



RESEARCH ARTICLE

POSTOPERATIVE DRY EYE IN CATARACT SURGERY: A COMPARATIVE STUDY OF MANUAL SMALL INCISION CATARACT SURGERY AND PHACOEMULSIFICATION TECHNIQUE

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Key words:-

Dryeye, MSICS, Phacoemulsification, Schirmers Test, Tear Breakup Time.

Abstract

Aim: To compare the incidence of dry eye following phacoemulsification and manual small incision cataract surgery at a tertiary care hospital.

Materials and Methods: A prospective, comparative hospital-based study was done. 50 eyes of 50 patients were taken and divided into 2 groups. Groups A and B had undergone SICS and phacoemulsification, respectively for senile cataract and had preoperative Schirmer Test (ST-1) values ≥ 10 mm, Tear film Breakup Time (TBUT) ≥ 10 seconds. Patients were assessed at 1 week and 6 weeks postoperatively for signs of dry eye using ST-1 and TBUT.

Results: The incidence of dry eye as per ST-1 was maximum at 1 week in SICS group (40%) followed by phacoemulsification group (24%). By the end of 6 weeks dry eye almost reduced. The incidence of dry eye as per TBUT was peaking at 1 week and was maximum in SICS group (32%) than phacoemulsification group (16%). This gradually decreased by 6 weeks.

Conclusion: According to our study, we conclude that Phacoemulsification resulted in lesser incidence of dry eye than SICS. The dry eye parameters showed a worsening in the early postoperative period but improved by the end of 6 weeks in both the groups.

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Introduction:-

Dry eye syndrome (DES) is a complex condition affecting the precorneal tear film, leading to ocular discomfort, visual disturbances, and tear film instability, which may result in damage to the ocular surface.^[1] Various factors contribute to its development, including aging, menopause, connective tissue disorders, diabetes mellitus, systemic hypertension, and contact lens use. Certain medications, such as antihistamines, anticholinergics, antidepressants, and oral contraceptives, as well as topical eye drops containing preservatives, can also increase the risk. Additionally, ocular conditions like blepharitis, chronic conjunctivitis, meibomitis, and pterygium are known to be associated with dry eye.^[2]

Surgical procedures, including PRK, LASIK, and cataract surgery, can also trigger dry eye symptoms, making it one of the most frequently reported post-operative complications. Studies have shown that cataract surgery can induce or worsen dry eye symptoms.^[3] In traditional cataract surgery, or MSICS, a wide limbal incision leads to corneal desensitization due to denervation of the superior cornea, potentially contributing to post-surgical complications. In

contrast, phacoemulsification involves a smaller incision, shorter surgical duration, and reduced post-operative irritation.^[4] Furthermore, prolonged use of post-operative antibiotic and steroid eye drops containing preservatives can exacerbate dry eye symptoms.

Aim:-

This study aims to evaluate the incidence of dry eye occurrence after phacoemulsification and manual small incision cataract surgery in a tertiary care setting.

Objectives:-

1. To study the incidence of dry eye after phacoemulsification compared to manual small incision cataract surgery.
2. To evaluate the tear secretion and tear film stability after MSICS and phacoemulsification.

Materials and Methods: -

Study design: This prospective comparative study involved 50 eyes from 50 patients who underwent either Manual Small Incision Cataract Surgery (MSICS) or phacoemulsification from January 2024 to December 2024. The Institutional Research and Ethics Committee approved the study.

50 patients of senile cataract were selected and divided into 2 study groups- A and B

25 patients from group A underwent MSICS

25 patients from group B underwent Phacoemulsification

At the initial visit, demographic details such as age, gender, and address were recorded using a standardized form. All patients were assessed with history, complete ophthalmic evaluation, ST-1, TBUT preoperatively, postoperatively at 1 week, postoperatively at 6 weeks. All the surgeries were done by a single surgeon. Written informed consent was taken from each patient.

Tear Break up time (TBUT): After administering fluorescein dye into the eye, the time interval between the final blink and the initial appearance of a dry spot was recorded under cobalt blue illumination using a slit lamp.^[4] TBUT of less than 10 seconds was taken as abnormal.

Schirmers test -1: A strip of Whatman filter paper No. 41 was folded at a 5 mm mark and positioned in the lower fornix at the junction of the outer and middle thirds. After 5 minutes, the extent of strip wetting was measured without anesthesia.^[5]

Wetting less than 10 mm after 5 minutes was considered abnormal.

