Original Article

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A Study in Dry Eye Among Patients with Pterygium at A Tertiary Care Centre, Narayana Medical College, Nellore

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Abstract

Aim: To find out the proportion of Dry eye among patients affected with Pterygium.

Materials And Methods: It was a cross-sectional study. The patients with clinical diagnosis of Pterygium were selected. Ocular examination with special emphasis on Schirmer test, Tear film Break–up Time, Tear Meniscus Height, size of Pterygium was conducted. Data was entered into Microsoft Excel. Statistical analysis was made using Chi-Square test and Correlation test.

Results: Dry eye condition was assessed on the basis of the tests. 20.5% of eye on Schirmer test, 33.5% of eyes on Tear film Break–up Time, and 59.5% of eyes on Tear Meniscus Height were found to be affected with Dry eye. Mean value of Schirmer test was 16.94 mm on right eye and 17.85 mm on left eye. Mean value of Tear film Break–up Time was 10.14 sec on right eye and 10.72 sec on left eye.Mean value of Tear Meniscus Height was 0.39 mm on right eye and 0.38 mm on left eye. The association between Dry eye tests and presence of Pterygium not showed any positive association, expect in the case of Tear film Break–up Time and Pterygium on right eye. The Dry eye tests between right and left eyes showed strong association, irrespective of unilateral or bilateral Pterygium.

Conclusion: Dry eye condition is seen at least in 26% of eyes, but significant association between Dry eye and presence of Pterygium is not seen. Irrespective of the eye affected with Pterygium, Dry eye tests of both eyes showed strong association. Further case control studies can be done.

Keywords: Pterygium; Dry Eye; Schirmer's Test; Tear Film Break–Up Time; Tear Meniscus Height.

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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].

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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 [2].

The pathogenesis of pterygium is still not completely understood. An overall view of the growth process reveals a multiplicity of factors that are correlated and interrelated. Recent evidence implicates anti-apoptotic mechanisms, immunological mechanisms, cytokines, growth factors, extracellular matrix modulators, genetic factors and viral infections, among other possible causative factors [3,4]. In addition; there are associations with rural regions, increasing age and male gender, which correlate with outdoor work [5]. Early pterygium is usually asymptomatic.

Pterygium causes dryness, burning and itching due to irregular wetting of the cornea. 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 [6].

Conventional surgical procedures practiced nowadays to prevent recurrence, alone or in combination, are conjunctival flap, conjunctival rotational autograft, amniotic membrane graft (AMG), or free conjunctival autograft (CAG) or limbal CAG (LCAG) with surgical adjunct (e.g., suture, commercial fibrin glue, intra-or post-operative 0.02% mitomycin C [MMC]), with variable postoperative recurrence and/or success rates [7].

CAG surgery with the use of fibrin glue, sutures, or MMC was generally regarded as the procedure of choice where surgery is indicated for the treatment of primary and recurrent pterygium, primarily because of its comparable recurrence rate, efficacy, and longterm safety in contrast to other procedures [8,9]. However, using these surgical adjunct has surgical risks and complications too [10].

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 [11]. 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.

Materials and Methods

A cross-sectional study was conducted among 100 patients with pterygium attending the Outpatient section at Department of Ophthalmology, Narayana Medical College and Hospital, Nellore. The study period was 18 Months (01st Jan 2017 to 01st July 2018). Inclusion Criteria are patients with clinical diagnosis of Pterygium and willing to participate in the study. Exclusion Criteria are patients with acute eye condition like watering, itching or pain are excluded and those who had eye surgery within the last one month or awaiting surgery in the next few days. Study Tools were pre-tested questionnaire, external eye examination under torch light, slit lamp examination and direct ophthalmoscopy, Schirmer's test without anesthesia, Tear film break-up time test, Marginal Tear film meniscus height.

Methodology

After obtaining informed consent, data was collected from each patient using a pre-tested questionnaire. Size of Pterygium, Schirmer's test,Tear film Break-up Time and Tear Meniscus Height were assessed. Tests were done for each eye.

1. Schirmer's Test I (Test without Anaesthesia): 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.

2. Tear film Break-up Time: Fluorescein strip was used to stain the tear film by keeping the chin on the slit lamp chin-rest. 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 broad beam of slit lamp. Time taken between the last blink and the appearance of first dry spot was taken in seconds.

3. 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.

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

5. Dry eye was considered to be present on the basis of the tests:

Schirmer's test without anaesthesia :

less than 10 mm

TBUT: less than 10 seconds

TMH: less than 0.50 mm

Ethical Clearance and Conflict of Interests

The study proposal was presented before the Institutional Ethical Comittee and was approved. All the guidelines of the committee was followed during the study period. There were no conflict of interests involved. There was no external funding sources.

