

Original Research Article

“A STUDY ON DRY EYE AMONG PATIENTS WITH PTERYGIUM: A TERTIARY CARE EXPERIENCE”

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ABSTRACT:

Background: Pterygium is a degenerative condition resulting in the formation of fibrovascular wing shaped tissue that develops from the conjunctiva & encroaches on to the cornea ⁽¹⁾. Apart from being a cosmetic blemish, it can cause significant visual impairment induced due to corneal astigmatism and also cause persistent ocular discomfort to the patients often requiring surgical intervention

OBJECTIVE: To study the proportion of Dry eye in patients with Pterygium and to study the factors associated with Dry eye among these patients.

Material & Methods: Study Design: Hospital based cross-sectional study. **Study area:** Dept. of. Ophthalmology, High tech medical college and hospital, Rourkela. **Study Period:** Jan. 2021 – Jan. 2022 (1 year) . **Study population:** Patients with who presented with symptoms of Pterygium to the OPD of the department of Ophthalmology. **Sample size:** study consisted a total of 100 patients. **Sampling method:** Simple Random sampling method. **Ethical consideration:** Institutional Ethical committee permission was taken prior to the commencement of the study. **Study tools and Data collection procedure:** Pre-tested questionnaire, External eye examination under torchlight, Slit lamp examination and direct ophthalmoscopy Schirmer test with anesthesia and without anesthesia Tear film Break-up Time test, Marginal tear film Meniscus Height. **Statistical Analysis:** The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean & S.D were used for continuous variables

Results: Among the study participants, the number of participants with Right pterygium and Left pterygium were 76 and 72 respectively.

CONCLUSION:

On the basis of different criteria at least 26 % of eyes with Pterygium (either unilateral or bilateral) are affected with dry eye. On studying different factors, age showed a positive association with dry eye tests among the patients with Pterygium.

Key words: Pterygium, Dry eye, Schirmer test

INTRODUCTION:

Pterygium is a degenerative condition resulting in the formation of fibrovascular wing shaped tissue that develops from the conjunctiva & encroaches on to the cornea ⁽¹⁾. Apart from being

a cosmetic blemish, it can cause significant visual impairment induced due to corneal astigmatism and also cause persistent ocular discomfort to the patients often requiring surgical intervention ⁽²⁾.

Presently, it is believed that Pterygium most commonly affects the individuals who are exposed to the outdoor environment particularly in tropical and subtropical countries, therefore, exposure to dry, dusty, windy, and sunny weather is blamed to be the risk factor ⁽³⁾. One of the theories is that the tear film abnormalities causes local drying of the cornea & conjunctiva which in turn predisposes to these new growths and exposes epithelium directly to the destructive effect of UV rays ⁽⁴⁾. Whether tear dysfunction leads to Pterygium or Pterygium causes tear dysfunction is not clearly understood. The present study aims to assess Dry eye condition in patients with Pterygium.

OBJECTIVE:To study the proportion of Dry eye in patients with Pterygium and to study the factors associated with Dry eye among these patients.

Material & Methods:

Study Design: Hospital based cross-sectional study.

Study area: Dept. of. Ophthalmology, High tech medical college and hospital, Rourkela.

Study Period: Jan. 2021 – Jan. 2022 (1 year).

Study population: Patients with who presented with symptoms of Pterygium to the OPD of the department of Ophthalmology.

Sample size: study consisted a total of 100 patients.

Sampling method: Simple Random sampling method.

Inclusion Criteria: Patients with a clinical diagnosis of Pterygium and willing to participate in the study.

Exclusion Criteria: Patients with acute eye condition like watering, itching or pain are excluded. Those who had eye surgery within the last one month or awaiting surgery in the next few days were excluded.

Ethical consideration: Institutional Ethical committee permission was taken prior to the commencement of the study.

Study tools and Data collection procedure:

Pre-tested questionnaire, External eye examination under torchlight, Slit lamp examination and direct ophthalmoscopy Schirmer test with anesthesia and without anesthesia Tear film Break-up Time test, Marginal tear film Meniscus Height.

