

Visual Outcome after Cataract Surgery in Rural Hospital of Wardha District: A Prospective Study

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ABSTRACT

Introduction: The most common cause of blindness is cataract, affecting over 17 million people worldwide. Cataract surgery is the most common surgical procedure done in the developed world.

Aim: To study visual outcome of patients who underwent cataract surgery.

Materials and Methods: It was a prospective study carried out in the Department of Ophthalmology for 1 year and total of 1750 patients with cataract underwent cataract surgery and the pre-operative and post-operative visual acuity was assessed. By using convenient random sampling, all patient who are admitted in the Department of Ophthalmology for cataract extraction surgery were included in this study. Statistical analysis was done by using descriptive and inferential statistics using Chi-square test. Software used was SPSS 17.0 and Graph Pad 6.0 and $p < 0.05$ was considered as level of significance.

Results: Total 1750 cases were enrolled and the maximum number of cases were in the age group of 51-60 years (54.86%) whereas the least cases were found in 41-50 years of age group, Out of 1750 cases, 64.28% were males and 35.72% were females. Pre-operative uncorrected visual acuity (UCVA) was $< 6/60$ in maximum 630 cases (36%) cases, Out of 1750 cases surgeries was performed with phacoemulsification in 1120 (64%) cases and Small Incision Cataract surgery (SICS) in 945 (54%) cases, post-operative Best corrected visual acuity was 6/24-6/9 in maximum 1479 (84.51%) cases.

Conclusion: The present study identified the factors that affect the visual outcomes such as surgical procedure, pre-operative Visual acuity, post-operative visual acuity. The phacoemulsification can be utilised due to evidence for better cataract surgery outcomes when compared to SICS. There is a need for community-based approach to increase awareness of eye health which is very important.

Keywords: Eye lens, Phacoemulsification, Visual acuity

INTRODUCTION

Lens is a transparent structure that has evolved to adjust the refraction of light entering into the eye. World Health Organisation estimated that cataract was the most common cause of blindness worldwide, affecting over 17 million people across the globe [1]. In the developed world, cataract surgery is the most common procedure done and cataract blindness is reversible by this surgery [2]. This will help to attain the targets of the VISION 2020 initiative and manage the World Health Organisation (WHO) recommendation that more than 85% of operated eyes should have good outcome that is $\geq 6/18$ vision and less than 5% should have poor outcome (6/60 vision) at 6 weeks following cataract surgery. The WHO categorised the visibility outcome following cataract surgery, as good= $6/18$, borderline= $6/24-6/60$, and poor= $< 6/60$ [3]. However it is becoming evident that the outcomes of surgery is not good always as it is previously assumed, and there is much more attention needed to this aspect of surgical services [4].

Kelman introduced Phacoemulsification in 1967, which is one of the most important innovations in ophthalmology and is accepted as gold standard for surgical procedure in treating cataract [5]. The main aim of cataract surgery is to restore their visual acuity which may be helpful in improving their quality of life [6].

The most popular methods of nucleotomy are "Divide and Conquer" and "Chopping". Among the two Divide-and-conquer technique was described by Gimbel. It was the first nucleofractis cracking technique which was developed [5]. Whereas at the meeting of the American Society of Cataract and Refractive Surgery in 1993, Kunihiro Nagahara, presented a technique known as phaco chop. Phaco chop can be horizontal chopping or vertical chopping [7,8].

An alternative approach is followed by Kunihiro Nagahara for disassembling the nucleus, using a horizontal chopping technique [8]. The benefit of phaco chop over divide and conquer is that the nucleus can be rapidly disassembled, which results in significantly decreased use of ultrasound energy. The sutureless manual Small Incision Cataract Surgery (SICS) is a good alternative to Phacoemulsification which gives visual results equivalent to Phacoemulsification, at lower expenses [9]. The purpose of this study was to study the visual outcome of patients who underwent cataract surgery.

MATERIALS AND METHODS

This was a hospital based prospective, cross-sectional study and was conducted between April 2018 to March 2019. This study was adhered to the tenets of the declaration of helsinki, and it was approved by an Institutional Ethics Committee (DMIMS(DU)/IEC/2017-18/6518) of Datta Meghe Institute of Medical Sciences, Wardha. All the surgeries in the study were conducted at the Department of Ophthalmology, Acharya Vinoba Bhave Hospital, Sawangi by a experienced surgeon. Informed consent from all subjects was taken after the nature and possible consequences of the study was explained to them.

