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Assessment Of Dry Eye Status Using The Ocular Surface Disease Index (Osdi) In Cataract Surgery

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ABSTRACT

Background: Dry eye disease is multi-factorial and subsequently seen in patient who have undergone phacoemulsification and small incision cataract surgery. So this study was planned to assess the dry eye status among patients undergone phacoemulsification and small incision cataract surgery by using ocular surface disease index (OSDI).

Materials & Methods: A prospective clinical study included 54 eyes of 54 patients of age 50-80 years suffering with cataract undergoing phacoemulsification or small incision cataract surgery. At the primary visit there were basic eye evaluation that included a detailed ocular and systemic history. Dry eye symptoms were evaluated using a validated Ocular Surface Disease Index (OSDI) questionnaire. The results were assessed before and 1 month after the surgery.

Results: In 54 study patients, 66.7% women and 33.3% men, mean age was 74.08 ± 5.37. There was a significant increase in mean OSDI score after the cataract surgery: from 12.15 ± 10.34 to 13.79 ± 10.88, p =0.001. The postoperative increase in mean OSDI score was noted in both men (from 8.81 ± 7.65 to 10.5 ± 9.34, p = 0.054) and women group (from 13.59 ± 10.78 to 15.44 ± 11.35, p =0.008).

Conclusions: this study concluded that the ocular surface was affected 1 month after the cataract surgery and the OSDI score increased. Further research is needed to evaluate if the changes observed in our study are long-term or not.

Keywords: *Dry eye disease; Ocular surface dysfunction; Cataract surgery; Phacoemulsification; Corneal nerve density.*

1. INTRODUCTION

The Tear Film Is A Thin Fluid Layer Covering The Ocular Surface; It Is The Interface Of The Ocular Surface With The Environment. It Is Responsible For Ocular Surface Comfort

mechanical, environmental and immune protection, epithelial (both corneal and conjunctival) health and it forms smooth, refracting surface for vision. Ocular surface disease refers to a condition affecting the epithelium of the cornea and conjunctiva, as well as the lacrimal and meibomian glands. It may arise from various underlying disorders and can result in inadequate or abnormal tear secretion, leading to eye irritation, discomfort, pain, and even reduced visual clarity. [1]

Abnormalities in any layer of the tears due to any reason then cause the dry eye. Dry eye is a multi-factorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance and tears film instability with potential damage to ocular surface. Dry Eye Disease (DED) is a common cause of ocular surface impairment, with a prevalence ranging between 5% and 34%, and it becomes more frequent with advancing age. The diagnosis of DED is primarily based on patient-reported symptoms, which can be assessed using survey tools like the Ocular Surface Disease Index (OSDI).

Cataract is the most common cause of the blindness or visual impairment in the world. A cataract is a cloudy area in the lens of the eye. Cataract can make blurry of vision, distance. Due to cataract we could not perform our daily work activity properly. cataract surgery is the most classic and successful surgery in the field of ophthalmology. Modern cataract surgeries named small incision cataract surgery and phacoemulsification are very safe surgery. [2]

Cataract surgery has given innumerable patients good visual acuity, but dry eye-associated symptoms, such as foreign body sensation, fatigue, redness and watery eyes, frequently occur after the procedure. These symptoms may be accompanied by signs, such as superficial punctatae keratitis and epithelial defects on the cornea. Many factors may affect the ocular surface status after cataract surgery. Eye drops containing preservatives, such as benzalkonium chloride, and topical anesthesia are well known to have toxic effects on the corneal epithelium.

The postoperative dry eye may also be associated with exposure to light from the operating microscope and to incision shape. The scleral or corneal incisions have varying effect on tear film stability. Subsequently develop dry eye is seen in patient who have undergone phacoemulsification and small incision cataract surgery. This study was planned to assess the dry eye status among patients undergone phacoemulsification and small incision cataract surgery by using ocular surface disease index (OSDI).

2. MATERIALS AND METHODS:

Study Design: Prospective observational study.

Study Area: The study was conducted at the department of Ophthalmology, Sharan Super specialty Eye Care, Prayagraj, Uttar Pradesh.

