

## Demography and Characterisation of Visual Acuity in Preoperative and Postoperative Period of Cataract Surgery

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### Abstract:

**Background:** Dry eye has become one of the most important factors influencing quality of Life (QOL) in elderly patients. Cataract surgery is the most successful and rewarding surgery in the field of ophthalmology. In spite of a perfect cataract surgery and a good Snellen's visual acuity the patients may remain dissatisfied due to aggravation of dry eye disease after surgery. **Objectives:** To find out the clinical profile of the patients undergoing cataract surgery and to compare the visual acuity before and after cataract surgery of these patients. **Material and methods:** This is a prospective, randomized study conducted on sixty nine patients, attending Outpatient Department of Department of Ophthalmology in a municipal hospital of Delhi. Complete ocular examination included visual acuity, intra ocular pressure, slit lamp examination and fundoscopy. Ocular surface examination was done which included questionnaire using OSDI score and tear film breakup time, tear meniscus height and Schirmer test-I, both preoperatively and in the follow up periods. **Results:** Maximum numbers of patients were in the age group of 56 – 65 years. Female predominance was seen in the study groups. Among the total of 69 patients, it was noted that majority of the study population comprised of housewives, then farmers. Within the subgroups, who had undergone phacoemulsification (84%) and almost 73% of the patients who had undergone manual small incision cataract surgery had visual acuity in the range of 20/20 to 20/40 at the end of the study. **Conclusion:** Age distribution of our patients was 50-87 years with a female preponderance. SICS (79%) was almost as good as Phacoemulsification (83%) in terms of visual outcome. Thus we conclude that, although the two surgeries differ in terms of procedure and technology, but both cause similar dry eye condition as measured by various tests in spite of improvement of visual acuity.

**Keywords:** Phacoemulsification, SICS, Dry Eye, visual acuity

### I. Introduction

Dry eye disease is an ocular surface disorder which produces discomfort and reduced vision due to tear film instability. Dry eye per se is not a disease entity, but a symptom complex occurring as sequelae to deficiency or abnormalities of tear film, exposing the corneal and conjunctival epithelium to evaporation. Dry eye has become one of the most important factors influencing quality of Life (QOL) in elderly patients. Incidence of dry eye in the US has been estimated to be around 2.7 per year. Incidence of dry eye in India amongst eye out patient department patients has been estimated to be around 0.46% with a male: female ratio of 1:1.22<sup>1</sup>

Cataract is the leading cause of blindness in the world. At the same time cataract surgery is the most successful and rewarding surgery in the field of ophthalmology. However, after cataract surgery many patients complain of foreign body sensation, irritation redness, blurring of vision which are considered as unwanted effects of the surgery (Cho, et al., 2009)<sup>2</sup>. These effects are worse in the elderly population and those with ocular surface disorder. These persist in some patients until they are managed by subsequent effective treatment (Li, et al., 2007)<sup>3</sup>. Some studies have reported aggravation of dry eye symptoms and signs after cataract surgery (Ram, et al., 1998 and 2002)<sup>4 and 5</sup>. Thus in spite of a perfect cataract surgery and a good snellen visual acuity the patients may remain dissatisfied.

### Objectives

1. To find out the clinical profile of the cataract patients under study .
2. To compare the visual acuity before and after cataract surgery of those patients.

## **II. Material And Methods**

This was a prospective, randomized study conducted in the Department of Ophthalmology from July 2009 to June 2011 on patients attending Outpatient Department (OPD) of Department of Ophthalmology, Hindu Rao Hospital having cataract, who were planned for cataract surgery.

