

Role of pre-operative measures in Cataract surgery outcome: Observational study

¹Dr. Jitendra Kumar, ²Dr. Rajesh Kr. Shakya*, ³Dr. Vijay Pratap Singh

¹Associate Professor, Department of Ophthalmology, MLB Medical College, Jhansi, UP, India

² Junior Resident, Department of Ophthalmology, MLB Medical College, Jhansi, UP, India

³ Senior Resident, Department of Ophthalmology, MLB Medical College, Jhansi, UP, India

*Corresponding Author: Dr. Jitendra Kumar

Abstract: Cataract is the most common cause of blindness in worldwide. Most common form of cataract is senile cataract. Now days, the cataract surgery mainly depends on size of incision and technique. Apart from this, post operative outcomes are also depends upon preoperative measures. Total 237 patients (one patient, one eye) were included in this study which was conducted in department of ophthalmology MLB medical college Jhansi, India over a period of 3 months and patients were divided into 2 groups. Group A- Those patients who were closely taken part in pre-operative measures according to special Guideline. Group B- All patients were taken part into only routine or highly necessary pre-operative measures and taken direct from the camp. Patients below 40 years of the age and Patients those had Vitreous or retinal detachment, corneal ulcer, and Iris neovascularization were excluded from the study. The main aim of this study was, to assess the role of pre-operative factors in cataract surgery, and various complications in cataract surgery. After assessment patients were taken for surgery (mostly by Phacoemulsification and few complicated cases by MSICS). Then close intra and post-operative follow-up done up to 1 month. The male female ratio was 1.3:1. Maximum complications were found in age group above 60 years (16.03%), irrespective of Study groups. Patients of Group B had higher post operative complications (30.93%) as compare to Group A (17.85 %) because of pre-operative measures (which was better in Group A patients). The female patients of both Groups had higher post operative complications (32.04%) as compare to male patients (16.42%) of both Groups. The visual improvement in Group A patients exceptionally better as compare to Group B patients (Group A, 57.14% patients had 6/12 to 6/6 unaided vision while 32.99% in Group B patients). In this study the incidence of intra-operative complications was 5.09%, which was slightly more in Group B. Corneal edema was most common early post-operative complication in both Group (15.46% in Group B and 10% in Group A) followed by post operative keratitis (6.43% in Group A and 9.28% in group B, overall 7.59%) and post-operative pain and inflammation. The late post operative complications were also high in Group B (15.46%) patients as compare to Group A (4.29%). Overall incidence was 8.86% in both groups. Incidence of Endophthalmitis was 0.42% in this study. In current Indian scenario, the outcome of cataract surgery also improved in past few decades, but not significantly as compare to developed countries. This is mainly due to either lack of awareness, low socioeconomic status, illiteracy, and overpopulation, less infrastructure as well as poor attention to pre-operative factors.

Keywords: Corneal edema, Endophthalmitis, Keratitis, MSICS, Phacoemulsification, Senile cataract

Date of Submission: 26-06-2019

Date of acceptance: 13-07-2019

I. Introduction:

Cataract terms generally refer to the cloudiness of crystalline lens which alters the amount of entering the light and leads to a decrease in vision. ^[1]According to national surveys in India, the number of people affected with cataract will reach to 8.25 million by 2020. ^[2] Age related cataract (Senile cataract) is the most common form of the cataract which can be occurs after 50 years of the age and is responsible for 48% of world blindness. ^[3] Main possible causes of cataract includes, age (most common), trauma, radiation, Genetics, drugs, metabolic and skin diseases etc.

Type of cataract includes senile (Most common type), congenital and developmental, complicated, metabolic or toxic, and radiation or electrical ^[4, 5]

Types of cataract surgery:

Intracapsular cataract extraction (ICCE): In this method, the entire lens with its capsule was removed in one piece. This procedure has a relatively high rate of complications. It has therefore been largely superseded

and is rarely performed in countries where operating microscopes and high-technology equipment are readily available.^[6]

Extracapsular cataract extraction (ECCE): Extracapsular cataract extraction involves the removal of almost the entire natural lens while the elastic lens capsule (posterior capsule) is left intact to allow implantation of an intraocular lens.^[6]

Manual small incision cataract surgery (MSICS): This technique has a modified technique of Extracapsular cataract extraction, where lens with anterior capsule is has removed by small circular sclera tunnel. Beneficial over phacoemulsification in case of dens/hard cataract.

