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PREVALENCE OF DRY EYE IN POST CATARACT SURGERY PATIENTS,IN A TERTIARY CARE HOSPITAL, PONDICHERRY

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Abstract

Background: Dry eye is a common clinical disorder of tear film due to tear deficiency or excessive evaporation of the tear. Although several factors have been attributed, studies have shown an increased incidence of dry eye after cataract surgery. The present study was carried out to estimate the incidence and severity of dry eye post cataract surgery. **Materials and Methods:** This prospective cross sectional study was carried out among 96 patients who were diagnosed with cataract. After pre-operative assessment of dry eye using Schrimer's test and TBUT, the participants were then taken for Small incision cataract surgery by a single consultant surgeon. They were followed up in subsequent first week, third week and sixth weeks post surgery with the same tests. **Results:** Majority of the participants belonged to the age group of 50-65 years (74%). The findings of Schrimer's test showed that pre-operatively majority of the participants had >15mm (71.9%) while post operatively 9-14 mm was observed in 67.7% at 1st week, 71.9% at 3rd week and 53.1% at 6th week (p<0.001).The TBUT was >10 sec among 100% of the participants pre-operatively, 63.5% in the post-operative at 1st week, 78.1% at 3rd week and 97.9% at 6th week. (p<0.001). **Conclusion:** Diagnosis and assessment of dry eye are complicated by the considerable variation in disease symptoms, and observer variations. Therefore, it is important for an ophthalmologist to be alert for its occurrence among post cataract surgery patients.

INTRODUCTION

The disorder which is due to deficiency in tear or excessive evaporation of tear may cause damage to the interpapebral ocular surface is known as Dry eye .It is often found to be associated with the ocular discomfort.[1,2,3] It is a clinical condition characterized by quantitative or qualitative reduction of tear film resulting in the exposure of the underlying corneal and conjunctival epithelium to the atmosphere directly. Clinically, dry eye produces discomfort and reduces vision in situations when the tear film becomes chronically unstable or when it repeatedly breaks up into dry eye spots between the blinks, exposing the corneal and conjunctival epithelium to evaporation.[4] The term used commonly to denote dry eye in clinical practice is "keratoconjunctivitis sicca".

The prevalence of dry eye increases with age. It is estimated that nearly 75% of people over 65 will experience dry eye syndrome.[5] Studies have reported that factors like aging, connective tissue disorders, diabetes, allergy, smoking, refractive surgeries on the eye and the use of antihistamines are contributable in the development of dry eye syndrome. Several etio- pathological factors have been attributed to dry eye. It is said to be caused by deficiency of any one or more of the tear film components, or can be a component of systemic diseases, including Sjogren's syndrome, lupus and Stevens-Johnson syndrome. Additionally, factors such as chronic use of contact lenses and adverse environmental exposures such as arid environments, windy conditions or visual tasking can exacerbate the symptoms of dry eye. Dry eye symptoms may present as redness of eyes, foreign body sensation, fatigue, watering of eyes. In addition, dry eye syndrome can occur as complication after different types of cataract surgeries, which is commonly performed among the elderly population. One of the commonly performed cataract surgery is Small incision cataract surgery (SICS) in India in which the removal of the cataract is followed by replacement with artificial intraocular lens. A study done by Ishrat S et al has documented that about 42% of the patients develop dry eye following SICS.[6] In another study done by Khadke A et al, about 22.1% of the patients developed dry eye

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following cataract surgery.[7] With an increasing prevalence of dry eye among post-cataract patients, there is an imminent need to study the clinical pattern of presentation, in order to develop preventive strategies for dry eye management. In order to throw light in this grey area our present study was conducted to estimate the incidence and the severity pattern of dry eye among patients who have undergone SICS for Cataract.

MATERIALS AND METHODS

Study settings and participants
The study was carried out as a prospective cross sectional study cohort study among patients diagnosed with cataract in the outpatient facility of Department of Ophthalmology of our tertiary care hospital for a period of 18 months between October 2017 and September 2019.

Inclusion Criteria
1. Patients who were undergoing SICS in SMVMCH.
2. Patients who were undergoing uncomplicated cataract surgery.
3. Patients should have been receiving the same brand of moxifloxocin, prednisalone combination eye drops post-surgery.

Exclusion Criteria
1. Any intra operative complications during this surgery.
2. Patients with diabetes mellitus.
3. Preexisting ocular diseases such as
    a. Dry eye
    b. Complicated cataract
    c. Glaucoma
    d. Uveitis
    e. Disorder of lids and nasolacrimal duct pathway
    f. Ocular allergies
    g. Pterygium

4. Previous ocular surgery on the eye undergoing the study.

Sample Size and Sampling
Based on the available literature, the prevalence of dry eye post cataract surgery was found to be 40%8. At 95% confidence limits and 10% absolute precision, the sample size was calculated as 96. The study participants were selected by simple random sampling using table of random numbers.