Following were the inclusion and exclusion criteria:

### Inclusion criteria:

1. Age > 50 years.
2. Patients having unilateral or bilateral age related cataract with or without dry eye symptoms.

### Exclusion criteria:

1. Age < 50 years.
2. Pseudophakia in the other eye.
3. Cataract caused by an etiology other than age, e.g., trauma, uveitis, drug induced.
4. Pre-existing ocular diseases glaucoma, disorders of lids, conjunctiva, cornea, and sclera.
5. Chemical burns, radiation.
6. Use of contact lens.
7. Patients on chronic ocular medications.
8. Patients who have undergone corneal refractive surgery.
9. Patients who had ocular allergies, pterygia, or blepharitis.

### **Evaluation:**

The study was done on 69 consecutive patients attending the outpatient department, having cataract and were scheduled for cataract operation fulfilling the inclusion and exclusion criteria of the study. The patients were randomized into 2 groups:

Group (A) of 30 patients was scheduled for manual Small Incision cataract surgery.

Group (B) of 39 patients was scheduled for phacoemulsification.

The other unoperated eye of all cases served as control in both the groups.

Preoperatively, signed and informed consent was taken from the patient for

participating in the study and each patient underwent complete eye examination.

Complete ocular examination included visual acuity, intra ocular pressure, slit lamp examination and funduscopy. Ocular surface examination included:

- Slit lamp bio microscope examination
- Tear film break up time
- Corneal fluorescein staining
- Tear meniscus height
- Schirmer test – I
- Impression cytology.

### **Follow Up:**

The patients in the two groups were followed up at 1 week, 1 month and 3 months post-operatively by means of questionnaire (Ocular Surface Disease Index), and the ocular examinations related to dry eye disease. The examinations conducted were Tear film Breakup Time, fluorescein staining grading, Tear Meniscus Height, Schirmer's test-I and conjunctival impression cytology. Conjunctival impression cytology was done preoperatively and at 3 months follow-up visit. A standardized follow up proforma was used for follow up.

### **Analysis:**

The data collected was entered into an Excel spreadsheet and analyzed using statistical software (SPSS 16.0). The significance (p value) was set at 5%.

### **Observation and results**

Sixty nine eyes of 69 patients attending the outpatient department of Hindu Rao Hospital, Delhi were included in this study to investigate dry eye disease and analyse the pathogenic factors following cataract surgery from July 2009 to June 2011. The fellow eyes of the 69 patients were taken as control and were subjected to all the tests. The patients were randomized into 2 groups:

Group (A) of 30 patients was scheduled for manual Small Incision cataract surgery.

Group (B) of 39 patients was scheduled for phacoemulsification.

The patients in the two groups were followed up at 1 week, 1 month and 3 months post-operatively.

The observation and results are discussed under the following headings.

I. Demography

II. Characterization of visual acuity and dry eye parameters preoperative and postoperative (1week, 1 month and 3 month) between case and controls.

### Demography

#### Age Disribution

Total number of patients was 69. The oldest patient was 87 years old and the youngest 50 years old. Maximum numbers of patients were in the age group of 56 – 65 years and minimum in the age group of > 86 years.

#### Sex Distribution

Female predominance was seen in the study groups. Total number of male patients was 29(42%) and female patients were 40(57.97%).

#### Occupation

Among the total of 69 patients, it was noted that majority of the study population comprised of housewives [(57.97%) n=40], then farmers [(36.23%) n=25]. The rest were skilled worker or into service.

### Characterization of visual acuity and dry eye parameters preoperative and postoperative (1week, 1 month and 3 month) between case and controls.

#### Visual Acuity

Majority of the patients had preoperative visual acuity less than 20/200 uncorrected visual acuity according to snellen's chart. Only about 12% of patients had uncorrected visual acuity better than 20/200. However the visual acuity of the patients recorded at the end of the study, had visual acuity in the range of 20/20 to 20/40 according to snellen's chart, of about 79%. Likewise it has been found that, within the subgroups, almost 84% of the patients who had undergone phacoemulsification had visual acuity in the range of 20/20 to 20/40 at the end of the study. And almost 73% of the patients who had undergone manual small incision cataract surgery had visual acuity in the range of 20/20 to 20/40 at the end of the study. Rest of the patients fell in range of 20/40 to 20/80. The distribution of the study population according to visual acuity before and after cataract surgery, within the group and subgroups is shown in table 1, 2, 3, figure 1 and 2.