Phacoemulsification (phaco): The term originated from phaco- (Greek phako-, comb. form of phakós, lentil; see lens) + emulsification.^[7] The phacoemulsification procedure was first performed on the human eye by Charles Kelman in 1967. Due to less incision size, there is less complications associated with healing, inflammation, suture related problems and astigmatism.^[8] Phaco is a technique employed for the removal of cataracts and implantation of IOLs using machine and micro-surgical instruments.^[9]

Cataract surgery in modern era is very fascinating with the time. Now days, the cataract surgery solely depends on size of incision. As compare to small incision cataract surgery (SICS) 5-6 mm, incision changed into 1.5 to 2.8 mm depending upon technique of cataract surgery. Apart from size of incision and type of cataract surgery, post operative out comes also depends on closely pre-operative measures of patients. Manual small incision cataract surgery and phacoemulsification were the common surgical method for cataract surgery in recent decades.^[10] PHACO and MSICS have similar efficacy, but compared with the latter, the former has the advantages of simple operation, short learning curve, low equipment requirement and low operation cost.^[11,12]

II. Method and material:

Total 237 patients (one patient, one eye) were included in this study which was conducted in department of ophthalmology MLB medical college Jhansi, India over a period of 3 months (i.e. Nov. to Jan 2018) all procedures were followed according to Helniski declaration and assessor permission were obtain from ethical committee of college. The studied patients were divided into 2 groups, Group A & B

Group A- Those patients who were closely taken part in pre-operative measures according to special Guideline (those patients who had any risk, either treated with appropriate method/ medication and taken into study or shifted into group B). 140 patients included in this group. These were those patients who were attend the ophthalmology OPD and admitted for cataract surgery after close pre operative evaluation.

Group B- All patients were taken part into only routine or highly necessary pre-operative measures as like history taking, torch light examination, and biometry (not repeated). In this study, these (Group B) patients were collected at camp level by mobile unit but operated by same surgeon with same equipment (OT). 97 patients were taken direct from camp and undergone for cataract surgery (mostly by Phacoemulsification and few complicated cases by MSICS)

Special Guideline to preoperative measure for cataract surgery (Group A):

1. Close and careful history : including negative history, past and present medical or surgical history
2. Slit lamp examination: To assess the

Lid factors: presence of trichiasis, meibomitis

Conjunctival factors: Any sign of congestion, papillary reaction.

Lacrimal apparatus: any discharge, status of puncta (also confirmed by syringing)

Ac, Iris and Lens: Ac status, posterior synechiae, Iris neovascularization, any sign of lens dislocation, type and grading of cataract.

Vitreous and posterior segment evaluation: any sign of and vitreous pathology as like hemorrhage, detachment and Vitritis.

3. Fundus evolution: Pupils dilation before cataract surgery is an important step, and it also help to assess the lens and fundus details.
4. Ocular B-scan: In case of orbital, vitreous, and retinal mass,
5. IOP measurement: Usually non contact tonometer (NCT) preferred.
6. Systemic evaluation: As like neurological, respiratory and cardiac evaluation, random blood sugar, blood pressure, and other blood investigation to rule out any systemic infections
7. Biometry: Repeated almost 3 times. It includes K_V , K_H with axis. Axial length (with $SD > 0.005$)
8. Xylocaine sensitivity, part preparation (also shaving of beard) etc.

INCLUSION CRITERIA:

- Patients with cataract ≥ 40 years of age.
- Both male and female patients were included in this study.

EXCLUSION CRITERIA:

- Patients below 40 years of the age.
- Patients those had Vitreous or retinal detachment, corneal ulcer, and Iris neovascularization.

Then patients were taken into OT and operated. Then all patients were evaluated intra-operative and 4 post operative follow-up (at 24 hrs, 1st week, 3rd week and after 1 month.) was done.

In every follow-up, patients post operative status evaluated by Slit lamp examination, Visual acuity, Best corrected visual acuity (BCVA), and Fundus examination. OCT, Perimetry, and B-scan was done in special cases.