Informed consent and proforma-wise information collected from each patient. The following details were arbitrarily taken. Occupation: working in sunlight at least 6 hours per day for at least three days per week was considered as an outdoor occupation; other occupations as indoor. Diet: eating either fish or meat at least twice per week was considered as Non-vegetarian; others as a vegetarian. Smoking: smoking at least once per day was considered as smoking present others as Non-smoking. Size of Pterygium, Schirmer test, Tear film Break-up Time, Tear Meniscus Height was assessed. Tests were done for each eye. Principal investigator conducted the examinations.

Schirmer Test I (Test without anesthesia) :Whatman No.41 filter paper folded at one end, kept inside the lower eye lid at the junction of medial 2/3rd and lateral 1/3rd. The patient

was asked to keep the eyes open for 5 minutes. Gentle blinking was Allowed, if needed at the end of 5 minutes, reading on the strip was taken. This data was then taken for analysis.

Tear film break-up Time: Fluorescein strip was used to stain the tear film by keeping the chin on the slit lamp chin-rest. The patient was asked to blink a few times; then to keep the eyes open. The tear film over the cornea was examined under Cobalt blue filter with a broad beam of the slit lamp. Time taken between the last blink and the appearance of the first dry spot was taken in seconds.

Tear Meniscus Height: The height of the tear meniscus is taken by directing the slit lamp beam towards the lower lid margin and adjusting the size of graticule to match the meniscus height.

Size of the Pterygium from the limbus to apex was taken by keeping the beam of a slit lamp in the horizontal axis.

Dry eye was considered to be present on the basis of the tests: Schirmer test without anesthesia: less than 10 mm

TBUT : less than 10 seconds TMH: less than 0.50 mm

Statistical Analysis:

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean & S.D were used for continuous variables. To find the significance in categorical data Chi-Square test was used. In all these statistical tools the probability value of 0.05 is considered to be the significant level.

OBSERVATIONS AND RESULTS:

TABLE 1: Distribution of study participants by sex, age, occupation, and smoking.

Sex	Frequency	Percentage
Male	36	36.0
Female	64	64.0
Age group		
< 35 years	6	6
36 - 45 years	21	21
46 - 55 years	23	23
56 - 65 years	31	31
> = 66 years	19	19
Occupation		
Outdoor	69	69.0
Indoor	31	31.0
Smoking		
Smoking	12	12.0
Nonsmoking	88	88.0
Total	100	100.0

TABLE 2: Distribution of study participants by diet, diabetes, hypertension.

DIET	Frequency	Percent
Nonvegetarin	91	91.0
Vegetarian	9	9.0
DIABETES		
Diabetes present	21	21.0
Diabetes absent	79	79.0
HYPERTENSION		
Hypertension present	26	26.0
Hypertension absent	74	74.0
Total	100	100.0

Among the study participants, the number of participants with Right pterygium and Left pterygium were 76 and 72 respectively.

TABLE 3: Distribution of study participants according to dry eye tests.

RSCHIRMER TEST	Frequency	Percent
Yes (<10)	23	23.0
No (>=10)	77	77.0
LSCHIRMER TEST		
Yes (<10)	18	18.0
No(>=10)	82	82.0
RTBUT TEST		
Yes (<10)	36	36.0
No (>=10)	64	64.0
LTBUT TEST		
Yes (<10)	31	31.0
No (>=10)	69	69.0
RTMH TEST		
Yes (< 0.5)	59	59.0
No (>=0.5)	41	41.0
LTMH TEST		
Yes (<0.5)	60	60.0
No (>=0.5)	40	40.0
Total	100	100.0

Table 4: Mean values of Dry eye tests of the study population.