Data Analysis

Collected data were coded and entered in Microsoft Excel 2010. The data has been analyzed using SPSS version 22.0. Chi-Square test was used to find association. p value of less than or equal to

0.05 was considered as statistically significant.

Results

Out of 100 patients with Pterygium on either one eye or both eyes, among which 36 were male and 64 were female patients (Table 1).

Size of Pterygium

The overall mean values of size of Pterygium were 1.89 mm for right eye with mean values of 1.0 mm for males and 2.20 mm for females. It was 1.24 mm left eyes with mean values of 1.11 mm for males and 1.30 mm for females.

Table 1: Age –wise comparision of mean values of size of Right and Left Pterygium

	Right Pterygium			Left Pterygium		
Age	Over all	Male	Female	Over all	Male	Female
< = 35	1.67	1.50	1.75	1.83	2.00	1.75
36 - 45	1.76	1.73	1.80	1.57	1.64	1.50
46 - 55	1.87	1.83	1.88	1.78	1.67	1.82
56 - 65	1.74	1.80	1.71	1.68	1.68	1.71
>= 66 years	1.68	1.71	1.67	1.84	1.71	1.92

Table 2: Mean values of Dry eye tests of study population

	Dry Eye Examination : Mean Value					
Gender	**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
			Age (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 years	13.20	15.60	10.20	12.0	0.36	0.19
			Age and Gender (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 years	11.90	15.40	7.8	11.10	0.37	0.41
			Age and Gender (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 years	14.0	15.80	11.6	12.50	0.36	0.31

Table 2 shows that Mean value of Schirmer test of right and left eye in the present study is 16.94mm and 17.85mm respectively. Mean value of TBUT of right and left eye in the present study is 10.14 sec and 10.72 sec respectively. Mean value of TMH of right and left eye in the present study is 0.39mm and 0.38mm respectively.

Statistically significant association was not found between the presence of Pterygium and the dry eye. Also, there was no association between size of Pterygium and dry eye.

Table 3: Pearson's correlation between pterygium and dry eye tests

Correlation Between Pterygium And Dry Eye		
Correlation Between	**Correlation Coefficient**	**Remarks**
RSCHIRMR – RPTRGY	0.313	Very weak positive correlation
RTBUT-RTPRGY	0.191	Very weak positive correlation
RTMH-RPTRGY	0.035	Negligible correlation
LSCHIRMR-LPTRGY	-0.137	Very weak negative correlation

LTBUT-LPTRGY	0.020	Negligible correlation
LTMH-LPTRGY	-0.105	Very weak negative correlation
RSCHIRMR-LSCHIRMR	0.636	Strong positive correlation
RTBUT-LTBUT	0.621	Strong positive correlation
RTMH-LTMH	0.619	Strong positive correlation
RPTRGY-LPTRGY	0.76	Negligible correlation

Table 3 shows that the present study found weak or negligible correlation between dry eye and size of Pterygium.

Dry eye examination - Pterygium (Right eye)

Table 4: Relation between right SCHIRMER test, TBUT, TMH with right eye pterygium.

	RPTRGY		
RSCHIRMER	No Pterygium	Pterygium Present	Total
yes (<10)	8	15	23
no (>=10)	16	61	77
$\chi2$ = 1.904 df=1 p= 0.16			
RTBUT	No Pterygium	Pterygium Present	Total
yes (<10)	4	32	36
no (>=10)	20	44	64
$\chi2$=5.123 df=1 p=0.024			
RTMH	No Pterygium	Pterygium Present	Total
yes < 0.5	13	46	59
no (>= 0.5)	11	30	41
Total	24	76	100
$\chi2$=0.305 df=1 p=0.638			

Table 4 shows that there was no association between right SCHIRMER test and right eye TMH with right eye Pterygium,but there was an association between right eye TBUT and right eye Pterygium.

RPTRGY: Pterygium on Right eye,

LPTRGY: Pterygium on Left eye,

RSCHIRMR: Schirmer test on right eye (without anaesthesia)

LSCHIRMR: Schirmer test on left eye (without anaesthesia),

RTBUT: Tear film break –up time test on right eye,

LTBUT: Tear film break -up time test on left eye,

RTMH: Tear meniscus height on right eye

LTMH : Tear meniscus height on left eye

Dry eye examination: pterygium (Left eye)

Table 5: Relation between left SCHIRMER test, TBUT, TMH with left eye pterygium.

	LPTRGY		
LSCHIRMER	No Pterygium	Pterygium Present	Total
yes (10)	4	19	23
no (>=10)	24	53	77
$\chi2$=1.668 df=1 p=0.197			
LTBUT	No Pterygium	Pterygium Present	Total
yes (<10)	13	23	36
no (>=10)	15	49	64
$\chi2$=1.836 df=1 p=0.175			
LTMH	No Pterygium	Pterygium Present	Total
yes < 0.5	19	40	59
no (>= 0.5)	9	32	41
Total	28	72	100
$\chi2$=1.261 df=1 p=0.261			

Table 5 shows that there was no association between left Schirmer test, left eye TBUT and left eye TMH with left eye pterygium.