III. Results

Table 1: Age wise patient’s distribution in study (N=237)

Age groups (in years)	Number of patients			
	Group A (140)	Percentage	Group B (97)	Percentage
40-50	28	20 %	04	4.12%
50-60	44	31.43%	16	16.50%
60-70	56	40%	40	41.24%
Above 70 year	12	8.57	37	38.14%
Total	140 (59.07%)	100%	97(40.93%)	100%

As above table, 40 patients (maximum 41.24% patients) were related to 60-70 years of age group, followed by patients above 70 years of age group (37 patients 38.14%)

Table 2: Male & Female in study (N=237)

Gender	Male		Female	
	Group A	Group B	Group A	Group B
No. of patients	103	31	37	66
Total	134		103	
Percentage	56.54%		43.46%	

Sex wise distribution shows, 134 (56.54%) male and 103 (43.46%) females included, Group A contains 103 males and Group B contains 31 males. The male female ratio was 1.3:1.

Table 3: Number of patients with major intra/post operative (Early and late) complication

Age groups in years	No. of complicated cases			
	Group A (140)	Percentage	Group B (97)	Percentage
40-59	03	2.14%	01	1.03%
51-60	08	5.71%	05	5.15%
61-70	12	8.57%	16	16.50%
Above 70	02	1.43%	08	8.25%
Total	25	17.85%	30	30.93%

Maximum complications were seen in patients of Group B (30.93%) as compare to Group A (17.85 %), and maximum complication were found in age group above 60 years.

Table 4: Number of complicated cases among males and females (237)

Gender	Male (134)		Female (103)	
	Group A	Group B	Group A	Group B
No. of patients	09	13	16	17
Percentage	6.72%	9.7%	15.53%	16.50 %
Total	22		33	
Percentage	16.42%		32.04%	

As table 4, female of Group B had slightly more complications (16.50 %) as compare to Group A females (15.53%), similar results were found in male patients, Group B (9.7%) males had more complication as compare to Group A males (6.72%).

Table 5: Visual outcome (Visual acuity) in study Groups (after 1 month)

Visual acuity (without correction)	Number of patents			
	Group A (140)	Percentage	Group B (97)	Percentage
6/6-6/12	80	57.14%	32	32.99%
6/12(p) – 6/24	41	29.29%	28	28.87%
6/24(p) - 6/60	15	10.71%	23	23.71%
5/60 – 1/60	03	2.14%	10	10.3%

FC to PL(+)	01	0.71%	04	4.12%
PL Negative	Nil	Nil	01	1.03%

As table 5 shows that, the 15.45% patients of Group B had below 6/60 Vision (uncorrected) while 2.85% patients of Group A had below 6/60 Vision. In Group B, 1 patient had PL negative vision due to expulsive choroidal hemorrhage (evisceration done after 1 month), and 2 patients with Aphakia (secondary ACIOL planned) and 2 patients of phacomorphic glaucoma had PL positive visual out come.

Table 6: Various Intra operative complications in study

Major intra-operative complications	Number of patients			
	Group A(140)	Percentage	Group B (97)	Percentage
Posterior capsular tear	01	0.71%	02	2.06%
Nuclear/ IOL drop	Nil	Nil	01	1.03%
Descemet's detachment	Nil	Nil	01	1.03%
Expulsive vitreous hemorrhage	Nil	Nil	01	1.03%
Iris related complications	03	2.14%	05	5.15%
Total	04	2.86%	10	10.31%

10.31% patients of Group B had major intra-operative complications, while Group A had 2.86 % complications. Mostly complications (Intra-operative) are Iris related. One patient had expulsive choroidal hemorrhage, later undergone for Evisceration. Amount to total intra-operative complications in this study were 5.91%.

Table 7: Various early post operative complication (Within 24 hours of cataract surgery)

Early complications (within 24 hours):	Number of patients			
	Group A (140)	Percentage	Group B (97)	Percentage
Anterior chamber collapse	01	0.71%	Nil	Nil
Corneal edema	14	10%	15	15.46%
Keratitis	09	6.43%	09	9.28%
Hyphaema	02	1.43%	02	2.06%
Raise IOP	01	0.71%	02	2.06%
Wound leakage.	Nil	Nil	02	2.06%
Peribulbar block related complication.	03	2.14%	05	5.15%
Post-operative pain and inflammation.	05	3.58%	08	8.25%
Total	35	25%	43	44.33%

In Group B, the post operative early complications were found in 44.33%. Corneal edema was most common complication in both Group (15.46% in Group B and 10% in Group A) followed by post- operative keratitis and post- operative pain and inflammation.