Dry eye examination: Mean value						
	RSCHIRMR	LSCHIRMR	RTBUT	LTBUT	RTMH	LTMH
Overall	16.94	17.85	10.14	10.72	0.39	0.38
Males	15.88	17.77	9.94	11.41	0.4	.39
Female	17.53	17.89	10.2	10.3	0.38	0.38
Overall						
< = 35	22.0	21.80	13.33	14.16	0.48	0.15
36 - 45	18.47	18.09	10.0	11.09	0.40	0.17
46 - 55	21.30	20.60	10.80	10.13	0.43	0.21
56 - 65	13.90	16.20	9.0	9.45	0.34	0.20
>= 66	13.20	15.60	10.20	12.0	0.36	0.19
Male						
< = 35	14.50	14.50	15.0	15.0	0.35	0.35
36 - 45	19.10	19.81	9.81	11.60	0.47	0.44
46 - 55	19.50	19.66	10.80	9.60	0.46	0.33
56 - 65	13.20	16.70	10.0	11.70	0.32	0.37
>= 66	11.90	15.40	7.8	11.10	0.37	0.41
Female						
< = 35	25.70	25.50	12.50	13.75	0.55	0.42
36 - 45	17.70	16.20	10.20	10.50	0.33	0.36
46 - 55	21.20	20.90	10.80	10.29	0.42	0.42
56 - 65	14.20	15.90	8.50	8.38	0.35	0.39
>= 66	14.0	15.80	11.6	12.50	0.36	0.31

Table 5: Relation between Age and SCHIRMER.

Age	Either SCHIRMER < 10		
	Yes	No	Total
<35years	0	6	6
36 - 45 years	5	16	21
46 - 55 years	3	20	23
56 - 65 years	12	19	31
> = 66 years	11	8	19
Total	31	69	100

$\chi^2=13.957$ $df=4$ $p=0.007(S)$

There is a significant association between Age and SCHIRMER.

Table 6: Relation between Age and TBUT.

Age	Either TBUT < 10		
	Yes	No	Total

<35years	0	6	6
36 - 45 years	8	13	21
46 - 55 years	9	14	23
56 - 65 years	19	12	31
> = 66 years	7	12	19
Total	43	57	100

$\chi^2=9.398$ df=4 p=0.05 (S)

There is a significant association between Age and TBUT.

Table 7: Relation between Diabetes and TBUT.

Diabetes	Both TBUT		Total
	Dry eye present	No dry eye	
Diabetes present	14	7	21
Diabetes absent	29	50	79
Total	43	57	100

$\chi^2=6.075$ df=1 p=0.014(SS)

Table 8: Association between the Dry eye and Different Factors.

Factors	SCHIRMER	TBUT	TMH
Age	Yes	Yes	No
Gender	No	No	No
Occupation	No	No	No
Diet	No	No	No
Menopause	No	No	No
Smoking	No	No	No
Diabetes	No	Yes	No
Hypertension	No	No	No

DISCUSSION:

Pterygium is common in the tropical and subtropical areas, particularly in persons exposed to sun, wind, and dust. UV light exposure plays a major role in the development of pterygium. There is an increased risk of dry eye symptoms in pterygium patients. While a direct mechanism is obvious, advances in our understanding of the inflammatory basis of dry eye syndrome suggest an indirect effect of inflammatory mediators in pterygium resulting in a dry eye state. Drying of interpalpebral tear film can be a predisposing factor to pterygium.

Unstable tear film in the interpalpebral area exposes the peripheral corneal epithelium, Bowman's membrane and the underlying corneal stroma to the destructive effect of UV light and the tissue damage thus sustained stimulates the formation of pterygium. Drying of interpalpebral tear film occurs most readily in the medial third of the interpalpebral fissure, because this part is farthest from lacrimal gland and nearest to the puncta. One of the theories is that the tear film abnormalities causes local drying of the cornea and conjunctiva which in turn predisposes to these new growths ⁽⁴⁾.

Dry eye is a multifactorial disease of the tears and ocular surface that results in ocular discomfort, visual disturbance and tear film instability with potential damage to the ocular surface ⁽⁵⁾. Pterygium is associated with tear hyperosmolarity and abnormal tear film function. Dry eye disease can decrease the performance of activities of daily living and is associated with an overall decrease in quality of life ⁽⁶⁾.

23% of right eyes with Pterygium showed dry eye condition. 18% of left eyes with Pterygium are affected with the dry eye condition. On average, dry eye condition is seen in 20.5% of eyes with Pterygium. Different studies show a wide range from 8.00% to 52.00%. Dry eye is seen in 36% of right eyes with Pterygium and 31% of left eyes with Pterygium. On average, dry eye is seen in 33.5% of eyes with Pterygium. Different studies show range from 30.00% to 75.00%. Atiya Rahman ⁽⁷⁾ had found that in patients with pterygium, TBUT test was abnormal in 75.6% of eyes and 9.3% of eyes in the control group. The Schirmer test was positive in 9.3% of eyes with pterygium and 3.5% of eyes in the control group.