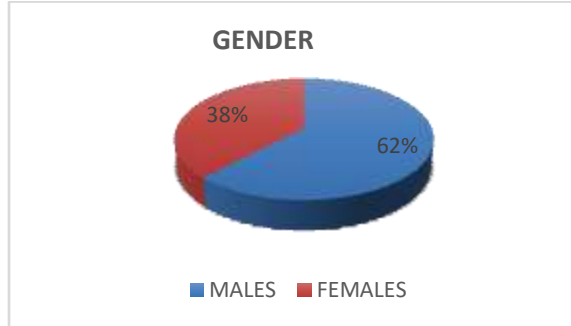
TBUT evaluates tear film stability and ST-1 evaluates tear secretion.

Inclusion Criteria:

1. Any patient coming to ophthalmology opd with age above 50 years with cataractous changes in their lens and willing for cataract surgery
2. All senile cataracts

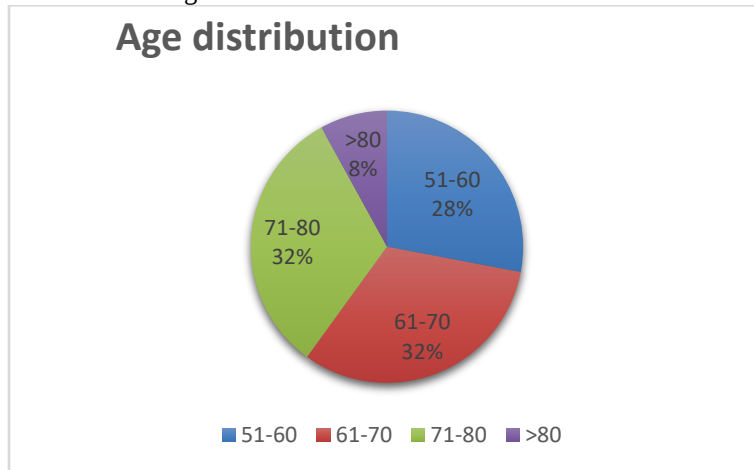
Exclusion Criteria:

- | | |
|---|---|
| 1. Disorders of eyelids | 4. Previous ocular trauma |
| 2. Any previous ocular surgeries | 5. Uveitis |
| 3. Pre-existing dry eye disease | 6. cataracts caused by an etiology other than age |
| 4. Patients on chronic ocular medications | |

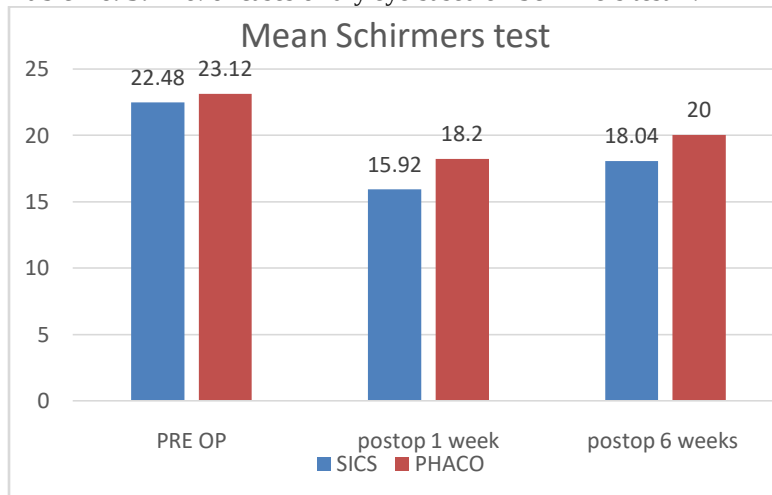
Results:-**Table No. 1:- Gender wise distribution.**

Gender	No. Of patients	Percentage
Male	31	62%
Female	19	38%

The study population consisted of 62% males and 38% females. This suggests a higher prevalence of cataract surgery among male patients in our study group. However, previous studies have shown varied gender distributions, with some reporting a higher incidence of postoperative dry eye in females due to hormonal influences.

Table No. 2:- Age wise distribution.

Age group	No. of patients	Percentage
51-60	14	28%
61-70	16	32%
71-80	16	32%
>80	4	8%

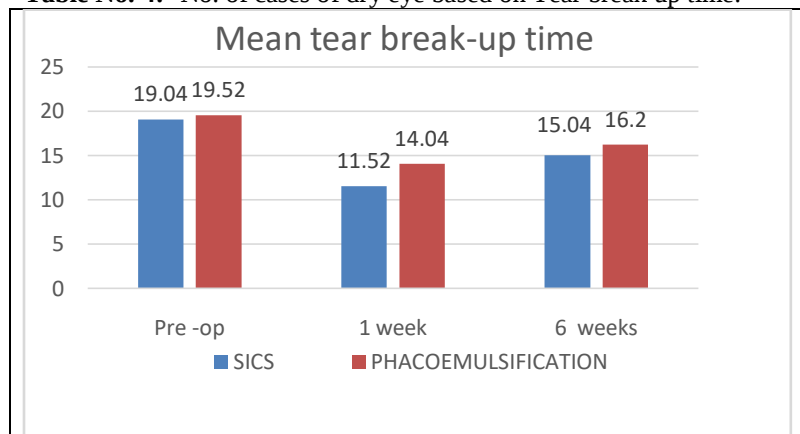
Table No. 3:- No. of cases of dry eye based on Schirmers test-1.

