Original Research Paper

Volume - 14 | Issue - 09 | September - 2024 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Ophthalomology

TEAR FILM CHANGES AFTER CATARACT SURGERY :MANUAL SMALL INCISION CATARACT SURGERY VERSUS PHACOEMULSIFICATION AT TERTIARY EYE CARE CENTRE

Thirumanwar Sharath — Post graduate (ophthalmology), Osmania medical college, Hyderabad.

Tejaswini Matsyaraja — Post graduate (ophthalmology), Osmania medical college ,Hyderabad.

ABSTRACT **Purpose:** To study tear film changes after small-incision cataract surgery (SICS)and phacoemulsification (PHACO) at tertiary eye care center. **Design:** This is a prospective randomized study .Patients will be divided into 2 groups; one Group includes patients who undergoing manual small incision cataract surgery and other group is patients who undergoing phacoemulsification patients. patients will be subjected to slit lamp examination and Schirmer's test ,Tear film breakup time, Marginal tear strip height, corneal fluorescein staining on pre operatively and then on 7th,21st and 90th day post operatively .every visit all the test values will be measured and will compare in between the two groups. **Results:** there is significant difference in Schirmer's (p-0.002) and TMH(P-0.012)(both Schirmer's and TMH values are higher in phaco patients) and minimal staining seen in both phaco and SICS in first 3 weeks (comparable in both groups) .after 3 weeks there is not much significant difference in both groups. **Conclusion:** mild to moderate dryness of eye was seen from first to third week postoperative period after both manual small-incision cataract surgery and phacoemulsification, with values of basic secretion test lower in manual small-incision cataract surgery group on day 21 as compared with the phacoemulsification group. Thus, cataract surgery can cause or aggravate dry eye in the postoperative period up to 3 months. Therefore, before surgery, patients must be informed about the possible aggravation of dry eye symptoms, and artificial tears should be prescribed for reducing corneal damage and dry eye symptoms.

KEYWORDS :

INTRODUCTION

Dry eye syndrome (DES) is a complex disease that presents with many symptoms, including ocular discomfort, tear film instability, and visual changes. It can greatly affect patient quality of life by impairing the ability to drive, read, use a computer, and watch television among others. Literature shows three published reports on the prevalence of dry eye among hospital-based populations from North and Eastern India, and the prevalence varies between 18.4 and 40.8%. One of the major risk factors for developing novel DES or exacerbating pre-existing DES is an ocular procedure, most commonly cataract or laser-assisted in-situ keratomileusis (LASIK) surgery(1) . By nature of the procedure, cataract surgery typically results in some denervation of the cornea and impaired corneal sensation. Decreased corneal sensation may lead to reduced lacrimal gland tear production, which in turn can lead to dry eye symptoms.

With the incidence of cataracts and number of cataract surgeries performed rapidly increasing, it is important to study the effects of this procedure. In the LASIK literature, dry eye symptoms after LASIK surgery adversely affected patient satisfaction and willingness to have the surgery again. Studies have shown that cataract surgery worsens dry eye symptoms in patients with pre-existing DES and induces dry eye symptoms in patients without pre-existing DES in at least the first 2 months after surgery [1].

Phacoemulsification is the most commonly employed technique for cataract surgery worldwide. However, manual small incision cataract surgery is still widely performed as it offers distinct advantages; it is relatively inexpensive, smaller learning curve, and shorter operating time. Thus, it is ideally suited for the Indian subcontinent where the funds are low and there is an enormous burden of cataracts [2].

Although the effects of cataract surgery on DES in the short term are well described, there are only a few studies comparing the effect of the type of cataract surgery (manual small-incision cataract surgery or phacoemulsification) on causing dry eye disease.

We intend to study tear film changes after small-incision cataract surgery and phacoemulsification, to identify if the type of surgical procedure has any bearing on DES. We also aim to find out the duration of postsurgical recovery of dryness in both procedures.