Study Population: Patients of age 50-80 years suffering with cataract undergoing phacoemulsification or small incision cataract surgery.

Inclusion criteria:

- 50 years or older.
- Willing to participate in the study (signed informed consent).
- Patients with uncomplicated cataract undergoing phacoemulsification/ SICS..

Exclusion criteria:

- Other Ocular surgeries within the previous 6 months
- Intra-operative or postoperative complications of phacoemulsification/SICS.
- Contact lenses user.
- Severe blepharitis.
- Palpebral malposition and secondary dry eye.
- Hypersensitivity to investigated substances or diagnostic stains used.
- Anti-glaucomatous topical medication.
- Any History of eye disease other than cataracts.

3. METHODOLOGY:

The study was received approval from the IEC committee of NIMS University Rajasthan, Jaipur. Written informed consent was obtained from all participants involved in the study.

Total of 54 eyes from 54 patients undergoing a routine, uncomplicated phacoemulsification procedure for age-related cataracts has enrolled after consideration of inclusion criteria and provided consent. At the primary visit there were basic eye evaluation that included a detailed ocular and systemic history including any symptoms of dry eye syndrome, lid disorders (blepharitis, ectropion, entropions) contact lens wear, chronic allergic conjunctivitis, any ocular /systemic surgeries in the past six months, exposure keratitis and systemic disease like diabetes mellitus, systemic hypertension, thyroid rheumatoid arthritis, Sjogren's syndrome, Vitamin A deficiency, and other habits affecting tear film such as smoking, chronic heat exposure, etc.

Assessment by Ocular Surface Disease Index (OSDI):

Dry eye symptoms were evaluated using a validated Ocular Surface Disease Index (OSDI) questionnaire. This tool includes 12 items addressing various symptoms, where patients rate their experiences from 'never' (0 points) to 'all the time' (4 points). The final score is computed using the formula:

OSDI score = (sum of responses × 100) / (no. of questions answered × 4)

Interpretation:

The OSDI score ranges from 0 to 100, with the following interpretation:

0–12: within the normal range

13–22: indicates mild dry eye

23–32: represents moderate dry eye

33–100: reflects severe dry eye disease

4. RESULTS:

In Fifty four eyes from 54 study patients were included in this study and 36 (66.7%) were women and 18 (33.3%) were men. Mean age was 74.08 ± 5.37 years (72.31 ± 5.55 vs. 74.97 ± 5.14 years for men and women, respectively, (p = 0.109)).

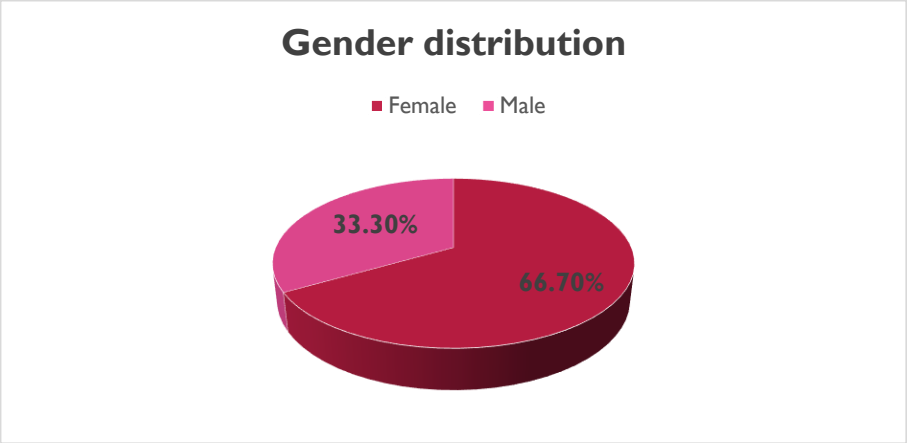

Figure 1: Gender Distribution of study subjects

The preoperative incidence of dry eye disease according to OSDI questionnaire results was 30 (55.56%) while after the surgery it was 35 (64.81%).

