

Original research article

Study of Clinical Presentation and Severity of Dry Eye in Patients Undergoing Cataract Surgery at a Tertiary Care Hospital

Amreen Anjum Deshmukh¹, Mohammad Hafiz Deshmukhh²

¹Assistant Professor, Department of Ophthalmology, JIU's Indian Institute of Medical Science & Research, Badnapur, Jalna, M.S.

²Assistant Professor, Department of Respiratory Medicine, MGM Medical College & Hospital, Aurangabad, M.S.

Corresponding Author: Amreen Anjum Deshmukh

E-mail: dramreen287@gmail.com

Abstract

Introduction: Occurrence of dry eye symptoms foreign body sensation, irritation and blurring of vision is frequently encountered after routine cataract surgeries.

Aim: To study the clinical presentation and severity of dry eye in patients undergoing Cataract surgery at a tertiary care hospital

Materials and methods: The present study is a prospective, observational, randomized study conducted on 200 patients, over a duration of one year, attending outpatient department of a tertiary care hospital. Patients' thorough ocular surface examination was done. The assessment included Ocular Surface Disease Index (OSDI) , slit lamp biomicroscopy, tear film break-up time, Schirmer's test-1 pre-operatively and at post-operative 1 week, 1 month and 3 months follow-ups. Data analysis was done by using SPSS-----

Results: Patients were divided into two groups- those undergoing phacoemulsification and undergoing manual small incision cataract surgery (manual SICS). Both the groups showed increased dry eye symptoms after surgery, more in manual SICS as compared to Phacoemulsification group. There was a significant reduction in Tear film break-up time, Schirmer's test 1 values and OSDI at subsequent follow-ups.

Conclusion: This study concluded that there is worsening of dry eye symptoms after cataract surgery. SICS patients had more dry eye symptoms as compared to Phacoemulsification patients.

Key words: OSDI, SICS

Introduction

Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tears film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.¹ Undergoing cataract surgery can lead to dry eye symptoms or worsen pre-existing dry eye symptoms. Various factors that can contribute are clear corneal incisions and side port incisions leading to disruption corneal nerve endings, ocular surface irregularity created by the incision, long term use of anti-inflammatory eye drops, ocular inflammation and microscope light exposure.

Patients continue to experience foreign body sensation, grittiness after surgery.² The symptoms may resolve within 2-3 months. It is important to counsel the patient and address the dry eye in the post-operative period.

The aim of this study was to study the clinical presentation and severity of dry eye after cataract surgery, manual small incision cataract surgery and Phacoemulsification.

MATERIALS AND METHODS:

Type of study: Prospective, observational, randomized study

Sample size: 200 eyes of 200 patients over a duration of one year, attending outpatient department of a tertiary care hospital.

Informed, valid consent was obtained from patients.

Inclusion Criteria: all patients with diagnosis of cataract and visual acuity < 6/18

Exclusion Criteria:

- a) Those with pre-existing dry eyes (Schirmers less than 10 mm)
- b) Pre-existing ocular diseases
- c) Disorders of lid and lacrimal pathway
- d) Ocular allergies
- e) Pterygium
- f) Previous ocular surgeries

Patients' thorough ocular surface examination was done pre-operatively and post-operatively at 1 week, 1 month and 3 months.

The assessment included thorough slit lamp examination and

- a) **Schirmer's test-** Dry eye was graded as mild, moderate and severe based on values 7- 9 mm, 5-7 mm and <5mm respectively.
- b) **Ocular Surface Disease Index (OSDI)** - It is based upon the response to a questionnaire of 12 questions, subjective symptoms were graded as normal, mild, moderate and severe based on the guidelines of Dry Eye Workshop (DEWS) report.¹
- c) **Tear film break up time-** a TBUT of <10 seconds indicates dry eye.

The patients were divided into two groups for surgery, manual SICS and phacoemulsification, based upon nuclear grading.

All surgeries were performed by single surgeon.

In manual SICS, the incision length was between 6-7mm with one side port of 1.2mm. Phacoemulsification was done through 2.8mm clear corneal incision with 2 side ports of 1mm each. The cases with uneventful surgeries were included. Post-operatively, prednisolone acetate 1% eyedrops 6 times a day with weekly tapering and Moxifloxacin eyedrops four times a day were started for a period of a month.

RESULTS:

200 eyes of 200 patients were included in this study. The mean age was 66.3 years, age range 42-87 years. There were total 115 (57.5%) female and 85 (42.5%) male patients. Most of the patients were farmers, farm labourers and housewives.

100 (50%) patients underwent manual SICS and 100 (50%) Phacoemulsification.

The Mean \pm SD values of Schirmer's test type 1 and TBUT in pre-operative period in both the groups were Manual SICS 10.12 ± 2.11 and 10.74 ± 2.23 , and Phacoemulsification 10.23 ± 2.13 and 10.83 ± 2.34 .

At the post-operative follow ups of 1 week, 1 month and 3 months, Schirmer's test 1 values were respectively, (Mean \pm SD) 7.82 ± 1.85 , 6.73 ± 1.45 and 8.23 ± 1.33 in Manual SICS patients and 8.73 ± 1.78 , 7.34 ± 1.52 and 8.93 ± 1.22 in Phacoemulsification patients.

Tear film breakup time in post-operative follow up at 1 week, 1 month and 3 months, respectively, (Mean \pm SD) 7.64 ± 1.72 , 6.23 ± 1.17 and 8.70 ± 1.32 in Manual SICS patients and 8.51 ± 1.63 , 7.78 ± 1.39 and 9.22 ± 1.35 in Phacoemulsification patients.

