



EARLY AND LATE COMPLICATION OF CATARACT SURGERY: OBSERVATIONAL STUDY

Ophthalmology

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ABSTRACT

Purpose: The main aim of study A) To evaluate the incidence of various early and late complication of routine cataract surgery. B) Contributory factors that affect the outcome of cataract surgery.

Method: A total of 1000 Patients/eye who were diagnosed as a case of cataract and operated, were included in this observational study. All patients with cataract were included in this study irrespective of their visual acuity, age, type of cataract, visual outcome and prognosis. Cases with extracapsular cataract extraction (ECCE) were excluded from the study. All selected cases were taken for routine examination and investigation as like Intraocular pressure (IOP), syringing, blood pressure (BP), random blood pressure (RBS), ECG, CBC, ESR, clotting time (CT), and bleeding time (BT). Pre-operative assessments as like xylocaie sensitivity, part preparation, and proper antibiotic coverage were done before surgery. After cataract surgery patients were evaluated within 24 for hours for detection of early complications and proper follow up at 1st week then at 1st, 2nd, 4th and 6th month after cataract surgery for late complications.

Results: The most common early complication of cataract surgery was stromal edema 22.10% followed by keratitis 12%, Post-operative pain and inflammation was 8%, Hyphaema 4.70%, and shallow AC 4.30%. Rest other complications were raised IOP, Wound leakage, and Toxic anterior segment syndrome were less than 2%. In this study the most common late complication was posterior capsule opacification (PCO) 21.10 % followed by prolonged postoperative inflammation 4.2%, persistent corneal edema 3.9%, vitreous detachment 2%, postoperative uveitis 1.7%, cystoid macular edema (CME) 1% and Endophthalmitis, IOL dislocation, and retinal detachment were found in less than 1% cases.

Conclusion: As a clinician, the most important step is to assess the patient pre-operatively to predict high risk individuals and to counsel them appropriately. In these patients, various pre- or post-operative management steps can be taken in addition to routine cataract surgery to optimize their visual outcome

KEYWORDS

Cystoid macular edema, Endophthalmitis, Extracapsular cataract extraction, Hyphaema, Posterior capsule opacification, Stromal edema, Xylocaie sensitivity.

Introduction

Cataract is a medical condition in which the lens of the eye becomes progressively opaque, resulting in blurred vision. Symptoms may include faded colors, blurring of vision, colored halos around light, trouble with bright lights, and trouble seeing at night.¹ Cataracts are most commonly due to aging but may also occur due to trauma or radiation exposure, be present from birth, or occur following eye surgery for other problems.^{1,2} Risk factors include diabetes, smoking tobacco, prolonged exposure to sunlight, and alcohol. Either clumps of protein or yellow-brown pigment may be deposited in the lens reducing the transmission of light to the retina at the back of the eye. About 20 million people are blind due to cataracts.² It is the cause of approximately 5% of blindness in the United States and nearly 60% of blindness in parts of Africa and South America.³ Blindness from cataracts occurs in about 10 to 40 per 100,000 children in the developing world, and 1 to 4 per 100,000 children in the developed world.⁴ Cataracts become more common with age.¹

Causes:

Age (most common) ^{1,2}	Smoking and alcohol ¹⁰
Trauma	Post-operative ¹¹
Genetics ⁵	Congenital
Skin diseases ⁶	Infections
Radiation ⁷	Genetic syndromes
Medications ⁸	Metabolic and nutritional diseases
Inadequate vitamin C ⁹	

Classification

Age related is by far the most common type of cataract and it is divided into 3 types based on the anatomy of the human lens. There are Nuclear Sclerotic, Cortical and Posterior Subcapsular Cataracts. Patients commonly develop opacity in more than one area of their lens which can cause overlap in the classification of cataracts.

Nuclear sclerosis is the most common type of cataract, and involves the central or 'nuclear' part of the lens. This eventually becomes hard, or 'sclerotic', due to condensation on the lens nucleus and the deposition of brown pigment within the lens. In its advanced stages it is called a brunescant cataract. This type of cataract can present with a

shift to nearsightedness, causing problems with distance vision though reading is less affected.^{1,12}

Cortical cataracts are due to the lens cortex (outer layer) becoming opaque. They occur when changes in the fluid contained in the periphery of the lens causes fissuring. When these cataracts are viewed through an ophthalmoscope, or other magnification system, the appearance is similar to white spokes of a wheel. Symptoms often include problems with glare and light scatter at night.¹²