Inclusion Criteria

1. Patients with uncomplicated senile cataract, having nuclear sclerosis of all grades by LOCS II classification [10], cortical cataracts and posterior Sub-capsular cataract.
2. Patients who were accessible and willing for follow-up.
3. Patients not having any ocular pathology.
4. Patients with age group 41-70 years.

Exclusion Criteria

1. Patients with additional visual comorbidity which may influence the vision after surgery, like- glaucoma, corneal and retinal pathologies.
2. Patients with traumatic, subluxated or complicated cataracts
3. Systemic pathologies affecting vision, like- hypertensive retinopathy and diabetic retinopathy.
4. Cataract with pseudoexfoliation or posterior synechiae causing small pupil.
5. Patient not giving consent
6. Any intraoperative or post-operative complications

According to the published data the Prevalance of cataract was 62.6% [11] and according to this minimum sample size required was 1000 and a total of 1750 consecutive eyes of patient with Pre-Senile and Senile cataract attending the Ophthalmology OPD and the IPD patient of Acharya Vinobha Bhave Rural Hospital, Sawangi (Meghe), Wardha, Maharashtra, India were selected. The patients were randomly selected by envelope technique and underwent Phacoemulsification and Small Incision Cataract Surgery with implantation of posterior chamber intraocular lens.

Vital data like pulse, blood pressure, peripheral pulses were noted. Examination of cranial nerves was done. Assessment of External eye was performed for the conditions like exophthalmos, bupthalmos etc. Any deviation in the eyeball was also recorded. Extraocular movements were recorded for both ductions and versions in all cardinal positions. Details of the anterior segment from the lids to the lens were noted. Pupillary reaction both direct and consensual reflex was also noted.

The pre-operative assessment of each patients were done in terms of:

A. History:

The age, sex, any history of trauma, and ocular surgery was obtained.

B. Vision:

The Uncorrected Visual Acuity was recorded using Snellen's chart or Landolt C chart in case of illiterate subjects.

C. Ocular examination: [9]

- Detailed ocular examination of anterior and posterior segment was done by slit lamp and slit lamp biomicroscopy was done.
- Pre-operative Intra Ocular Pressure was recorded by Applanation Tonometer.
- Syringing was performed for each of the patients.
- Pre-operative keratometric reading was measured for all the cases with the help of Bausch and Lomb Keratometer.
- The axial length and IOL power was calculated in all the subjects with the help of A-Scan biometry using the SRK-II formula.
- Routine investigations like measuring temperature, pulse, respiratory rate and blood pressure and estimating blood sugar, ECG was done in all subjects.

STATISTICAL ANALYSIS

Descriptive and inferential statistics and Chi square test was applied. Software used in the analysis was SPSS 17.0 and Graph Pad 6.0.

RESULTS

The mean age was 61.50 years and the maximum number of subjects were in the age group of 51-60 year (54.86 %) whereas the least cases found in 41-50 years of age group [Table/Fig-1]. Out of 1750 cases, 64.28 % were males and 35.72% were females [Table/Fig-2].

Pre-operative UCVA was <6/60 in maximum 630 cases (36%) cases [Table/Fig-3]. Out of 1750 cases surgeries were performed with phacoemulsification in 1120 (64%) cases and SICS in 630 (36%)

Age group (years)	No. of patients	Percentage (%)
41-50 years	159	9.09%
51-60 years	960	54.86%
61-70 years	631	36.05%
Total	1750	100%

[Table/Fig-1]: Age wise distribution.

Gender	No. of patients	Percentage (%)
Males	1125	64.28%
Females	625	35.72%
Total	1750	100

[Table/Fig-2]: Gender wise distribution.

Pre-operative unaided visual acuity	No. of patients	Percentage (%)
PL+PR accurate	210	12%
HMCF	364	20.80%
FCCF	423	24.17%
<6/60	630	36%
6/60-6/24	81	4.63%
6/24-6/9	42	2.40%
Total	1750	100%

[Table/Fig-3]: Pre-operative UCVA.

HMCF: Hand movement close to face; FCCF: Finger counting close to face

cases [Table/Fig-4]. Post-operative VA was 6/24-6/9 in maximum 1479 (84.51%) cases [Table/Fig-5].