METHODS:

This is a prospective randomized comparative study. We consider patients who is undergoing manual small incision cataract surgery and phacoemulsification over a period of 18 months. our sample size is 100 patients.

Inclusion Criteria:

Patients who are undergoing manual small incision cataract surgery or phacoemulsification for cataract surgery.

Exclusion Criteria:

- Patients with preexisting DES
- Patients having ocular allergies, pterygium and blepharitis
- Preexisting ocular diseases
- Using contact lens
- Patients on chronic ocular medications and systemic medication which causes dry eye
- Patients who underwent Ocular surgery other than phacoemulsification or manual SICS
- rheumatoid arthritis

Study Design:

Patients will be divided into 2 groups; one Group includes patients who are undergoing manual small incision cataract surgery and the other group is patients who are undergoing phacoemulsification patients will be subjected to:

1. Detailed history taking including family history
2. General examination
3. Refraction
4. Slit lamp examination
5. Schirmer's test
6. Tear film breakup time(TBUTT)
7. Marginal tear strip height
8. corneal fluorescein stain

The Patients will be followed up on pre operatively and then on 7th,21st and 90th day post operatively .every visit we check Schirmer's test, tear film breakup time ,marginal tear strip height and corneal staining based on modified oxford scale. On Every visit values will be measured and will compare in between the two groups

OBSERVATIONS AND RESULTS

A total of 100 patients are selected and divided into two groups A and B. Group A includes 50 patients who underwent manual SICS and other group B includes who underwent phacoemulsification.

The Mean age in group A is 58.54 and in group B is 57.06. Most of them belong to the age group between 45-70. male and female ratio in both groups is 1:1

In this study,33% of people are having hypertensive followed by diabetes (22%), hypo or hyper thyroid(8%).out of 100,6 people are suffering with CKD,CVA,CAD,ASTHMA.

Table-3: Schirmer Test Values Comparison Between 2 Groups:

SCHIRMER'S TEST			
	GROUP A	GROUP B	
	Mean± SD	Mean± SD	P value
Pre-OP	18.98±3.77	20.34±3.81	
7th day	12.12±4.35	14.74±4.49	.002
21st day	15.04±4.33	16.94±4.61	.553
90th day	17.82±4	20.04±4.54	.075

Table-6:T BUTT Values Comparison, Between 2 Groups

TBUTT (SECONDS)			
	GROUP A	GROUP B	P value
	Mean± SD	Mean± SD	
Pre-OP	13.88±2.93	14.44±3.10	
7th day	9.22±3.22	10.36±3.05	.167
21st day	11.68±3.01	12.64±3.08	.290
90th day	13.52±3.01	14.42±3.03	.336

Table -9: Tear Meniscus Values Between 2 Groups

TEAR MENISCUS HEIGHT(mm)			
	GROUP A	GROUP B	
	Mean± SD	Mean± SD	P VALUE
Pre-OP	0.41±0.11	0.40±0.07	
7th day	0.21±0.08	0.25±0.07	.012
21st day	0.32±0.11	0.35±0.09	.035
90th day	0.38±0.10	0.40±0.08	.068

DISCUSSION

In our present study, male to female ratio in each group is 1:1, and the age distribution is between 40-75 years old. Most of them are present in between the age group 50-59(43%).

The mean age in group A is 58.54 and in group B is 57.06. the study by Moss et al which showed an association between older age and an increase in dry eye symptoms.

SCHIRMER TEST VALUES IN BETWEEN 2 GROUPS AND PREVALENCE OF DRY EYE BASED ON SCHIRMER TEST VALUES:

The mean Schirmer's values in group A on pre op,7th day,21st day,90th day are 18.98,12.12,15.04,17.82 respectively.

The mean Schirmer's test values in group B on pre op,7th day,21st day,90th day are 20.34,14.74,16.94,20.04 respectively.