RPTRGY: Pterygium on Right eye,

LPTRGY: Pterygium on Left eye,

RSCHIRMR: Schirmer test on right eye (without anaesthesia)

LSCHIRMR: Schirmer test on left eye (without anaesthesia),

RTBUT: Tear film break –up time test on right eye,

LTBUT: Tear film break -up time test on left eye,

RTMH: Tear meniscus height on right eye

LTMH : Tear meniscus height on left eye

Discussion

Proportion of dry eye condition on the patients with Pterygium :

Based on Schirmer Test

Twenty three percent (23%) of right eyes with Pterygium showed dry eye condition. 18% of left eyes with Pterygium are affected with dry eye condition. On average, dry eye condition is seen in 20.5% of eyes with Pterygium in the present study. Different studies show a wide range from 8.00% to 52.00%. Studies such as Goldberg, Roka N, Ranjana, Atiya, Balogun [12-16] shows 52.54%, 31.57%, 8.00%, 9.30%, 31.20% respectively.

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 in the present study. Different studies show range from 30.00% to 75.00%. Studies such as Goldberg, Roka N, Ranjana, Atiya, Balogun, Amer Y [12-17] shows 50.84%, 43.42%, 30.00%, 75.60%, 39.70%, 47.20% respectively.

Based on TMH

Fifty nine percent (59%) of right eyes with Pterygium and 60% of left eyes with Pterygium have dry eye. On average, present study and Muhammad Saleem [18] shows 59.50% and 37.50% dry eye respectively.

Comparative Studies

Mean value of Schirmer test of right and left eye in the present study is 16.94mm and 17.85mm respectively. Studies such as Muhammad Saleem [18], Rajiv et al. [19], RokaN [13], Kampitak [20], Chaidaraoon [21] has mean value of 5.2mm, 5.2mm, 16.19mm, 9.8mm, 11.6mm respectively. Mean value of TBUT of right and left eye in the present study is 10.14 sec and 10.72 sec respectively. Studies such as Rajiv et al. [19], Muhammad Saleem [18], Roka N [13], Kampitak [20], Amer Y [17], Balogun [16], Ann Tresa Antony et al. [22], Manhas A et al. [23], Rajab AY [24], El-Sersy TH [25] has mean value of 5.6 sec, 6 sec, 10.56 sec, 5.5 sec, 11.1 sec, 17.9 sec, 7.6 sec, 9.88 sec, 11.4 sec, 5.91 sec respectively. Mean value of TMH of right and left eye in the present study is 0.39mm and 0.38mm respectively (No studies to compare).

Range of Dry Eye Tests

Range of Schirmer test of the present study and other studies such as Rajiv [19], Muhammad Saleem [18], Roka N [13] was 1 to 35 mm, 3 to 9.4 mm, 3 to 14 mm, 2.50 to 35 mm respectively. Range of TBUT of the present study and other studies such as Muhammad Saleem [18], Roka N [13] was 3 to 25 sec, 3 to 14 sec and 2.5 to 27.50 sec respectively. Range of TMH of the present study is 0.2 to 1.00 mm (No comparitive studies).

Kampitak et al. [20] found that mean horizontal size of Pterygium ± standard deviation was 2.1 ±0.7mm. The mean±standard deviation of TBUT in Pterygium eyes was 5.5±1.9 seconds. In the contralateral normal eyes it was 11.3±2.7 seconds ($p<0.001$). The Schirmer test results in Pterygium eyes and the opposite normal eyes was not statistically significant. Both TBUT and Schirmer test results had no correlation with Pterygium size.

Association between Dry eye and Presence of Pterygium

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 observation by Goldberg et al. [12], Balogun [16], Jie et al. [26]. The result is in contrast with six other studies which showed a positive correlation between dry eye and Pterygium [27,19,13,16,21,28]. Decreased TBUT, but normal Schirmer test was found by Kampitak et al. [20]. The present study also showed similar results in the case of the right eye.

Correlation Between Dry Eye and Size of Pterygium

The present study found weak or negligible correlation between dry eye and size of Pterygium. This agrees with the observation by Kampitak et al [20].

Conclusion

On the basis of different criteria at least 26% of eyes with Pterygium (either unilateral or bilateral) are affected with dry eye. The tests showed different proportions of dry eye condition among the patients with Pterygium:

Schirmer test: 20.5%

TBUT: 33.5%

TMH: 59.5%

Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest:

There are no conflicts of interest.

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