

A Study on Dry Eye in Patients with Pterygium at a Tertiary Care Centre**C.G.Padmavathi^{1*}, Y. Indira², Y. Malathi³**¹Associate Professor, Department of Ophthalmology, Govt. Medical College, Anantapuramu, A.P., India²Associate Professor, Department of Physiology, Govt. Medical College, Anantapuramu, A.P., India³Postgraduate, Department of Ophthalmology, Govt. Medical College, Anantapuramu, A.P., India

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Conflict of interest: Nil

Abstract:**Aim:** Current study analyze the dry eye prevalence in patients with Pterygium.**Method:** Cross-sectional study conducted in 100 Patients with pterygium attending the Out-patient section at Department of Ophthalmology, Govt. medical college, Anantapuramu during study period of 2021 to 2022. Size of Pterygium, Schirmer test, Tear film Break-up Time, Tear Meniscus Height was assessed. Tests were done for each eye. Dry eye was considered to be present on the basis of the tests: Schirmer test without anesthesia: less than 10 mm.**Results:** On the basis of different criteria, at least 26 % of eyes were observed with Pterygium (either unilateral or bilateral) are affected with dry eye. Female were predominate (64%) than males. Majority patients were of 56 - 65 years age group. Majority workers Outdoor which accounts 69%. Diabetes mellitus was observed in 21% and hypertension in 26%. The mean size of right and left Pterygium was 1.89 and 1.24. Patients aged more than 70 years showed a significantly higher prevalence of dry eyes ($p = 0.006$). A significant relationship between occupation (outdoor and indoor) and Dry eye tests were not found in patients with Pterygium. Significant association is not found between the presence of Pterygium and the dry eye. There is no association between the size of Pterygium and dry eye.**Conclusion:** 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.**Keywords:** Pterygium; Dry eye; Conjunctiva; Collagenases; Ultraviolet Radiation; Ophthalmoeliosis.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Pterygium is an abnormal overgrowth of epithelial and fibrovascular tissue of the bulbar conjunctiva onto the corneoscleral limbus which may progress invading the superficial corneal layers. [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. It is believed that Pterygium is the 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. [2]

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 and exposes epithelium directly to the destructive effect of UV rays.

Whether tear dysfunction leads to Pterygium or Pterygium causes tear dysfunction is not clearly understood. The current study examines the dry eye in patients with Pterygium.

Materials & Methods**Study Design:** Cross-sectional study**Study Setting:** Department of Ophthalmology, Dept. of Ophthalmology, Govt. medical college, Anantapuramu.**Study Subject:** Patients with pterygium attending the Out-patient section at Department of Ophthalmology, Govt. medical college, Anantapuramu.**Study period:** 2021 to 2022.**Sample Size:** The sample size was calculated using the formula $n=4pq/d^2$ Where p = prevalence of dry eye in patients with Pterygium, 50% by the study of

$q = 100 - p$

d = clinically allowable error which is 20% of prevalence. Power of study at a significance level of 0.05 is 80%.

$N=100$.

Study Material:

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

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.

Method:

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.

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 (TBUT): Fluorescein strip was used to stain the tear film by keeping the chin on the slit lamp chinrest. 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: < 10 seconds TMH: < 0.50 mm

Data Analysis:

Collected data were coded and entered in Microsoft Excel sheet. Chi-Square test was used to find an association. P value of ≤ 0.05 is considered as statistically significant.

Results

Female were predominate (64%) than males. Majority patients were of 56 - 65 years age group. Majority workers Outdoor which accounts 69%. Majority cases were of Non-smoking and non-vegetarian in diet.

Diabetes mellitus was observed in 21% and hypertension in 26% respectively. 43% women were of Postmenopause menstruation state. Among participants, the number of participants with Right pterygium and Left pterygium were 76 and 72 respectively. The mean size of right and left Pterygium was 1.89 and 1.24.

Table 1: Distribution of study participants according to dry eye tests

Right SCHIRMER TEST	Frequency
Yes (<10)	23
No (≥ 10)	77
Left SCHIRMER TEST	Frequency
Yes (<10)	18
No (≥ 10)	82
Right TBUT TEST	Frequency
Yes (<10)	36

No (≥ 10)	64
Left TBUT TEST	Frequency
Yes (< 10)	31
No (≥ 10)	69
Right TMH TEST	Frequency
Yes (< 0.5)	59
No (≥ 0.5)	41
Left TMH TEST	Frequency
Yes (< 0.5)	60
No (≥ 0.5)	40
Total	100

Table 2: Relation between both SCHIRMER and both eyes pterygium

Pterygium both eyes			P value
both eyes SCHIRMER	No (Unilateral)	Yes (Bilateral)	
Dry eye present	17	14	0.7
No dry eye	35	34	
Both TBUT			
Dry eye present	21	22	0.6
No dry eye	31	26	
Both TMH			
Dry eye present	36	35	0.7
No dry eye	16	13	

Table 3: Association between left SCHIRMER test, left BUT, left TMH and left eye pterygium

Left SCHIRMER	left eye pterygium		P value
	No Pterygium	Pterygium Present	
yes (10)	4	19	0.2
no (≥ 10)	24	53	
Left BUT			
yes (< 10)	13	23	0.18
no (≥ 10)	15	49	
TMH			
yes < 0.5	19	40	0.28
no (≥ 0.5)	9	32	