Schirmer's, I test results between the two groups were similar preoperatively; the manual group had decreased scores as compared to the baseline but remained within normal range (p value=0.005). The difference between the two groups became significant statistically at 1 week after surgery, with the phacoemulsification group showing higher values. The change from baseline to 3 months values were insignificant in the phacoemulsification group (p=0.0.994), while the difference from baseline was significant at 3 months in the manual SICS group (p=0.001) though the values were within normal range.

Sagarika Dash1*, Sujoy Mukherjee2, Nadeem K study also showed the similar results but in their study the change from baseline to 3 months values were significant in the phacoemulsification group.[2]

In Pushpa kumari study, in both groups it has been reduced 1 week following surgery and returned to near baseline value after 3 months in both the groups[3]

By the values of Schirmer's test, there is a significant difference between these groups. Group A people are having less Schirmer's values compared to group B.

In pallam reddy sreelekha study none of the patients had ST1 values in the dry eye range preoperatively, whereas 0%, 3% and 0% of patients in the postoperative 1 week, 1 month and 3 months respectively had ST1 values in the dry eye range. [4]

TBUT TEST VALUES IN BETWEEN 2 GROUPS AND PREVALENCE OF DRY EYE BASED ON SCHIRMER TEST VALUES:

The mean TBUTT values in group A on preop,7th day,21st day and 90th day are 13.88,9.22,11.68 and 13.52 respectively

The mean TBUTT values in group B on preop ,7th day ,21st day and 90th day are 14.44,10.36,12.64 and 14.42 respectively.

In our study, the TBUTT values decreased from the baseline on the 7th day and 21 st day returned to preop values on the 90th day. but there is statistical difference is present throughout the study in between 2 groups with P values (0.167,0.290,0.336) on 7th day,21st day and 90th day respectively.

IN SAGARIKA DASH STUDY, The tear film breakup time (TBUT) decreased from the baseline values at 1 day after surgery in both the groups. This difference was statistically significant in the phacoemulsification group (0.0002) and the manual group (p<0.0001), the change from baseline at 3 months was also significant (p=0.049 and p=0.01 respectively). The mean values did not show any statistically significant difference between the two groups, either preoperatively or after surgery.[2]

IN OUR STUDY, T BUTT values less than 10 seconds in group A on 7th day,21st day and 90th day are 25(50%),13(26%) and 3(6%) respectively. TBUTT values less than 10 seconds in group B on 7th day,21st day and 90th day are 20(40%),5(10%) and 1(2%) respectively. So, there is statistically difference present in between 2 groups explaining that t butt values are less in post op SICS compared to post op phaco patients. Oh et al. found a marked decrease in TBUT in the early postoperative period in patients who had undergone phacoemulsification surgery but ST-1 was within normal range.[7] In addition, at 1 and 3 months postoperatively, the authors noticed that TBUT and ST-1 values showed improvement, although they still remained lower than the baseline. Other studies have also reported reduced postoperative TBUT and ST-1 scores after phacoemulsification.[3]

TEAR MENISCUS HEIGHT IN BETWEEN 2 GROUPS AND PREVALENCE OF DRY EYE BASED ON MENISCUS HEIGHT VALUES:

The mean values of tear meniscus height in group A on pre op,7th day ,21st day and 90th day are 0.41,0.21,0.32 and 0.38 respectively.

The mean values of tear meniscus height in group B on pre op,7th day,21st day and 90th day are 0.40,0.25,0.35 and 0.40 respectively.

there is statistical difference between 2 groups on 7th day(0.012) and 21st day 21 st day(0.035) but there is no statistical difference on 90th day (0.068).tear meniscus height is reduced markedly on 7th day and gradually improved on 21st day and almost reached to pre op values on 90th day.in the group A tear meniscus height values are less compared to group B post operatively.

In group A ,on 7th day 34 (68%) patients are having values less than 0.3mm,

On the 21st day 13(26%) patients and on the 90th day only 2(4%) patients are having values less than 0.3mm.

In group B,on 7th day 27(54%) patients are having values less than 0.3 mm ,on 21 st day 6(12%) and on 90th day no one is having values less than 0.3mm.

