



Original Article

Dry Eye Disease Following Cataract Surgery

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OPEN ACCESS

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Received: 30-05-2026

Accepted: 25-06-2026

Available online: 12-07-2026

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Medical and Pharmaceutical Research

ABSTRACT

Purpose: To know the changes in tear film and the presence or absence of Dry eye disease (DED) after cataract surgery

Study Design: Prospective descriptive study.

Place and Duration of Study: Govt. Medical College Baramullah Jan 2025-december 2026

Material and Methods: The baseline characteristics of 192 patients were recorded and Dry eye (DE) questionnaire was administered by a trained interviewer. Dry eye tests were performed on day 0 (baseline), day 7, 30 and day 90 after phacoemulsification under the same physical conditions by a single surgeon. SPSS version 17 was used and data analyzed for frequencies/percentages. Diagnosis was made on three of five parameters

Results: Of the 192 patients, 121 (63%) patients had dry eyes and 71 (37%) patients did not have any dry eyes. After surgery, symptoms of DE increased but all dry eye tests declined. Maximum change in both sexes was on 7th post-operative day and in those above 60 years of age. Among all patients the height of marginal tear strip was nearly 1 mm and was discarded for grading. On 30th day the tests improved gradually but interestingly preoperative values were not achieved even after sixty days.

Conclusion: DE symptoms and signs appeared within seven days which improved later on slowly.

Keywords: Dry eye, cataract surgery, corneal nerves, dry eye tests.

INTRODUCTION

Recently, emphasis has been given to dry eye disease following cataract surgery. Before surgery most cases had normal lacrimal secretions. A grooved incision can raise these symptoms during early postoperative period.

Damage to any part of the lacrimal functional unit results in tear film instability and ocular surface damage so dry eyes influence patient's ocular, general health and quality of life¹. Various studies have shown the DE prevalence to be 13.3% and 21.6% respectively between the ages of 43 and 86 years after 5-10 years of follow-up². In US population, it is 5% to 17% and the incidence of dry eye after phacoemulsification was 9.8%³. In the United States alone, about 7-10 million Americans require artificial tear preparation spending over 100 million dollars/year⁴.

Dry eyes can develop after different ocular surgeries like photorefractive keratectomy and laser-assisted in situ keratomileusis. Cataract surgery affects the neurogenic response and decreases tear secretions⁵.

Cornea has rich innervations having 44 nerve bundles entering around the limbus. Larger nerve fibers enter from 9 to 3 o'clock position⁶. During surgery, temporal corneal incisions reduce the corneal sensitivity⁷. Moreover longer the surgical time the more damage to the corneal nerves. Neurogenic inflammation and inflammatory mediators can reduce corneal sensitivity⁸.

After 4 weeks, neural growth factors regenerate the subepithelial corneal neurite cells during healing process of the corneal nerves⁹. This explains the occurrence of DE early after surgery which then improves slowly. The aim of our study was to know tear film changes and the presence or absence of DED after cataract surgery.

MATERIALS AND METHODS

A prospective descriptive study was conducted at Ophthalmology department, Govt Medical College Baramullah from Jan 2025-december 2026 after taking their consent and permission from Ethical committee. First operated eyes of one hundred and ninety-two (52% males, 48% females) uncomplicated cataract patients undergoing phacoemulsification with no dry eye symptoms were included. The mean age was 60.07 years with 40-78 years range. Patients with autoimmune diseases, previous ocular surgery/injury, ocular allergies and using topical eye drops were excluded. Patients who developed complications during surgery were also excluded. Under subtenon anesthesia a standard surgical technique with 2.80 mm superior/temporal corneal incision was used on all patients. After surgery, all patients used tobramycin with dexamethasone eye drops four times daily for four weeks.

Clinical examinations included DE questionnaire (DEQ 5), tear film breakup time (TBUT), Shirmer's test (ST), corneal fluorescein staining (CFS) with Oxford Schema, tear meniscus height (TMH) and slit-lamp examination of lid margin changes based on 'The International Dry Eye Workshop' (DEWS) 2007 guidelines by a single surgeon under same physical conditions. Follow-up was on 7th day, 1 month and 3 months postoperatively. Diagnosis was based on DEQ scores, TBUT values < 10 sec, ST values < 10 mm/5s and CFS staining > 1 and presence of lid plugging and telangiectasias. Data was entered into SPSS version 17 and analyzed for percentages/frequencies.