**Table 1: Distribution Of Study Population According To Visual Acuity Before And After Cataract Surgery (N=69)**

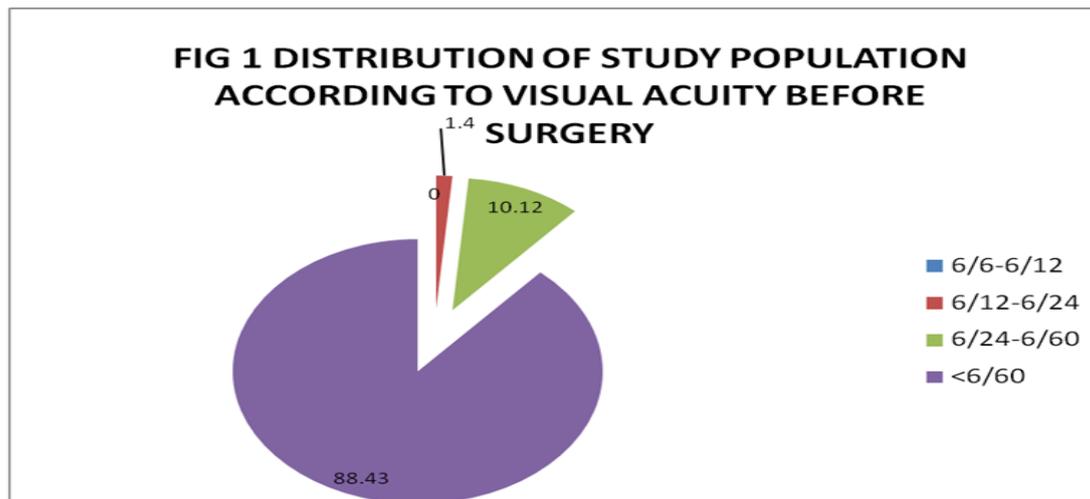
VISUAL ACUITY	NUMBER OF PATIENTS BEFORE SURGERY	PERCENTAGE (%)	NUMBER OF PATIENTS AFTER SURGERY	PERCENTAGE (%)
20/20 – 20/40	0	0	55	79.71
20/40 – 20/80	1	1.4	14	20.28
20/80 – 20/200	7	10.12	0	0
≤20/200	61	88.43	0	0
TOTAL	69	100	69	100

**Table 2: Distribution Of Study Population According To Visual Acuity Before And After Manual Sics (N=30)**

VISUAL ACUITY	BEFORE SURGERY (NUMBER OF PATIENTS)	PERCENTAGE (%)	AFTER SURGERY (NUMBER OF PATIENTS)	PERCENTAGE (%)
20/20 – 20/40	0	0	22	73.33
20/40 – 20/80	0	0	8	26.66
20/80 – 20/200	2	6.66	0	0
≤20/200	28	93.33	0	0
TOTAL	30	100	30	100

**Table 3: Distribution Of Study Population According To Visual Acuity Before And After Phacoemulsification (N=39)**

VISUAL ACUITY	BEFORE SURGERY (NUMBER OF PATIENTS)	PERCENTAGE (%)	AFTER SURGERY (NUMBER OF PATIENTS)	PERCENTAGE (%)
20/20 – 20/40	0	0	33	84.61
20/40 – 20/80	1	2.56	6	15.38
20/80 – 20/200	5	12.82	0	0
≤20/200	33	84.61	0	0
TOTAL	39	100	39	100



### III. Discussion

Dry eye produces discomfort and reduced vision when the tear film becomes chronically unstable and repeatedly breaks up into dry spots between blinks, exposing the corneal and conjunctival epithelium to evaporation (Parson, et al., 2007<sup>6</sup>).