Table 8: Various post-operative late complications (after 24 hours of cataract surgery)

Post-operative complication	Number of patients			
	Group A (140)	Percentage	Group B (97)	Percentage
Prolonged postoperative inflammation	02	1.43%	04	4.12%
Persistent corneal edema	01	0.71%	02	2.06%
Postoperative uveitis	Nil	Nil	02	2.06%
Endophthalmitis	Nil	Nil	01	1.03%
Vitreous detachment	01	0.71%	01	1.03%
Bullous keratopathy	Nil	Nil	01	1.03%
Retinal detachment	01	0.71%	01	1.03%
IOL dislocation	Nil	Nil	01	1.03%
Cystoids macular edema	01	0.71%	02	2.06%
Total	06	4.29%	15	15.46%

In Group B, higher late post operative Complications (15.46%) as compare to Group A (4.29%), the major complications were prolonged post operative pain and inflammation, persistent corneal edema, post-operative uveitis and Cystoid macular edema.

IV. Discussion

In this study, we kept highly close pre-operative attention towards Group A as compare to Group B patients (whose poses only few specific necessary requirement). The male female ratio was 1.3:1. Maximum complications were found in age group above 60 years (16.03%), irrespective of Study groups. Due to lack of awareness, illiteracy, poor hygiene and poor compliance are the main risk factor in older individuals. Patients of Group B had higher post operative complications (30.93%) as compare to Group A (17.85 %) because of pre-operative measures (which is more better in Group A patients). The female patients of both Groups had higher post operative complications (32.04%) as compare to male patients (16.42%) of both Groups. According to a study Females and extremes of ages (below 40 years and above 80 years) had more complications. Females and those above 70 were found to have more complications in other studies too.^[13] The visual improvement in Group A patients exceptionally better as compare to Group B patients. This was because of better pre-operative care and patients' selection. In Group A, 57.14% patients had 6/12 to 6/6 unaided vision while 32.99% in Group B patients.

In this study the incidence of intra-operative complications was 5.09%, this was slightly high because of small sample size. Venkatesh et al.^[14] in 2003 reported an incidence of 1.9% of intra-operative complications. Other study in india shows, out of 12,992 eyes, 6.1% had intra-operative complications.^[15] Intra-operative complications were slightly more common in Group B patients. Corneal edema was most common early post-operative complication in both Group (15.46% in Group B and 10% in Group A) followed by post-operative keratitis (6.43% in Group A and 9.28% in group B, overall 7.59%) and post operative pain and inflammation. A study in Pune (India) shows, incidence of Corneal edema was 4.5% in Phaco and 2% in MSICS.^[16] Sudhakar et al.^[17] in their study found a similar incidence (7.3%) of keratitis as like our study.

The late post operative complications were also high in Group B (15.46%) patients as compare to Group A (4.29%). Overall incidence was 8.86% in both groups. Most common complication was prolonged post-operative pain and inflammation Followed by uveitis, persistent corneal edema and CME. Only single case of Endophthalmitis was found in Group B patients. Incidence of Endophthalmitis was 0.42% in this study. A higher incidence was reported by Anand^[18] (1.4%) and Verma et al.^[19] (4.3%) in surgeries conducted in rural camps. Incidence of Cystoid macular edema was 1.27% in this study (0.71% I Group A and 1.03 % in Group B). Cystoid macular edema (0.3%) was reported by Sudhakar et al.^[20] Other complication as like IOI dislocation, VD, RD, and Bullous keratopathy were minimally found, but there is no group deviation, may be due to less sample size. The main confounding factors for better post-operative result in group A was exclusion of complicated cases.

V. Conclusion

Post operative outcome of cataract surgery mainly depends on size of incision and advance technique, but it also depends upon pre-operative measures. In this study we can see that the outcome of cataract surgery also depend on multiple pre-preoperative factors (Group A had better visual outcome and low incidence of post operative complication) In current Indian scenario, the outcome of cataract surgery also improved in past few decades, but not significantly as compare to developed countries. This is mainly due to either lack of awareness, low socioeconomic status, illiteracy, and overpopulation, less infrastructure as well as poor attention to pre-operative factors. Hence the ophthalmological sector requires better infrastructure (quality as well as quantity), awareness, advance training and trained staff. This will surly reduce the economical burden on community in future.