Type of surgery	No. of patients	Percentage (%)
Phacoemulsification	1120	64%
SICS	630	36%
Total	1750	100%

[Table/Fig-4]: Type of surgery.

Post-operative unaided visual acuity	No. of patients	Percentage (%)
PL+PR accurate	3	0.17
HMCF	9	0.51
FCCF	17	0.97
<6/60	22	1.26
6/60-6/24	220	12.58
6/24-6/9	1479	84.51
Total	1750	100

[Table/Fig-5]: Post-operative BCVA.

DISCUSSION

In the present prospective cross-sectional study of 1750 cases, visual outcome of patients who underwent cataract surgery were studied.

The results showed that the maximum number of patients were in the age group of 51-60 year (54.86%) whereas the least cases found in age group was 41-50 years of age group. In a study by Olawoye OO et al., [12], the age distribution of the patients showed that majority were between the ages of 50 and 79 with a mean age of 65.8 years. Also in a study by Madhumita P and Daigavane S [9], the maximum of the patients who underwent SICS were in age group of 61-70 years (56%). In a study by Bandhu SD et al., [13], the mean age of the patients was 62.46 years which is comparable to the present study. Present study data showed that out of 1750 cases, 64.28% were males and 35.72% were females which was similar to study done by Chanchlani M et al., [14], which showed that among 412 patients 240 were males (58.2%) and 172 were females (41.7%). Males work in farm and they have habit of smoking so the cataract is seen more in males than females.

In the present study it was found that pre-operative UCVA was <6/60 in maximum cases (36%). The study population had severe visual impairment and yet they were going out to work, this fact brings out the information that even with low vision, people were independent in their routinely activities. In a study by Madhumita P and Daigavane S [9], the pre-operative visual acuity was <6/60 in maximum of the patients pre-operatively. Also in a study by Bandhu SD et al., [13], showed 70% of the study population had VA <20/200 (6/60). At the time of presentation, 10% presented with vision <20/400 (6/120) whereas 2% of patients presented with VA of perception of light in both eyes.

This study found that out of 1750 cases, phacoemulsification was performed in 1120 (64%) cases and SICS in 630 (36%) cases. Although it was randomly divided. No surgical bias was done. Alhassan MB et al., [6], found that with adequate surgical skills, posterior chamber intraocular lens implantation offers good visual rehabilitation even under training conditions. Whereas in a study by Matta S et al., [15], in the year 2016, the most common technique was Small Incision Cataract Surgery with Intraocular Lens implantation (91.8%). In a study done by Chanchlani M et al., [14], Out of 412 cases Small Incision Cataract Surgery (SICS) was the most common method done in 330 cases, (80%), followed by phacoemulsification in 82 cases (20%).

In the present study the visual rehabilitation was early and better uncorrected visual acuity was in the range 6/24-6/9 in maximum 1479 (84.51%) cases. Visual outcomes for cataract surgery were reported acuity of 6/12 or better in the operated eye at two points in time during post-operative recovery. Good quality cataract surgery raise the quality of life and should be available for the rural population.

In a study by Madhumita P and Daigavane S [9] the reduced visual acuity on the first post-operative day in both groups was due to the corneal edema, anterior chamber reaction and surgically induced astigmatism. Matta S et al., [15], in the year 2016, found that best- corrected visual outcome, 91.7% had good outcomes with visual acuity >6/18. Similarly in a study by Gogate P et al., [16], found that the amount of eyes having a visual acuity of 6/18 or better improved significantly, from 86.5% in 2002 to 90.5% in 2005. Also in a study by Venkatesh R et al., [17], Best corrected visual acuity of $\geq 6/18$ was achieved in 520 patients out of 593 patients. In a study by Yorston D and Foster A [18], the best corrected vision of 6/18 or better was obtained in 94.3% of eyes. In a study by Bandhu SD et al., [13], showed that 99.4% of the study population achieved good vision (>6/18) after surgery. Kobia-Acquah E et al., [19], found that the percentage of patients with visual acuity $\geq 6/18$ was 14.46% which is less as compared to the present study.

Limitation(s)

This study is hospital based located in Central India. Study population is therefore definitely not typical for the population as a whole.

CONCLUSION(S)

Visual outcome after cataract surgery is very important aspect. It is recommended to use Phacoemulsification technique as it yields good surgical outcomes in comparison to SICS.

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