Table 4: Pearson's correlation between pterygium and dry eye tests

Correlation between Pterygium and Dry eye		
Correlation Between	Correlation coefficient	P value
Right SCHIRMER –RPTRGY	0.298	0.04
Right TBUT-RTPRGY	0.182	0.035
Right TMH-RPTRGY	-0.041	0.022
Left SCHIRMER-LPTRGY	-0.125	0.0012
Left TBUT-LPTRGY	-0.030	0.39
Left TMH-LPTRGY	-0.11	0.04
Left SCHIRMER-LSCHIRMER	0.62	0.0012
Left TBUT-LTBUT	0.64	0.0002
Left TMH-LTMH	0.65	0.002
Right PTRGY-LPTRGY	0.8	0.05

Table 5: Relation between Diabetes mellitus type II and SCHIRMER/TBUT/ TMH (Diabetes & Dry eye)

Diabetes	Both SCHIRMER		P value
	Dry eye present	No dry eye	
Diabetes present	8	13	0.456
Diabetes absent	23	56	
Both TBUT			
Diabetes present	14	7	0.004
Diabetes absent	29	50	
Both TMH			
Diabetes present	16	5	0.6
Diabetes absent	55	24	

Table 6: Relation between Hypertension and SCHIRMER/TBUT/ TMH

Hypertension	Both SCHIRMER		P value
	Dry eye present	No dry eye	
Hypertension present	7	19	0.7
Hypertension absent	24	50	
	Both TBUT		
Hypertension present	12	14	0.65
Hypertension absent	31	43	
	Both TMH		
Hypertension present	17	9	0.55
Hypertension absent	54	20	

Table 7: Association between the Dry eye and Different Factors

Factors	SCHIRMER	TBUT	TMH
Age	+ve	+ve	-ve
Gender	ve	ve	ve
Occupation	ve	ve	ve
Diet	ve	ve	ve
Menopause	ve	ve	ve
Smoking	ve	ve	ve
Diabetes	ve	+ve	ve
Hypertension	ve	ve	ve

Discussion

Based on the Schirmer test, 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 shows range from 8% to 52%.

Based on TBUT, 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 shows range from 30% to 75%. Atiya Rahman [3] 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. Based on TMH, 59% of right eyes with Pterygium and 60% of left eyes with Pterygium have dry eye. On average, 59.5% of eyes with Pterygium have dry eye.

In a study by Ann Tresa Antony [4] et al, mean value 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 [5] 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 were

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.

While some studies showed correlation between dry eye and Pterygium [18,19,62,68], others did not find such a correlation. [6,7] Tamer H El-Sersy [8] study is consistent with Rajiv [19] who reported that TBUT values were significantly reduced in cases of pterygium indicating the inadequacy of tear film in these patients. TBUT has been shown to be shortened significantly in pterygium.

Some of the studies did not find any correlation between dry eye & pterygium. [9] A study has found an association between pterygium and shortened tear break up time and Schirmer's test, and a decreased tear function index. [10] Although these findings are supported by an earlier study, conflicting results have also been documented. [11,12]

The present study showed no association between dry eye and the presence of Pterygium, except in right eye Pterygium with TBUT. The lack of association between dry eye and Pterygium is similar to the previous study observations. [6,7,8] Decreased TBUT, but normal Schirmer test was found by Kampitak et al. [13] The present study also showed similar results in the case of the right eye. The present study found a weak or negligible correlation between dry eye and size of Pterygium. This agrees with the observation by Kampitak et al. Even if there is unilateral or bilateral Pterygium,

dry eye tests showed a strong correlation between left and right eye.

In the present study positive association was found between age, Schirmer test, and TBUT. Also, diabetes and TBUT showed a positive association. The study by Roka N et al [14] showed that there is no statistically significant association between gender and dry eye test or between occupation and dry eye test. Patients aged more than 70 years showed a significantly higher prevalence of dry eyes ($p = 0.006$). The results showed that the prevalence of dry eye increased as the age of the patients increased showing a direct relationship between age and dry eyes. This result was also consistent with many other studies. [15,16,17]

A significant relationship between occupation (outdoor and indoor) and Dry eye tests were not found in patients with Pterygium and normal people who are in line with our study. [13] Results from the study by Mohammed Aljarousha showed a significant difference in TBUT values between diabetic and non-diabetic subjects which is consistent with our study. [18] The association of dry eye and diabetes is still a debatable issue, where Moss et al [19] reported that the long-term incidence of DED was not significantly associated with diabetes, whereas other studies have reported the opposite.

A study by Engy M [20], 57.1% of definite dry eye patients had diabetes mellitus. There was a significant association between pterygium and cigarette smoking in a study by Parviz Malekifar [21] which is opposite to our study. The association between smoking and pterygium is inconsistent among studies, most probably due to selection bias. There is also an undetermined dose-response relationship between smoking and the risk of pterygium. The biological pathways that link cigarette smoking with risk reduction are not well understood, and until more compelling evidence is available, it is hard to draw concrete conclusions based on current observational studies.

In a study by Turgut FG [22], in the postmenopausal women, Schirmer test scores were significantly lower both for the right ($p=0.001$) and the left eye ($p=0.003$) which is in contrast to our study. A study by Heena Radadia [23] revealed that dry eye is a most common problem in postmenopausal women. Overall 35% of postmenopausal women are diagnosed to be suffering from dry eye in our study. The severity of dry eye also increases with increasing age.

Conclusion

On the basis of different criteria at least 26 % of eyes with Pterygium (either unilateral or bilateral) are affected with dry eye. Significant association is not found between the presence of Pterygium and

the dry eye. There is no association between the size of Pterygium and 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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