References:

- [1]. "Facts About Cataract". September 2009. Archived from the original on 24 May 2015. Retrieved 24 May 2015.
- [2]. Murthy G, Gupta SK, John N, Vashist P. Current status of cataract blindness and Vision 2020: The right to sight initiative in India. *Indian J Ophthalmol.* 2008;56:489–94.
- [3]. World Health Organization. Causes of blindness and visual impairment. Prevention of blindness and visual impairment. [Last accessed on 27.3.11]. Available from: <http://www.who.int/blindness/causes/priority/cataract-magnitude/en/index.html> .
- [4]. Duke ES. The pathological action of light upon the eye. *Lancet.* 1926;1:188–91.
- [5]. Hollows F, Moran D. cataract-the ultraviolet risk factor. *Lancet.* 1981;11:1249–50
- [6]. Extracapsular Cataract Extraction - Definition, Purpose, Demographics, Description, Diagnosis/preparation, Aftercare, Risks, Normal results, Morbidity and mortality rates, Alternatives *Encyclopedia of Surgery: A Guide for Patients and Caregivers*
- [7]. Phacoemulsification *Dictionary.com, LLC.*
- [8]. Jha KN and Brig DP. Manual Small Incision Cataract Surgery: Experience at a Military Hospital, *MJAFI.* 2006; 62(3):212-215.
- [9]. Health Care. Phacoemulsification. Available from: <http://health.indiamart.com/eyecare> [Accessed on 22 August 2011].
- [10]. Jongsareejit A, Wiriyaluppa C, Kongsap P, Phumipan S. Cost-effectiveness analysis of manual small incision cataract surgery (MSICS) and phacoemulsification (PE) *J Med Assoc Thai.* 2012;95:212–20.
- [11]. Zhang LQ. Small incision cataract surgery in elderly patients. *Zhong Guo Yi Yao Zhi Nan.* 2012;10:532–533. [Google Scholar]
- [12]. 18. George R, Rupauliha P, Sripriya AV, Rajesh PS, Vahan PV, Praveen S. Comparison of endothelial cell loss and surgically induced astigmatism following conventional extracapsular cataract surgery, manual small-incision surgery and phacoemulsification. *Ophthalmic Epidemiol.* 2005;12:293–7.

- [13]. Matta S, Park J, Shantha GP, Khanna RC, Rao GN. Cataract surgery visual outcomes and associated risk factors in secondary level eye care centers of L V Prasad Eye Institute, India. PLoS One. 2016;11:e0144853.
- [14]. Venkatesh R, Muralikrishnan R, Balent LC, Prakash SK, Prajna NV. Outcomes of high volume cataract surgeries in a developing country. Br J Ophthalmol 2005;89:1079-83.
- [15]. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5369289/>
- [16]. Gogate PM, Kulkarni SR, Krishnaiah S, Deshpande RD, Joshi SA, Palimkar A, et al. Safety and efficacy of phacoemulsification compared with manual small incision cataract surgery by a randomized controlled clinical trial: Six weeks results. Ophthalmology 2005;112:869-74.
- [17]. Kratz RP, Mazzacco TR, Davidson B et al. The shearing intraocular lens: A report of 100 cases. J. Am. Intraocular Implant Soc 1981;7: 55
- [18]. Anand R, Gupta A, Ram J, Singh U, Kumar R, Visual outcome following cataract surgery in visual Punjab. Indian J Ophthalmol 2000;48:153-58.
- [19]. Verma L, Gupta SK, Murthi GVS, Goyal M, Pant TD. A follow up study on visual outcome after camp based intracapsular cataract extraction. J. Tropical Med and Int. Health 1996;1:342-47
- [20]. Sudhakar J, Ravindra RD, Natchiar G. Analysis of complication in 1000 cases of posterior chamber intraocular lens implantation. Indian J. Ophthalmol 1989;37:78-9.

Dr. Jitendra Kumar" Role of pre-operative measures in Cataract surgery outcome: Observational study" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 7, 2019, pp 19-24.