In a study from India (Mithal⁽⁸⁾ et al, 1991) when Schirmer's test was done in two groups of patients, they found that the mean wetting of the filter paper was 12.6 mm (range 11 - 16 mm) & 5.2 mm (range 3 - 9.4 mm) respectively in normal healthy eyes and the eyes of patients with pterygium, they concluded that both the values were found to be significantly reduced in cases of pterygium indicating the inadequacy of tear film in these pterygium patients.

In the study by Manhas A et al ⁽⁹⁾, The mean Schirmer-1 value was 13.17±4.57 in pterygium patients. El-Sersy TH ⁽¹⁰⁾ had also found that the mean wetting length of the filter paper in the Schirmer-1 test was 13.76 ± 2.06 mm (range 11-17 mm/5 min) in normal healthy eyes and 5.85±1.86 mm (range 3-9.5 mm/5 min) in the eyes of patients with pterygium.

In a study by Ann Tresa Antony ⁽¹¹⁾ et al, The mean +/- standard deviation of tear breakup time in pterygium eyes was 7.6 +/- 2.6 seconds and 11.2 +/- 1.8 seconds in contralateral normal eyes (t =11.5, p-value <0.001) There was a statistically significant difference in the dry eye tests (TBUT) results between the pterygium eyes and the contralateral eyes (p-value < 0.05). Thus there is a significant association between pterygium and dry eye which is in contrast with our study.

In the study by Manhas A ⁽⁹⁾ et al, the mean TBUT value was 9.88±3.39 in pterygium patients and 14.22±3.99 in control group. The mean difference was 4.34 which was highly significant. The mean Schirmer-1 value was 13.17±4.57 in pterygium patients and 16.40±5.21 in control group. The mean difference was 3.23 which was highly significant. This study found a strong positive clinical correlation between dry eye and pterygium (p<0.001) which is in contrast with our study. The prevalence of dry eye in pterygium patients was 58.89% which suggests that there is a strong positive clinical correlation between dry eye and pterygium

The risk factors studied are age, gender, occupation, menopause, smoking, diabetes mellitus, and hypertension. In the present study positive association was found between age, Schirmer test, and TBUT. Also, diabetes and TBUT showed a positive association. There are very few studies on the dry eye test and different factors among the patients with Pterygium. The study by Roka N et al ⁽¹²⁾ showed that there is no statistically significant association between gender and dry eye test nor between occupation and dry eye test. This agrees with our study. Comparison studies were not found between Dry eye and factors - menopause, smoking and hypertension among patients with Pterygium.

Rajiv et al ⁽⁸⁾ conducted a correlation study between Pterygium and Dry eye. They found that most cases of Pterygium found in the age group 30-40 years and it was more commonly seen in males compared to females. In their study, the youngest patient was 14 years old and oldest 71 years. It was found that in patients with Pterygium the mean Schirmer test reading was 5.2mm (range 3mm to 9.4mm). The Tear Film Break-Up Time also markedly reduced in these patients.

The age range of patients included in our study was 23-85 years with a mean age of 54.39 years. The age range of patients included in the study by Dr. Ann Tresa Antony et al ⁽¹¹⁾ was 20-77 years with a mean age of 51.5 years. There was a significant association between pterygium and cigarette smoking in a study by Parviz Malekifar ⁽¹³⁾ which is opposite to our study. The association between smoking and pterygium is inconsistent among studies, most probably due to selection bias. According to Hom and Deland ⁽¹⁴⁾, 52.9% of patients with either diabetes or borderline diabetes had self-reported clinically relevant dry eye, and stated that there is a correlation between diabetes and dry eye.

CONCLUSION:

On the basis of different criteria at least 26 % of eyes with Pterygium (either unilateral or bilateral) are affected with dry eye. On studying different factors, age showed a positive association with dry eye tests among the patients with Pterygium. Diabetes and TBUT also showed a positive association among patients with Pterygium. Dry eye test among patients with pterygium showed no association with gender, occupation, smoking, menopause, and hypertension.

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