

Research Article

A Clinical Study on Dry Eye Following Phacoemulsification and SICS in Patients in a Tertiary Care Hospital and its Association with Various Risk Factors

Dr. Deepanjan Ghosh^{1*}, Dr. Abhishruti Buragohain²

^{1*}Assistant professor Department of Ophthalmology Assam medical college, Dibrugarh.

²Department of Medicine, Research Scientist, ICMR Dibrugarh.

Corresponding Author: Dr. Deepanjan Ghosh

Received: 09.03.26, Revised: 11.04.26, Accepted: 13.05.26

ABSTRACT

Purpose: To evaluate and correlate the occurrence of dry eye following cataract surgery with tear film indices and its association with various risk factors responsible for its development.

Setting: Department of Ophthalmology, Assam Medical College and Hospital, Dibrugarh.

Study Design: Cross sectional study

Patients and Methods: Patients who presented with signs/symptoms suggestive of dry eye following cataract surgery (either phacoemulsification or sics) in Department of Ophthalmology, AMCH during the study period.

Results: The comprehensive grading of the dryness showed that of the 102 patients, 48(47%) patients had dry eyes and that 54 (53%) patients did not have any dry eye. The gender comparison of the dryness of the eyes showed that 21 patients were males and that 27 patients were females. Air pollution (23 out of 45) followed by Sunlight /high temperature (15 out of 25) were mostly risk factors for dry eyes whereas Excessive wind (5 out of 10), Smoking (4 out of 14) and drugs (1) were also having some association.

Conclusion: There was no statistical difference in dry eyes of those between phacoemulsification and SICS patients. Most of them had mild grade of dry eye. Risk factors like air pollution, sunlight, or excessive wind were associated with dry eye post cataract surgery.

Keywords: Dry Eye, Post Cataract Surgery, Risk Factors, SICS, Phacoemulsification.

INTRODUCTION

Dry eye is a multifactorial disease of precorneal tear film that results in ocular discomfort, visual disturbance, and tear film instability, with potential damage to the ocular surface. It is accompanied by an increased osmolarity of the tear film and inflammation of the ocular surface.¹ Many patients who have undergone cataract surgery have complained of symptoms of dry eye and irritation post-operatively.² Some studies have reported aggravation of dry eye symptoms and signs after cataract surgery.³ In literature, there are various risk factors for dry eye which include air pollution, smoking, low humidity, high temperature, sunlight exposure and drugs^{4,5}. So, these conditions were taken as risk factors in developing dry eye after cataract surgery.

Aims and Objectives

- To evaluate and correlate the occurrence of dry eye following cataract surgery with tear film indices.

- Association with various risk factors responsible for its development.

MATERIALS AND METHODS

- Place of Study:** Department of Ophthalmology, Assam Medical College and Hospital, Dibrugarh.
- Duration of Study:** 1 year
- Type of Study:** Cross sectional study
- Study Population:** Patients who presented with signs/symptoms suggestive of dry eye following cataract surgery in Department of Ophthalmology, AMCH during the study period.

Inclusion Criteria

- Patients presenting with symptoms/signs suggestive of dry eye within one month following cataract surgery (either phacoemulsification or sics) irrespective of their age and sex.

Exclusion Criteria

- Patients with surgical complications

- Autoimmune disorders like Sjogren's syndrome, Rheumatoid Arthritis
- With pre-existing ocular diseases like glaucoma, uveitis, disorders of the lid or the nasolacrimal pathway, ocular allergies, pterygium and previous ocular surgeries.

Sampling

102 eyes of as many patients who had undergone cataract surgery were taken into the study.

Patients were selected randomly who underwent uneventful and uncomplicated phacoemulsification and manual small incision cataract surgeries and presented within 30 days post operatively. Out of these 60 patients had undergone Phacoemulsification whereas 42 patients had undergone Manual SICS in our

hospital. The symptoms which were relevant to the dry eyes were noted, wherever necessary the symptoms were elicited on further questioning. Risk factors like the occupation, smoking habits, sun exposure, exposure to chemicals were taken into consideration. Slit lamp examination, tear meniscus height, Schirmer's test-I and tear film break-up time were evaluated and data were graded, based on the guidelines of the 2007 Report of The International Dry Eye Workshop (DEWS) [1].

