Journal of Innovations in Applied Pharmaceutical Sciences
www.jiapsonline.com

ISSN: 2455-5177

Review article

A review on post-operative complications and its care after cataract surgery

Singh Amarjeet[1]*, Sharma Pankaj[2], Gupta Jyoti[3], Sharma Jaya[4]

[1]Innovative College of Pharmacy, Gr. Noida U.P.
[2,4]Jaipur National University, