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CORRELATION BETWEEN OCULAR SURFACEDISEASE INDEX(OSDI), TEAR FILM BREAK UP TIME(TFBUT) AND SCHIRMER'S TESTS IN CASESOF DRY EYE DISEASE

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Aim-To study the Correlation between Ocular surface disease index (OSDI0,tear film break up time (TFBUT) and Schirmers Test in case of dry Eye. Materials and Methods- Observational study was conducted at the Ophthalmology Department of a Tertiary Hospital between 6 months . commenced with the administration of the OSDI questionnaire. Subsequently, Tear Film Break-Up Time (TFBUT) and Schirmer's test were conducted, andthe resulting data was subject to analysis. OSDI scores were recorded on a scale ranging from 0 to 100, with higher scores indicating greater disability. A diagnosis cut-off point for OSDI scores was established at ≥35.Results- suggests a positive correlation between Schirmer's test and TFBUT, indicating that as the Schirmer's test values increase, TFBUT values tend to increase as well. On the other hand, there is a negative correlation between TFBUT and OSDI, indicating that as TFBUT decreases, OSDI scores tend to increase, reflecting worse ocular surface discomfort. Conclusion- The Ocular Surface Disease Index (OSDI) questionnaire, in combination with quick and non-invasive clinical tests like the Schirmer test and Tear Film Break-Up Time (TBUT), provides a comprehensive approach to diagnose dry eye. This combined approach helps clinicians accurately diagnose and manage dry eye by considering both subjective and objective aspects of the condition.

INTRODUCTION

Dry eye is a complex condition that affects both the quality of tears and the surface of theeye, leading to uncomfortable symptoms, visual disruptions, and instability in the tear film, which can potentially harm the eye's surface. This condition is often associated with an elevated osmolarity of the tear film and inflammation of the eye's surface(1).

Dry eye syndrome (DES) is prevalent among a substantial portion of the population, with a particular prevalence in individuals over the age of 40. This condition transcends racial boundaries, exhibiting a higher incidence in females, and it ranks among the most common factors driving people to seek professional eye care(2).

Currently, there isn't a universally accepted "benchmark" test for clinically diagnosing dry eye disease (DED)(3). Numerous studies have presented a wide range of prevalence rates for DES, spanning from 5.5% to 37.7%. The challenges in comparing these studies across diverse populations stem from variations in age demographics, definitions of dry eye, and research methodologies (4,5). Research that focuses on assessing tear function through tests such as

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Schirmer's Test (ST), Tear Break-Up Time (TBUT), and corneal and conjunctival staining typically yields lower prevalence rates compared to studies relying on questionnaires(6). The Ocular Surface Disease Index (OSDI) questionnaire holds the highest level of validation among available options(7).

Aim of the Study

Correlation between Ocular surface disease index (OSDI0,tear film break up time (TFBUT) and Schirmers Test in case of dry Eye.

MATERIALS AND METHODS

An observational study was conducted at the Ophthalmology Department of a Tertiary Hospital between 6 months . The study involved a comprehensive ophthalmological examination that commenced with the administration of the OSDI questionnaire.

Subsequently, Tear Film Break-Up Time (TFBUT) and Schirmer's test were conducted, andthe resulting data was subject to analysis.

- INCLUSION CRITERIA

  Patients presenting with complaints of foreign body sensations, burning sensations, pain, dryness, blurred vision, photophobia, redness were included.

- EXCLUSION CRITERIA
  - Acute ocular infections
  - Topical ophthalmic medications or any systemic medication
  - Ocular surgery history
  - Any previous ocular surface disorders

METHODS

The Ocular Surface Disease Index (OSDI) questionnaire was administered prior to the ophthalmic examination. Comprising twelve questions, the OSDI questionnaire offers a swift evaluation of ocular irritation symptoms in dry eye and their impact on vision-related functioning. OSDI scores were recorded on a scale ranging from 0 to 100, with higher scores indicating greater disability. A diagnosis cut-off point for OSDI scores was established at ≥35.

Subsequent to the OSDI questionnaire, participants underwent a comprehensive ophthalmic examination, including assessments of best-corrected visual acuity, intraocular pressure measurement, examination of the anterior segment using a slit lamp biomicroscope, and a fundus examination conducted with an indirect ophthalmoscope.

Following the OSDI questionnaire and the ophthalmic examination, both the Tear Film Break-Up Time test (TBUT) and the Schirmer's Test were performed.

