent of corneal involvement. This can be attributed to the inflammatory irritation rather than the direct affect of the pterygium on the vision. Pterygium can have direct effect on vision in two ways - by contraction of its fibrous elements, it exerts pull on cornea resulting in astigmatism or rarely by encroachment to the papillary area and hence obstructing vision. Same findings were observed by *Starck T et al(1991)*, *Pesudovs K (2006)*, *Maheshwari S (2007)* and *Bahar I et al(2009)* and *Lin A et al(1998)*. Majority of the atrophic pterygia were found in older age group where senile lenticular changes and dull foveal reflex were also seen. Hence increased incidence of decreased VA in cases with atrophic pterygia can be attributed to the senile lenticular and macular changes. In spite of increased incidence of decreased VA, most patients with atrophic pterygia reported with complaints of irritation only and not of visual disturbance. The reason for this may be old age and the type of work these old patients would be doing, not requiring full VA.

Majority of the patients had corneal encroachment between 1.5 -2.5mm and very few had more than 2.5mm This shows that pterygium can sometimes so adversely affect the eyes of a person that it can prove fatal to the nature's valuable gift of vision. Our finding is consistent with those of *Shimazaki et al (1996)* and *Rachmeil et al (1995)*.

Of the 35 cases of pinguicula which were registered and followed for one year, none developed ptrygium. Thus, it can be said that pinguicula is not a precursor of pterygium but the possibility of its being precursor of pterygium at the same time can't be totally excluded because follow-up period is only one year and it is quite possible that pinguicula can take longer duration to change into pterygium. The same observation has been made by *Coleman (1943)* and *Duke Elder (1965)* who considered the two as separate entities. Dry eye was found in only 2 cases, so can't be considered as one of the etiological or adjuvant factors in the development of pterygium.

V. Conclusion

Pterygium, a pathological encroachment of degenerated bulbar on to the cornea is a serious problem in our rural population especially in younger age group (below 40 years) and in females. Majority of the patients suffering from this disease young (<40 years), belong to low socio-economic group and are illiterate, who have to work in dry, dusty and sunny atmosphere to liquidate their needs. Moreover, women folk in Kashmir apart from above factors are exposed to smoke in kitchens where they burn firewood to cook food, the condition getting worse in winters when doors and windows are closed due to severe cold. So, we concluded that efforts should be made to improve socio-economic status of these people so that they are not exposed to above mentioned factors and can afford alternative to firewood. Also they should be educated regarding use of protective glasses during work.

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