Posterior subcapsular cataracts are cloudy at the back of the lens adjacent to the capsule (or bag). Because light becomes more focused toward the back of the lens, they can cause disproportionate symptoms for their size

Surgical Treatment

Cataract surgery is one of the most common surgical procedures performed around the world and has a very high success rate. The most common type of cataract surgery in the United States utilizes ultrasound energy to break the cataract into particles small enough to aspirate through a hand piece. This technique is referred to as phacoemulsification. Other techniques include manual extracapsular cataract extraction (ECCE) in which the entire nucleus of the cataract is removed from the eye in one piece after extracting it from the capsular bag. While ECCE traditionally involved a large incision that required multiple sutures, a newer technique known by many names (such as manual small incision cataract surgery or small incision ECCE) allows for manual extraction without the need for any sutures.

The goal in modern cataract surgery is not only the removal of the cataract, but also the replacement of the cataractous lens with an intraocular lens (IOL). The IOL is typically placed during the cataract surgery, and may be placed in the capsular bag as a posterior chamber lens (PCIOL), in the ciliary sulcus, as a sulcus lens, or in the anterior chamber anterior to the iris as an anterior chamber lens (ACIOL). There are multiple types of IOLs that may be used in modern cataract surgery, including monofocal, multifocal, accommodative, and astigmatism-correcting lenses. The goal of all IOLs is to improve vision and limit dependency upon spectacles or contact lenses.

Recently, the femtosecond laser, familiar to the refractive ophthalmologist for its role in LASIK, INTACS, and corneal transplantation, has been adapted to assist in cataract surgery. This procedure still relies upon the cataract surgeon to remove lens material in a manner similar to phacoemulsification, but it replaces several manual steps of the procedure with a more automated laser mechanism.

Complication after cataract surgery

Early complications (within 24 hours):	Late complications (After 24 hours)
<ul style="list-style-type: none"> · Anterior chamber collapse · Corneal edema · Keratitis · Hyphaema · Raise IOP · Wound leakage · Peribulbar block related complications · Post-operative pain and inflammation 	<ul style="list-style-type: none"> · Endophthalmitis · IOL dislocation · Cystoid macular edema · Postoperative uveitis · Change in refraction / astigmatism · Posterior capsule opacification (PCO) · Prolonged postoperative inflammation · Toxic anterior segment syndrome (TASS) · Retinal detachment · Vitreous detachment · Persistent corneal edema

Material and method

A total of 1000 Patients/eye who were diagnosed as a case of cataract and operated, were included in this observational study conducted in the Department of Ophthalmology, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India over a period of Aug. 2016 to July. 2017.. The procedures followed were in accordance with the ethical standards committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

Inclusion criteria:

- All types of cataract were included in this study.
- Both male and female patients were included in the study.
- All age groups were included in this study.
- All cases of phacolytic and phacomorphic glaucoma were included in this study

Exclusion criteria:

- Patients, who had previous history of any ocular surgery, were excluded from the study.
- Patients with corneal ulcer, trauma, and any other active ocular pathology, were excluded from the study.
- All cases of extracapsular cataract extraction (ECCE) were excluded from the study.
- Patients with hematological disorders were excluded from the study.

An assessment of present complaints, detailed clinical history (present and past), and history of any ocular surgery were noted. Age, sex, occupation, and socio-economic status were recorded.

Ophthalmological check up as external examination of the eyes, visual acuity, torch light examination, slit lamp examination, Fluorescein eye staining, Schirmer's test, refraction, direct ophthalmoscopy, was done. All selected cases were taken for routine examination and investigation as like Intraocular pressure (IOP), syringing, blood pressure (BP), random blood pressure (RBS), ECG, CBC, ESR, clotting time (CT), and bleeding time (BT). OCT, B-scan were done in special cases.

Pre-operative assessments as like xylocain sensitivity, part preparation, and proper antibiotic coverage were done before surgery. After cataract surgery patients were evaluated within 24 for hours for detection of early complications and proper follow up at 1st week then at 1st, 2nd, 4th and 6th month after cataract surgery for late complications.