To determine tear break-up time (TBUT), a sterile fluorescein strip was gently placed in the lower eyelid's fornix and then removed. The subject was instructed to blink three times and subsequently fixate on a central point without further blinking. Under the illumination of cobalt blue filtered light from the slit-lamp microscope, the time elapsed between the last blink and the appearance of the first break in the tear film was carefully recorded using a stopwatch. This procedure was repeated three times for both eyes. A TBUT of less than 10 seconds was indicative of dry eye syndrome (DES). The average TBUT scores for both the

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right and left eyes were utilised for the ensuing statistical analysis.

Five minutes following the Tear Break-Up Time (TBUT) assessment, a Schirmer I test, conducted without anaesthesia, was carried out to assess both basal and reflex tear secretion. In the Schirmer I test, a filter paper strip measuring 35 × 5 mm was employed to quantify tear production over a 5-minute period. The strip was positioned at the junction ofthe middle and lateral thirds of the lower eyelid, and the test was conducted under normal ambient lighting. Patients were instructed to maintain a forward gaze and blink naturally during the 5-minute test. Subsequently, the extent of wetting on the filter paper over the
5-minute interval was recorded. Wetting exceeding 6 mm was regarded as indicative of dry eye syndrome (DES). The average Schirmer's test scores for both the right and left eyes were used for the subsequent statistical analysis.

STATISTICAL ANALYSIS

The collected data was input into MS Excel and subsequently subjected to analysis using Stata 11.0. To evaluate the relationships between OSDI, TBUT, and Schirmer's test scores,correlation analysis was performed, with Pearson's correlation coefficient (r) utilised. A significance level of $p < 0.05$ was considered as indicative of statistical significance.

Descriptive statistics, including frequencies (percentage) and mean scores (SD) for continuous variables, were presented. To ascertain variations between the means of diagnostic test scores, two-sample t-tests were employed. Additionally, 95% Confidence Intervals (CI) were included in the report. In examining differences among demographic characteristics within the treatment groups, the Chi-square test was utilised.

RESULT

Gender-wise, there were 27 male and 23 female patients. Age-wise, the patient distribution is as follows: 10 patients were between the ages of 15-30, 16 patients between 30-45, 17 patients between 45-60, and 7 patients were older than 60.

GENDER	No. of patients
Male	27
Female	23

AGE (in years)	No. of patients
15-30	10
30-45	16
45-60	17
>60	07

Regarding the correlations between tests, for the Schirmer's test and tear film break-up time (TFBUT) in the right eye, there was a positive correlation with an R-value of 0.35. In the left eye, the correlation between Schirmer's test and TFBUT had a slightly lower R-value of 0.24.

	Schirmer’s Test (mm)	TFBUT (in sec)	R value
Mean±SD (RE)	13.64 ± 9.23	8.48 ± 3.94	0.35

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Mean±SD (LE)	12.1 ± 7.71	8.26 ± 4.14	0.24

Additionally, the dataset includes correlations between Schirmer's test, TFBUT, and the Ocular Surface Disease Index (OSDI). In both eyes, the correlations between TFBUT and OSDI were negative, with R-values of -0.10 (right eye) and -0.09 (left eye). However, the correlations between Schirmer's test and OSDI were positive but weak, with R-values of 0.06 (right eye) and 0.07 (left eye).

	Schirmer’s Test (mm)	OSDI	R value
Mean ± SD (RE)	13.64 ± 9.23	35.25 ± 17.96	0.06
Mean ± SD (LE)	12.1 ± 7.71	35.25 ± 17.96	0.07

	TFBUT (in sec)	OSDI	R value
Mean ± SD (RE)	8.48 ± 3.94	35.25 ± 17.96	-0.10
Mean ± SD (LE)	8.26 ± 4.14	35.25 ± 17.96	-0.09

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 04, 2024

Overall, the data suggests a positive correlation between Schirmer's test and TFBUT, indicating that as the Schirmer's test values increase, TFBUT values tend to increase as well. On the other hand, there is a negative correlation between TFBUT and OSDI, indicating that as TFBUT decreases, OSDI scores tend to increase, reflecting worse ocular surface discomfort. The weak positive correlations between Schirmer's test and OSDI suggest that higher Schirmer's test values may be associated with better ocular surface comfort, but these relationships are not as strong.