ST-1	At week 1	At weeks 6
Group A	10(40%)	5 (20%)
Group B	6 (24%)	3 (12%)

Schirmer's Test-1 (ST-1) results show that tear production was significantly reduced in the early postoperative period, with 40% of MSICS patients and 24% of phacoemulsification patients experiencing dry eye at 1-week post-

op. However, by 6 weeks, there was a gradual recovery, with dry eye incidence decreasing to 16% in MSICS and 8% in phacoemulsification group. This suggests that while both surgical techniques cause temporary impairment in tear secretion, MSICS has a higher impact on postoperative dry eye compared to phacoemulsification.

Table No. 4:- No. of cases of dry eye based on Tear break up time:



TBUT	At 1 week	At 6 weeks
Group A	8 (32%)	3 (12%)
Group B	4 (16%)	1 (4%)

TBUT results indicate that tear film stability was most affected at 1 week postoperatively, with 32% of MSICS patients and 16% of phacoemulsification patients having abnormal TBUT. By 6 weeks, there was a significant improvement, with dry eye incidence decreasing to 12% in MSICS and 4% in phacoemulsification groups. These findings reinforce that MSICS has a greater short-term impact on tear film stability than phacoemulsification, but both techniques show recovery over time.

Table No. 5:- No. of cases of dry eye in both groups:

	Group A		Group B	
Post -op follow up:	At 1 week	At 6 weeks	At 1 week	At 6 weeks
TBUT	8 (32%)	3 (12%)	4 (16%)	1 (4%)
ST-1	10 (40%)	5 (20%)	6 (24%)	3 (12%)

The maximum of incidence of dry eye was seen in group A followed by group B at postoperative 1 week. At 6 weeks follow up, this had decreased in both the groups.

Discussion:-

Various factors influence ocular surface health following cataract surgery, including age, environmental conditions, systemic health issues, pre-existing ocular surface disease, reflex secretory block due to nerve injury, and epithelial damage during surgery.^[1]

Preservative-containing eye drops, such as those with benzalkonium chloride, are known to impact the corneal epithelium. Additionally, exposure to light from the operating microscope may contribute to postoperative dry eye.^[6] Most corneal surgeries alter normal corneal innervation, leading to pathological corneal changes and associated discomfort.

NgmajitKasetsuwan et al.^[7] conducted a study assessing dry eye incidence and severity post-phacoemulsification. At seven days post-surgery, the dry eye incidence was 9.8%, with peak severity at the same time, evaluated using TBUT and ST-I without anesthesia. Symptoms improved rapidly within 30 days, while signs showed gradual improvement over three months. Our study also found that signs of dry eye were more prevalent at one week post surgery than at six weeks.

Saba Ishrat et al.^[8] found no significant gender-based difference, though some studies reported a higher prevalence in females. They observed a statistically significant TBUT reduction at one and six weeks post-MSICS, aligning with our findings.

Oh et al.^[9] reported a significant early postoperative TBUT decline, while ST-I remained normal. In our study, the SICS group showed a greater mean ST-I reduction at one week than the phaco group, with improvement by six weeks.

Shrivastava et al.^[10] noted ST-I changes, but by the three-month follow-up, values returned to baseline with no significant difference. Consistent with all these studies, our research observed higher dry eye prevalence in MSICS than in phacoemulsification at one week postoperatively.

In phacoemulsification, high IOP fluidics contribute to increased postoperative inflammation, potentially effecting the ocular surface and delaying recovery. Employing low IOP settings can help to reduce post op inflammation.^[11]

Limitation of the study:

A notable limitation of this study is the lack of long term follow up which limited the ability to observe trends in dry eye over time.

Conclusion:-

According to our study, we conclude that “Phacoemulsification resulted in lesser incidence of dry eye when compared to MSICS. While both techniques temporarily worsened tear film stability, symptoms improved within six weeks. Future studies with longer follow-ups are recommended to assess long term recovery trends.”

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Conflicts of Interest:

There are no conflicts of interest

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