According to our study group A people are susceptible to dry eye changes compared to group B.

In the pallam reddy sreelakshmi study the TMH values were lowest at 1 month, while it showed slight improvement at 3 months. Cho, et al., in their study found that TMH value decreased in all the follow up visits from the preoperative value in the non-dry eye group. Gharaee, et al., also showed a decreased TMH value at 3 months follow up visit. The lowest value of TBUT was seen at 1 month and after 3 months there was slight improvement.[4]

CORNEAL FLUORESCEIN STAINING COMPARISON BETWEEN GROUP A AND GROUP B;

In group A , the percentage of corneal fluorescein staining was positive on 7th day,21st day and 90th day are 22(44%),9(18%) and 2(4%) respectively. In group B, the percentage of corneal fluorescein staining was positive on 7th day,21st day and 90th day are 23(46%),10(20%) and 0% respectively.

All are having grade 1 staining

In our study, There is no statistical difference between 2 groups .On

90th day, almost all people (96%) are negative for staining. All patients are having inferior and center corneal staining 1+ . those patients who had staining at 90 th is having inferior staining co relating to Meibomian gland dysfunction of those patients.

In pallam reddy sreelakshmi study, none of the patients had abnormality of RB staining preoperatively whereas 29%, 51% and 37% of patients in the postoperative 1 week, 1 month and 3 months had abnormal RB staining(4).

CONCLUSION:

mild to moderate dryness of eye was seen from first to third week postoperative period after both manual small-incision cataract surgery and phacoemulsification, with values of basic secretion test lower in manual small-incision cataract surgery group on day 21 as compared with phacoemulsification group. Thus, cataract surgery can cause or aggravate dry eye in the postoperative period up to 3 months. This holds true for both manual small-incision cataract surgery and phacoemulsification surgery. Therefore, before surgery, patients must be informed about the possible aggravation of dry eye symptoms, and artificial tears should be prescribed for reducing corneal damage and dry eye symptoms.

List Of Abbreviations

S.No.	Abbreviation	Description
1	RE	Right eye
2	LE	Left eye
3	TBUT	Tear film breakup time
4	SICS	Small incision cataract surgery
5	PHACO	Phacoemulsification
6	ST	Schirmer test

REFERENCES:

1. Shrivastava S, Dudhat B, Ramakrishnan R, Gore V. Tear film changes after cataract surgery: manual small-incision cataract surgery versus phacoemulsification. Delta J Ophthalmol 2018;19:170-3.
2. Dash S, Mukherjee S and Nadeem K. Comparative Evaluation of Tear Film Parameters Following Cataract Surgery in Diabetic Patients. J Opto Ophth. 2021; 2(1):1-14.
3. Comparative Study of Dry Eye after Phacoemulsification and Manual SICS in Tertiary Centre of Jharkhand Kumari, Puspa; Lakra, Marianus Deepak. Artigo
4. Pallamreddy Sree Lakshmi, C.S. Sandhya, C. Jagannath, K. MadhaviChanges in the Tear film after Manual Small Incision Cataract Surgery – A Prospective Study.DJO 2018;29:26-30. 10.17352/2455-1414.000040
5. Venugopal KC, Krishnaraj PA, Chandan N (2012) Evaluation of dry eye after manual small incision cataract surgery with corneoscleral tunnel incision. Journal of Clinical and Diagnostic Research 6: 1029-1033.
6. Comparative Evaluation of Dry Eye Following Cataract Surgery: A Study from North India January 2014 IOSR Journal of Dental and Medical Sciences 13(6):13-18.
7. Jayshree MP, Shivkumar H, Monalisha P, Mallikarjun S (2017) A Prospective study of Dry Eye after manual Small Incision Cataract Surgery in rural population of Bagalkot. J Clin Res Ophthalmol 4(2): 025-029
8. T, Jung Y, Chang D, Chang D, Kim J, Kim H. Changes in tear film and ocular surface after cataract surgery. Jpn J Ophthalmol 2012; 56:113–118.