DISCUSSION

Dry eye syndrome (DES) presents a prevalent public health challenge for ophthalmologists. Nevertheless, diagnosing DES is a complex task due to the imperfect correlation between symptoms and clinical signs. The effectiveness of the most commonly used diagnostic testsfor DES has faced scrutiny in numerous scientific publications (8). Researchers have explored the reproducibility(9) and the connections between these diagnostic tests, often revealing divergent and incongruent findings. Assessing diminished tear production can be accomplished through Schirmer's Test (ST). Reduced tear production is evident through Schirmer's Test (ST). Some patients with dry eye may lack symptoms beyond eye fatigue, even with ST results below 5 mm or even zero. However, reflex epiphora, excessive tearingdue to reflexes, can lead to misdiagnosis. Studies, such as one by Singh Bhinder and Singh Bhinder(10), show that ST results are influenced by reflex epiphora, making them poorly correlated with dry eye symptoms. Relying solely on ST for DES diagnosis is problematic due to its high result variability and low reproducibility.

Nichols(9) found that values <5 mm were present in only 21% of cases, which aligns with our study's 11.76% incidence. The Tear Break-Up Time (TBUT) test is often considered the primary diagnostic test due to its high reproducibility and low variability across dry eye types (9). However, TBUT has limitations, such as the need for a significant amount of fluorescein, which can lead to falsely elevated values. Some authors suggest lowering the set point to address this issue. In this study, we performed three tests for confirmation of the diagnosis; 56% of the patients were diagnosed as DED according to the results of the OSDI, 62% patients according to TBUT and 46% patients according to the Schirmer test. In our study we found that there was inverse correlation between OSDI and TF BUT (r= -0.10 for RE andr= -0.09 for LE) and there was positive correlation between Schirmer’s test and TF BUT, the relationship was weak (r= 0.35 for RE and r=0.24 for LE). There was no significant correlation between Ocular Surface Disease Index (OSDI) and Schirmer’s test (r=0.06 for RE and r=0.07 for LE).

CONCLUSION

The Ocular Surface Disease Index (OSDI) questionnaire, in combination with quick and non-invasive clinical tests like the Schirmer test and Tear Film Break-Up Time (TBUT), provides a comprehensive approach to diagnose dry eye. The OSDI assesses the patient's symptoms and quality of life, while the Schirmer test measures tear production, and Tear Film Break-Up Time (TBUT) evaluates tear film stability. This combined approach helps clinicians accurately diagnose and manage dry eye by considering both subjective and objective aspects of the condition.

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 04, 2024

REFERENCES

1. The definition and classification of dry eye disease: report of the Defini-tion and Classification Subcommittee of the International Dry Eye Work-Shop (2007). Ocul Surf. 2007;5(2):75–92
2. Smith JA. The epidemiology of dry eye disease: report of the Epidemiology Subcommittee of the International Dry Eye WorkShop (2007). Ocul Surf. 2007;5(2):93–107.
3. The definition and classification of dry eye disease: Report of the definition and classification subcommittee of the International Dry Eye Workshop Foulks. G Ocul Surf. 2007;5(2):75–92.
4. McCarty CA, Bansal AK, Livingston PM, Stanislavsky YL, Taylor HR. Theepidemiology of dry eye in Melbourne, Australia. Ophthalmology. 1998;105(6):1114–1119.
5. GuoB,LuP,ChenX,Zhang,ChenR.Prevalenceofdryeyediseasein Mongolians at high altitude in China: the Henan eye study. Ophthalmic Epidemiol. 2010;17:234–241.
6. Schein OD, Muñoz B, Tielsch JM, Bandeen-Roche K, West S. Prevalence of dry eye among the elderly. Am J Ophthalmol. 1997 Dec;124(6):723-8.
7. Unlü C, Güney E, Akçay B̈, Akçalı G, Erdoğan G, Bayramlar H. Comparison of ocular-surface disease index questionnaire, tear film break-up time, and Schirmer tests for the evaluation of the tear film in computer users with and without dry-eye symptomatology. Clin Ophthalmol. 2012;6:1303-6. doi: 10.2147/OPTH.S33588. Epub 2012 Aug 10.
8. Nichols KK, Nichols JJ, Mitchell GL. The lack of association between signs and symptoms in patients with dry eye disease. Cornea. 2004 Nov;23(8):762-70.
9. Nichols KK, Mitchell GL, Zadnik K. The repeatability of clinical measurements of dry eye. Cornea. 2004 Apr;23(3):272-85.
10. Singh Bhinder G, Singh Bhinder H. Reflex epiphora in patients with dry eye symptoms: role of variable time Schirmer-1 test. Eur J Ophthalmol. 2005 Jul-Aug;15(4):429-33.