Results

Table 1: Male and female distribution in study (n=1000)

	Male	Female
No. of patients	613	387
Percentage	61.3%	38.7%

Table 2: Cataract wise distribution of patients (n=1000)

Types of Cataract	No. of patients	Percentage
No complication	669	66.90%
Complicated	218	21.80%
Cataract associated with Comorbid conditions	113	11.30%
Total	1000	100%

Table 3: Distribution of patients according method of cataract extraction and type of IOL implanted (n=1000)

	Phacoemulsification	Percentage	Manual small incision Cataract surgery	Percentage	Total	Percentage
PMMA lens	401	40.10%	264	26.40%	665	66.50%
Acrylic lens	292	29.20%	043	4.30%	335	33.50%
Total	693	69.30%	307	30.7%	1000	100%

Table-4: Early complications in Phacoemulsification and manual small incision cataract surgery (n=1000)

Early Complications	Phacoemulsification(693)	Percentage	Manual small incision Cataract surgery (307)	Percentage	Total	Percentage
Anterior chamber collapse	09	1.3%	34	11.07%	43	4.30%
Corneal edema	126	18.18%	95	30.95%	221	
Keratitis	74	10.68%	46	14.98%	120	12.00%
Hyphaema	15	2.17%	32	10.42%	47	4.70%
Raise IOP	05	0.72%	07	2.28%	12	1.20%
Wound leakage.	03	0.43%	12	3.91%	15	1.50%
Peribulbar block related complication (major)	01	0.14%	02	0.65%	03	0.30%
Post-operative pain and inflammation.	23	3.32%	57	18.57%	80	8.00%
Toxic anterior segment syndrome (TASS)	03	0.43%	06	1.95%	09	0.90%

Table-5: Late complications in Phacoemulsification and manual Small incision cataract surgery (n=1000)

Early Complications	Phacoemulsification (693)	Percentage	Manual small incision Cataract surgery (307)	Percentage	Total	Percentage
Endophthalmitis	02	0.29%	05	1.63%	07	0.7%
IOL dislocation	02	0.29%	07	2.28%	09	0.95%
Cystoid macular edema	03	0.43%	07		10	1.00%
Postoperative uveitis	05	0.72%	12	3.91%	17	1.7%

Posterior capsule opacification (PCO)	123	17.75%	88	28.66%	211	21.1%
Prolonged postoperative inflammation	05	0.72%	37	12.05%	42	4.2%
Retinal detachment	02	0.29%	06	1.95%	08	0.8%
Vitreous detachment	07	1.01%	13	4.24%	20	2.00%
Persistent corneal edema	17	2.45%	32	1.42%	39	3.9%

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Discussion

In this study the gender distribution was, 613 male (61.30%) and 387 female (38.70%). The male female ratio was 1.58:1. All patients with cataract were included in this study irrespective of their visual acuity, age, type of cataract, visual outcome and prognosis. In this study there were 218 patients who had complicated cataract and 113 patients had cataract with comorbid condition as like Diabetes, hypertension, COPD etc. In this study 693 (69.30%) patients were selected for phacoemulsification and 307 (30.70%) patients were selected for Manual small incision cataract surgery. All cases of extracapsular cataract extraction (ECCE) were excluded from the study. Out of 1000, 665 patients had wish to implanted PMMA followed by 335 patients acrylic foldable IOL. The most common early complication of cataract surgery was corneal/stromal edema 22.10% followed by keratitis 12%. After that Post-operative pain and inflammation was 8%, Hyphaema 4.70%, and shallow AC 4.30%. Rest other complications were raised IOP, Wound leakage, and Toxic anterior segment syndrome were less than 2%.

In this study the most common late complication was posterior capsule opacification (PCO) 21.10 % followed by prolonged postoperative inflammation 4.2%, persistent corneal edema 3.9%, vitreous detachment 2%, postoperative uveitis 1.7%, cystoid macular edema (CME) 1% and Endophthalmitis, IOL dislocation, and retinal detachment were found in less than 1% cases. These early and late complication were most commonly associated with manual small incision cataract surgery because of SICS mostly performed by less experienced hand (resident doctor). Other contributory factors were type of implanted lens, complicated cataract, and cataract with comorbid conditions.

The confounding factors in this study were experience of surgical hands, patient's compliance towards proper use of medication, follow up, hygiene, and safety guideline.

Conclusion

Cataract surgery is one of the commonest surgical procedures performed in ophthalmic field and surgeons continually look for techniques to improve the efficiency, safety profile, and outcome of cataract surgery. Cataract surgery continues to be a very safe surgical procedure with few patients experiencing serious sight-threatening adverse events. The most devastating complication is Endophthalmitis, the rate of which is now significantly decreased through the use of intracameral antibiotics. As a clinician, the most important step is to assess the patient pre-operatively to predict high risk individuals and to counsel them appropriately.

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