Ethical approval and informed consent
The study was started after obtaining the Institutional Ethical Committee Letter Approval. Informed consent was obtained after explaining about the study to the participants.

Data Collection Procedure
A structured interview was used to document the demographic details and clinical history, and Ocular Surface Disease Index (OSDI) scoring followed by which they were evaluated for cataract and dry eye using distant vision by Snellen's chart, anterior segment and fundus examination by slit lamp examination, intraocular pressure by Schiotz/Goldman's indentation tonometry, Nasolacrimal duct patency by syringing, keratometry for K1 and K2 values, axial length by A scan, Intra Ocular Lens (IOL) calculation by SRK II formula, tearfilm stability by Tear Film Break-up Time (BUT), tear Production by Schirmer's test I and ocular Surface Disease by Ocular surface staining techniques – Fluorescein staining. The participants were then taken for Small incision cataract surgery by a single consultant surgeon. They were followed up in subsequent first week, third week and sixth weeks post-surgery for assessment of dry eye using Schrimer's test and TBUT.

Data Analysis
The data were entered using statistical software Epi_info (version 3.5.4) and analyzed using Statistical Package for Social Sciences (SPSS) version 24.0. Numbers and percentages was used to present the Categorical data. Continuous data was represented as mean and standard deviation (SD). For comparing the continuous variables between the groups Anova test was used.
. p value <0.05 was considered as statistically significant.

RESULTS

Majority of the participants belonged to the age group of 50-65 years (74%) followed by 66-75 years (12.6%). Majority of the participants were females (53.1%). [Table 1] It was observed that NSII was the most common type of cataract (29.2%) followed by mature cataract (21.9%) [Figure 1].

The findings of Schrimer's test showed that pre-operatively majority of the participants had >15mm (71.9%) while post operatively 9-14 mm was observed in 67.7% at 1st week, 71.9% at 3rd week and 53.1% at 6th week [Table 2].

The TBUT was >10 sec among 100% of the participants pre-operatively, 63.5% in the post-operative at 1st week, 78.1% at 3rd week and 97.9% at 6th week [Table 3].

A repeated measures ANOVA with a Greenhouse-Geisser correction determined that mean shrimer's test differed statistically significantly between time points (F (1.89, 180.39) = 437.44, P < 0.001). Post hoc tests using the Bonferroni correction revealed that mean shrimer's test elicited a reduction from pre-operative period to 1- week post-operatively (17.57±4.28 mm vs 10.47±2.62 mm, respectively), which statistically significant (p = <0.001). However, post- operatively at 3-week mean moisture production increased to 12.66±2.93 mm, which was statistically significantly (p <0.001) and 6-weeks post-operatively (p = <0.001) [Table 4].

A repeated measures ANOVA with a Greenhouse-Geisser correction determined that mean tear break up time test differed statistically significantly

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between time points (F (1.62, 154.49) = 329.88, P < 0.001). Post hoc tests using the Bonferroni correction revealed that mean tear breaks up time test elicited a reduction from pre-operative period to 1- week post-operatively (14.20±2.47 sec vs 10.34±1.63 sec, respectively), which statistically significant (p = <0.001). However, post-operatively at 3-week mean tear break up time increased to 11.38±1.82 sec, which was statistically significantly (p <0.001) and 6-weeks post-operatively (p = <0.001) [Table 4].
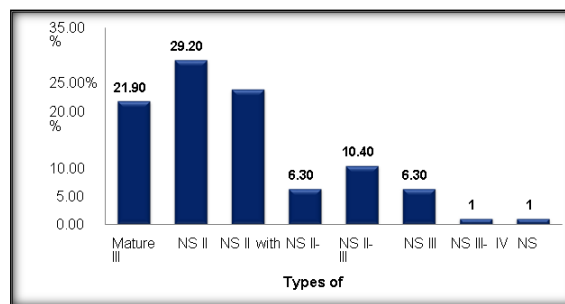

Figure 1: Distribution of the participants according to the type of cataract

Table 1: Demographic characteristics of the study participants

S. no	Particulars	Frequency	Percentage
1	Age (in years)		
	45-50	5	5.2
	51-55	8	8.3
	56-60	36	37.5
	61-65	35	36.5
	66-70	11	11.5
	70-75	1	1.0
2	Sex		
	Male	45	46.9
	Female	51	53.1