We considered the discomfort, severity and the frequency of the symptoms, the tear film break-up time and the Schirmer's test-I score from the classification and the final grading was done by adding the scores of the three mentioned tests, as shown below.

Severity	Scoring
Mild	<3
Moderate	3-4
Severe	>4

RESULTS AND OBSERVATIONS

Table 1: Grading Of Dryness of Eyes among Patients

Grading	Number of Patients	No. of Phacoemulsification	No. of SICS
Mild	26	15	11
Moderate	15	9	6
severe	7	4	3
Total	48	28	20

Table 2: Schirmer's Test Analysis Results

Schirmer's Test I Value	No. of Patients	Percentage
>15mm	67	65.6%
<10mm	22	21.5%
<5mm	9	8.8%
<2mm	4	3.9%

Table 3: Tear Film Break-Up Time Result Analysis

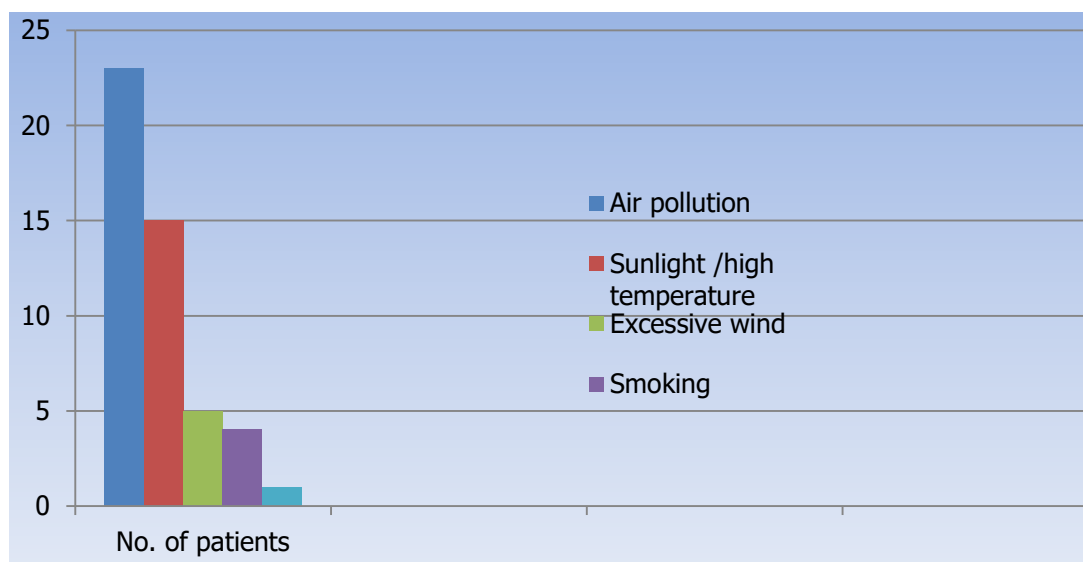
Tear Film Break Up Time Value	No. Of Patients	Percentage
>15s	44	43.6
<10s	22	21.4
<5s	28	27.2
Immediate	8	7.8

Table 4: Gender Differentiation of Dry Eyes

Grading	Number Of Patients	
	Males	Females
Absent	29	25
Mild	12	14
Moderate	7	8
Severe	2	5
Total	50	52

Table 5: Strength of Association of Drugs and Environmental Exposure Factors with Dry Eyes

Exposure Factors	Total No. of Patients	No. of Patients Having Dry Eye after Surgery
Excessive wind	10	5
Sunlight /high temperature	25	15
Smoking	14	4
Air pollution	45	23
Drugs	1	1



The symptomatology analysis showed that of the 102 patients, 48 patients had complained of symptoms which were related to dry eyes and that the rest of the 54 patients had no symptoms which were related to dry eyes. The Schirmer's test-I analysis showed that the lowest value of the Schirmer's test-I was 1mm and that the highest was 35mm. [Table 2].The tear film break-up time analysis showed that the tear film break-up time ranged from a minimum of the immediate breakup of the tear film to a maximum of 22 seconds . [Table 3].The marginal tear strip height analysis showed that all the patients had a marginal tear strip height between 0.5mm to 1mm. So, it is not considered for grading. The comprehensive grading of the dryness showed that of the 102 patients, 48(47%) patients had dry eyes and that 54 (53%) patients did not have any dry eye. The gender comparison of the dryness of the eyes showed that 21 patients were males and that 27 patients were females.