RESULTS

Of 192 subjects there were 48% females and 52% males. Majority of patients 110 (57.2%) were from urban areas and most of them, 98 (51%), belonged to age group of 53-65 years. There were 138 (72%) patients who were operated for right eye. Of the 192 patients, 121 (63%) {71 (58.6%) male and 50 (41.4%) females} patients had dry eyes and 71 (37%) patients did not have any dry eyes. The observations about the dryness of the eyes, if present, were graded according to the DEWS 2007 report. Table 1 shows the baseline characteristics of all the patients. Dry eye symptoms and severity on 7th, 30th and 90th days are shown in Table 2. At the end of the 30th post-operative day, out of 192 patients, 42 (15.4%) had improved TBUT and ST values.

Table 1. Baseline Characteristics of the Study Participants (N = 192)

Characteristic	Category	n	%
Age Group (years)	40-52	55	28.7
	53-65	98	51.0
	66-78	39	20.3
Sex	Male	100	52.0
	Female	92	48.0
Residential Status	Urban	123	64.0
	Rural	69	36.0
Operated Eye	Right eye	138	72.0
	Left eye	54	28.0
Incision Site	Superior incision	101	52.6
	Temporal incision	91	47.4

Table 2. Dry Eye (DE) Symptom Scores on 7th, 30th, and 90th Day

Ocular History	Visit 1 (7 Days) N (%)	Visit 2 (30 Days) N (%)	Visit 3 (90 Days) N (%)
Foreign body sensation	99 (51.5%)	82 (42.7%)	77 (40.0%)
Burning	98 (51.4%)	90 (46.8%)	72 (37.5%)
Dryness	81 (42.6%)	80 (41.6%)	67 (34.9%)
Watering	80 (41.6%)	78 (41.2%)	77 (40.0%)
Itching	42 (21.8%)	41 (21.6%)	35 (18.2%)

Table 3. Dry Eye Positive Signs on the 7th Day

Test	Incidence (%)
Tear Film Break-Up Time (TBUT)	69.0
Schirmer's Test (ST)	19.8
Oxford Schema	51.0
Lid Margin Abnormality	53.0
DEQ-5	62.0

Table 4. Tear Film Break-Up Time (TBUT) and Schirmer's Test Results on the 7th Day**A. Tear Film Break-Up Time (TBUT)**

TBUT Category	n	%
>15 seconds	59	30.7
<10 seconds	45	23.4
<5 seconds	88	45.8

B. Schirmer's Test

Schirmer's Test Value	n	%
≥15 mm	153	80.0
<10 mm	17	8.9
<5 mm	22	11.1

After cataract surgery all dry eye tests values were low with increased symptoms of patients. There were 12.2% eyes which had grade 4, 21.4% eyes had grade 3, 33.6% had grade 2 and 60 eyes (30.6%) had grade 1 Oxford Schema staining. There were 88 eyes (44.8%) which showed TBUT values below 10 seconds and 45 (23%) eyes showed values < 5s. ST values were below 10 mm/5 seconds in 22 eyes (11.2%) and below 5 mm/5 sec in 17 eyes (8.6%) (Table 3).

Operating microscope related phototoxicity was observed in other study²¹. The light exposure caused rise of DE symptoms and signs in Cho's and Kim's¹¹ study. In our study we did not any find relationship between microscopic light exposure time and DE tests.

Movahedan et al.²² mentioned that a healthy ocular surface has best visual results in cataract patients. Mild to moderate DE disease may not disturb vision but severe DE disturbs the vision in patients. So a proper preoperative assessment should be done¹⁰.

The present study showed abnormal interpalpebral staining of ocular surface characteristic of DE in contrast to inferior staining which occurs in drug toxicity. The abnormal Oxford Schema grading after cataract surgery may be the result of neurogenic inflammation²³.

In the present study, 101 (52.6%) cases had superior incision while 91 (47.4%) had temporal incision which showed more DE symptoms postoperatively explaining severing of corneal nerve twigs⁸.

Benzalkonium chloride containing topical eye drops reduce the number of mucin-expressing cells resulting in tear film instability²⁴. Over use of drops affect corneal toxicity and dry eye after surgery. In the present study we did not find the same observations..

CONCLUSION

Our results revealed that Cataract surgery negatively affects the tear film parameters and ocular surface in early postoperative period thus leading to DE.

RECOMMENDATIONS

Cataract surgeons can improve their results by treating the ocular surface before and after operation.

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