Table 2: Findings of Schrimer's test among the study participants

S. no	Schrimer's test	Pre-operative	Post- operative at 1 week	Post- operative at 3 weeks	Post- operative at 6 weeks
1	>15mm	69 (71.9)	9(9.4)	21 (21.9)	45(46.9)
2	9-14mm	27 (28.1)	65(67.7)	69 (71.9)	51(53.1)
3	4-8mm	0(0)	22(22.9)	6 (6.3)	0(0)

Table 3: Distribution of TBUT among the study participants

S. no	TBUT	Pre- operative	Post- operative at 1 week	Post- operative at 3 weeks	Post- operative at 6 weeks
1	>10 sec	96 (100)	61(63.5)	75(78.1)	94(97.9)
2	5-10 sec	0 (0)	35(36.5)	21(21.9)	2(2.1)

Table 4: Comparison of mean parameters preoperatively and postoperatively (N=96)

Test variable	Preop	Post- operative 1 week	Post- operative 3 weeks	Post- operative 6 weeks	ANOVA p value
Schrimer's test	17.57±4.28	10.47±2.62	12.66±2.93	14.73±3.20	<0.001
TBUT	14.20±2.47	10.34±1.63	11.38±1.82	12.43±2.09	<0.001

DISCUSSION

In this study the overall mean age of the patients was 61 years. The mean age in Khurana et al.,[8] study was 49.19 years. Female preponderance was observed in our study with 53% patients being females. In a study done by Sahi et al.[9] there were male preponderance observed. On performing schrimer's test in our study we have found only nine out of 96 patients having normal results at one-week postoperative period. Follow up at 3 weeks we found 21(21.9%) out of 96 patients having normal results and at 6 weeks follow up we have found 45 (46.9%) out of 96 patients having normal schrimer's test results. Similar results were found in a study

done by Mckinney et al.[10] where one-hundred and six patients (73 percent) had test results within

normal limits in their postoperative period. Paschides CA et al.[11] in his study found 68% of the individual values within the normal range.

The prevalence of dry eye in this study was found to be 53.1% according to schrimer's test. Based on tear film break up (TBUT) time only two participants were tested positive i.e had TBUT had less than 10 seconds.In a study done by Salisbury et al.[12] prevalence of dry eye post-cataract surgery was 14.6%. Another study conducted by Sahai et al.[9] also reported a prevalence of dry eye of 18.4%. In a cross-sectional study done at Indonesia by LEE AJ et al reported prevalence of dry eye to be 27.5%.[13] Another study done outside India among adult

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population in China found the prevalence of dry eye to be 21%.[14] A study done by Ishrat S et al has documented that about 42% of the patients develop dry eye following SICS.[6] In another study done by Khadke A et al, about 22.1% of the patients developed dry eye following cataract surgery.[7]

Overall the prevalence of dry eye varies from 10.8% to 57.1%.[11,15] Depending upon the diagnostic criteria employed and different cut-off values for the objective of dry test across the literature resulting in vast disparity in dry eye prevalence. The high prevalence in some studies is also because objective dry eye tests have been performed in patients with positive symptom score (thereby introducing a selection bias) or in patients in rheumatoid arthritis and Sjogren's syndrome, which have proven dry eye components.

The present study yielded mean value of Schrimer's test of 17.57±4.28 preoperative period, at 1 week after surgery 10.47±2.62, at 3 weeks after surgery 12.66±2.93 and at 6 weeks after surgery 14.73±3.20. In a study conducted by Mohana et al.[15] on 69 patients had mean schrimer's test value at preoperative period 9.23±2.11, at 1 week after surgery 7.30±2.24, at the end of one month after surgery mean values were 6.60±1.74. Similar results were found in a study done by Mckinney et al.[10] where forty patients (27 percent) had abnormal test results in their postoperative period. Paschides CA et al.[11] in his study found 42% of the individual values within the normal range and 95%of the values from primary patients were below 12 sec.

In the present study, TBUT yielded mean value of 14.20±2.47 preoperative period, at 1 week after surgery 10.34±1.63, at 3 weeks after surgery 11.38±1.82 and at 6 weeks after surgery 12.43±2.09. In a study conducted by Mohana et al.[15] on 69 patients had mean tear break up time test value at preoperative period 9.48±3.21, at 1 week after surgery 7.57±2.28, at the end of one month after surgery mean values were 6.80±2.18.

CONCLUSION

Diagnosis and assessment of dry eye are complicated by the considerable variation in disease symptoms, and observer variations. Therefore, it is important for an ophthalmologist to be alert for its occurrence among post cataract surgery patients. While considering the diagnosis of dry eye, attention should also be paid to other factors such as gender, presence of refractive error, associated systemic diseases like rheumatoid arthritis, as dry eye has positive correlation with these factors. Early and appropriate management will provide ocular comfort and satisfaction with a better quality of life.

Declaration
Conflict of interest nil Funding –nil
Ethical approval obtained

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