DISCUSSION

In our study, we found that after cataract surgery, 47% of the patients had dry eyes. Among the patients who had dryness of the eyes, a majority 54% had mild grade, 31% had moderate grade and 15% had the severe grade of dryness. Among the patients of

phacoemulsification 46 % of them had dry eyes and among those who underwent SICS 47 % had post operative dry eye. So, the difference was not so significant with p value of 0.987.The findings of the analysis of the symptoms, the Schirmer's test and the tear film break-up time were consistent with those of a study which was conducted by Srinivasan R et al., in which the tear film break-up time was reduced in pseudophakic eyes after phacoemulsification ⁹. This indicated that there was a tearfilm instability in the operated eyes. It could result from a surface irregularity at the site of the incision or from the decreased mucin production from the conjunctiva, as has been mentioned above. When we compared the dryness of the eyes post-operatively in males and females, we found that the dryness in the female patients (56%) was more than that in the male patients (44%) but this difference was not statistically significant, with a p-value of 0.3952 considering the magnitude of the study. Most of the studies have reported a higher prevalence of the dry eyes in females than in males in the general population ^{3,4,10}. Also, in our study we found there were association of some risk factors like patients exposed to sunlight /high temperature developed dry eye in 60% of the cases, whereas those exposed to wind had dry eye in

50% of the cases. Those exposed to air pollution had dry eyes in 51% of the cases whereas smoking and drugs were minor risk factors.

CONCLUSION

Dry eye is a known entity after cataract surgery. There was no statistical difference in dry eyes of those between phacoemulsification and SICS patients. Most of them had mild grade of dry eye. There was also association of some risk factors like sunlight, air pollution or excessive wind which can also aggravate any pre-existing dry eye post cataract surgery. In our study females seemed to be more affected than males after cataract surgery. There were some limitations in our study, as the pre-operative readings of the symptoms and the dry eye test values were not recorded. So, we could not correlate the pre-operative and the post-operative status following cataract surgery. This requires further studies.

REFERENCES

1. 2007 Report of the International Dry Eye WorkShop (DEWS). *Ocular Surface* 2007;5:75.
2. Cho YK, Man Soo Kim. Dry Eye After Cataract Surgery and Associated Intraoperative Risk Factors. *Korean J Ophthalmol*. 2009 June; 23(2): 65-73.
3. Hikichi, T., Yoshida, A., Fukui, Y., Hamano, T., Ri, M., Araki, K., et al. (1995) Prevalence of Dry Eye in Japanese Eye Centers. *Graefes Archive for Clinical and Experimental Ophthalmology*, 233, 555-558.
4. Moss, S.E., Klein, R. and Klein, B.E. (2000) Prevalence of and Risk Factors for Dry Eye Syndrome. *Archives of Ophthalmology*, 118, 1264-1268.
5. Hiroko BM, Steinert RF. Cataract surgery in the presence of other ocular comorbidities; *Cataract Surgery: technique, complications and management*. Saunders; 2004.:chap. 32.
6. Walker TD. Benzalkonium toxicity. *Clin Experiment Ophthalmol* 2004;32:657.
7. Donnenfeld ED, Solomon K, Perry HD, Doschi SJ, Ehrenhaus M, Solomon R, Biser S. The effect of the hinge position on the corneal sensation and the dry eye after LASIK. *Ophthalmology* 2003;110:1023-9.
8. Kohlhaas M. Corneal sensation after cataract surgery. *J Cat Ref Surg* 1998;24:1399-409.
9. Srinivasan R, Agarwal V, Suchismitha T, Kavitha. Dry eye after phacoemulsification. *AIOC* 2008:116-8.
10. Versura P, Celluni M, Torreggiani A, Profazio V, Bernabini B, Caramazza R. The dryness symptoms, the diagnostic protocol and the therapeutic management: A report on 1,200 patients. *Ophthalmic Res* 2001;33:221-7.