Cataract surgery is the most successful and classic surgery, which has given good visual acuity to many patients. Cataract operations have substantially increased from 16 lakh in 1992-93 to 59.1 lakh in 2009-10 according to the annual report 2010-11 of National Programme for Control of Blindness<sup>7</sup>. The etiology of dry eye following cataract surgery is characterized by presence of either pre-existing dry eye or surgically-induced dry eye. The present study was done on sixty nine patients attending the outpatient department having cataract and were scheduled for cataract operation. Amongst them, 30 patients were scheduled for small incision cataract surgery (SICS) and 39 patients were scheduled for Phacoemulsification (Phaco).

We will discuss our results under the following headings:

- I. Demography of the study group.
- II. Comparative analysis of dry eye parameters between cases and controls.

#### I. Demography:

The age distribution of our patients was similar to that of the studies conducted by Li et al.<sup>3</sup>, Ram et al.<sup>5</sup>, Sitompul et al.<sup>8</sup>, Khanal et al.<sup>9</sup> and others<sup>10 and 11</sup>. The age distribution of our patients was 50-87 years with a female preponderance (58%), that of Li et al.<sup>3</sup> was 55-75 years and that of Sitompul et al.<sup>8</sup> was 60-70 years. Majority of the patients in our study groups were in the age group 56-65 years. All the patients taken by Ram et al.<sup>5</sup> were more than 40 years of age. The average age was 70.83±10.66 years with 7 males and 11 females in a study conducted by Khanal, et al.<sup>9</sup> It was also noted that majority of our study population were housewives (57.97%) and farmers (36.23%) mainly because we had a female preponderance in the study population.

#### II. Comparative analysis of dry eye parameters between cases and control:

Uusitalo, et al., reported that 77.46% of the patients who had undergone manual small incision cataract surgery had visual acuity in the range of 20/20 to 20/40 at the end of the study<sup>12</sup>. Several studies have been conducted in India and Nepal comparing phacoemulsification with manual SICS and manual SICS with conventional ECCE<sup>13-17</sup>. These trials assessed visual outcome, visual-related quality of life, and cost. SICS was found to be as good as phacoemulsification.

Gogate et al., in 2005 concluded in their study that both SICS and phacoemulsification are safe and effective for visual rehabilitation of cataract patients, although phacoemulsification gives better visual acuity in patients at 6 weeks<sup>15</sup>. They found out that 81.08% patients of the phacoemulsification group and 71.1% patients of the small incision group were better than or equal to 20/60 at the 6 week follow up for presenting visual acuity. Visual acuity improved to  $\geq 20/60$  with best correction in 98.4% each in both the groups.

In our study majority of the patients had preoperative visual acuity less than 20/200 uncorrected visual acuity according to Snellen's chart. Only about 12% of patients had uncorrected visual acuity better than 20/200. The visual acuity of 79% of cases at the end of the study, was in the range of 20/20 to 20/40. On further analysis it was found that within the subgroups, almost 84% of the patients who had undergone phacoemulsification had visual acuity in the range of 20/20 to 20/40 at the end of the study and 73% of the patients who had undergone manual small incision cataract surgery had visual acuity in the range of 20/20 to 20/40 at the end of the study. Rest of the patients fell in range of 20/40 to 20/80.

#### **IV. Conclusion**

Age distribution of our patients was 50 – 87 years with a female preponderance (58%), mostly because this study was conducted in cases of age related cataract. Majority of our study population were housewives (58%) and farmers (36.23%), probably due to dry, dusty environment and outdoor activities respectively. We assessed visual outcome, visual related quality of life and found out that SICS (73%) was almost as good as Phacoemulsification (84%) in terms of visual outcome. At the end of the study, visual acuity of 79% of the total cases was in the range of 20/20 to 20/40. Thus we conclude that, although the two surgeries differ in terms of procedure and technology, but both cause similar dry eye condition as measured by various tests inspite of improvement of visual acuity.

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