OSDI in pre-operative period was below 12 in all the patients.

OSDI at 1 week after surgery was above 12 indicating dry eye in 93% of Manual SICS patients and 76% in Phacoemulsification patients.

OSDI of >12 at 1 month after surgery was seen in 80% of Manual SICS patients and 65% of Phacoemulsification patients.

OSDI of >12 at 3 months after surgery was seen in 63% of Manual SICS patients and 57% of Phacoemulsification patients.

All the results are represented in tabulated form from Table no. 1 to table no. 6.

Table no. 1 Schirmer's Test 1 Values in patients preoperative and post-operative

	Schirmer's test type 1 (Mean \pm SD)	
	Manual SICS	Phacoemulsification
Preoperative	10.12 ± 2.11	10.23 ± 2.13
Post-operative		
1 week	7.82 ± 1.85	8.73 ± 1.78
1month	6.73 ± 1.45	7.34 ± 1.52
3 months	8.23 ± 1.33	8.93 ± 1.22

Table no. 2 Tear Film Breakup Time Values in patients preoperative and post-operative

	TBUT (Mean \pm SD)	
	Manual SICS	Phacoemulsification
Pre-operative	10.74 ± 2.23	10.83 ± 2.34
Post-operative		
1 week	7.64 ± 1.72	8.51 ± 1.63
1month	6.23 ± 1.17	7.78 ± 1.39
3 months	8.70 ± 1.32	9.22 ± 1.35

Table no. 3 OSDI in patients preoperative period

OSDI	Manual SICS	Phacoemulsification
0	33	39
1-4	27	30

5-8	28	21
8-12	12	10

Table no. 4 OSDI in patients at 1 week of cataract surgery

OSDI	Manual SICS	Phacoemulsification
0-12	07	24
13-22	23	34
23-32	39	28
33-100	31	14

Table no. 5 OSDI in patients at 1 month of cataract surgery

OSDI	Manual SICS	Phacoemulsification
0-12	20	35
13-22	34	40
23-32	28	14
33-100	18	11

Table no. 6 OSDI in patients at 3 months of cataract surgery

OSDI	Manual SICS	Phacoemulsification
0-12	37	43
13-22	35	36
23-32	18	15
33-100	10	06

DISCUSSION

The tear film-cornea interface is the most important refracting surface of the eye. Any abnormality in the tear film results in various symptoms and hampers the quality of vision .

In this prospective study it is concluded that various dry eye symptoms and ocular surface damage occurs after routine cataract surgery. Development of dry eye after the cataract surgery is an unwanted and bothersome experience both for patients and surgeons.

In our study out of 200 patients, 60% patients experienced symptoms of dry eye after 3 months of surgery.

In this study postoperative ocular dryness was diagnosed by the abnormality of TBUT which reflects instability of the tear film as the main cause for dry eyes following cataract surgery. There was a marked decrease in TBUT values after cataract surgery in both the groups. This is similar to the study conducted by Oh et al.³

It was noticed that at 1 month and 3 month follow-ups, there was some improvement in both Schirmer's test 1 and TBUT values, but they still were below the baseline values. This was the finding in other studies also.⁴⁻⁶

In our study there was aggravation of dry eye symptoms and deterioration in values of various diagnostic tests in comparison with the pre-operative measurements. This was consistent with Cho et al² . Gharaee et al. showed that there is no statistically significant difference between the results of preoperative and postoperative ST-1.⁷ However, similar to our study, TBUT values were different between preoperative and postoperative examinations.

Postoperative dry eye following cataract surgery is related to the abnormality in lipid layer of tear film in some studies.

Park et al. have reported abnormal meibomian gland function as the cause of dry eye related to cataract surgery.⁸

In SICS, the sclerocorneal tunnel incision is large, thus there is denervation of cornea, which causes foreign body sensation and pooling of mucus and debris.⁹ However, in phacoemulsification, the incision is only 2.8mm. Therefore, there is less corneal denervation. Hence, in our study higher prevalence and severity of dry eye was noted in patients undergoing manual SICS than those undergoing phacoemulsification. This is in accordance with other studies where size of incision correlated with severity and duration of dry eye.^{3,9}

Reduction in corneal sensitivity and tear production after cataract surgery has been reported by many authors.¹⁰⁻¹²

Use of high potency Corticosteroids and preservatives in eye drops results in epithelial toxicity and delay the ocular surface healing after cataract surgery.^{13,14}

In present study, there was improvement in dry eye symptoms at 3 months follow-up. So the dry eye could not be attributed to the use of eyedrops

The OSDI showed marked worsening in patients in both the groups, more in SICS, at 1 week follow-up. The scores improved at 1 month and 3 month follow ups.

Several previous studies evaluated the correlation between the ocular surface disease index (OSDI) and objectively quantifiable parameters in dry eye patients¹⁵

The worsening of OSDI in post-operative period correlated with the worsening on Schirmer's test and TBUT.

Patients have a good visual outcome after cataract surgery if they have a healthy ocular surface.¹⁶ A surgeon must be aware of the association of dry eye symptoms after cataract surgery and must counsel the patients accordingly.

CONCLUSION:

Cataract surgery can lead to dry eye symptoms, of varying severity. The main cause for dry eye after cataract surgery is tear film instability. The incidence of dry eye after cataract surgery is more in manual SICS than in phacoemulsification, due to a large incision size.

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