Table 1: Dry eye incidence of study subjects

Variable	Dry eye found	Not found	P-value
Pre operative	30	24	
Post operative	35	19	

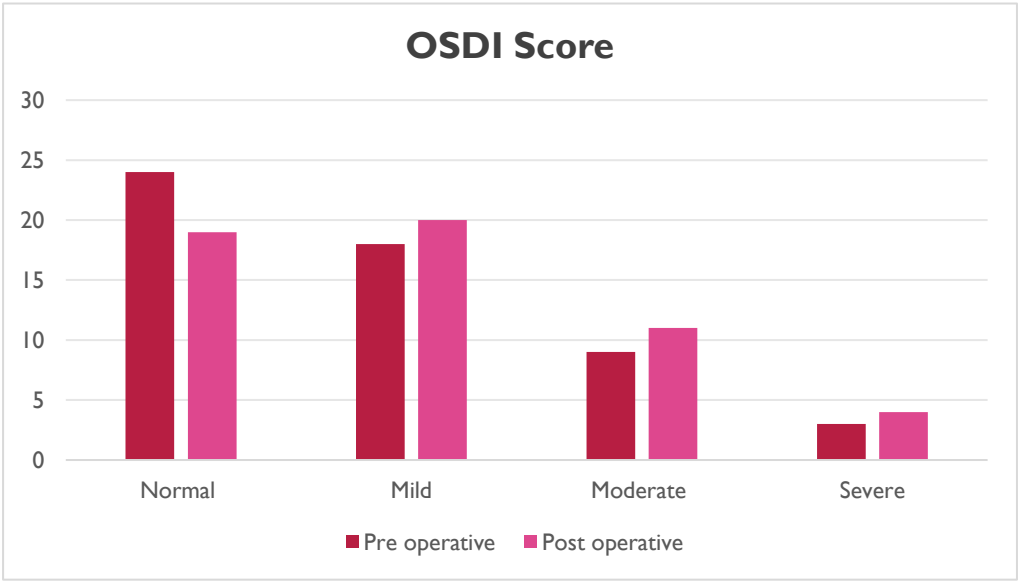

Figure 2: Distribution of OSDI Score

There was a significant increase in mean OSDI score after the cataract surgery: from 12.15 ± 10.34 to 13.79 ± 10.88, p =0.001. The postoperative increase in mean OSDI score was noted in both men (from 8.81 ± 7.65 to 10.5 ± 9.34, p = 0.054) and women group (from 13.59 ± 10.78 to 15.44 ± 11.35, p =0.008).

Table 2: Mean OSDI of study subjects

	Mean OSDI Score		
Variable	**Overall**	**Male**	**Female**
Pre operative	12.15 ± 10.34	8.81 ± 7.65	13.59 ± 10.78
Post operative	13.79 ± 10.88,	10.5 ± 9.34	15.44 ± 11.35
P-value	0.001	0.054	0.008

There was no significant difference in preoperative OSDI scores between men (8.81 ± 7.65) and women (13.59 ± 10.78), p = 0.157. Additionally, no correlation between the preoperative OSDI score and patient age was found (r = 0.62), p = 0.675

5. DISCUSSION:

The incidence of DED before the cataract surgery according to OSDI questionnaire's results in our study was 55.56%. Gupta et al. reported that 54% of patients before the phacoemulsification had DED [3]. The incidence of DED varies from 22.1 to 100% before the phacoemulsification in studies that determined symptoms using other and/or modified OSDI questionnaires [4,5]. Where ported a significant rise in the OSDI score in the first postoperative month when compared with preoperative results and this was also found in other studies [6-8].

In comparison, Xue described a very significant rise in the OSDI score from 12.5 preoperatively to 58.33 in the first postoperative month and 37.5 in the third postoperative month. In the sixth postoperative month, it decreased and became the same as the preoperative result [9].

We found that the mean OSDI score after the cataract surgery increased significantly in the women group, but no significant difference was found in preoperative results between men and women. Although we have not found studies describing OSDI score change after the surgery between men and women, it is noticed that DED is more common in women[10,11].

6. COCLUSIONS:

The ocular surface was affected 1 month after the cataract surgery: OSDI scores increased. OSDI scores increased for women after the surgery. Corneal nerve density decreased for women while the number of corneal nerves decreased for both sexes. Further research is needed to evaluate if the changes observed in our study are long-term.

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Conflict of Interest- None

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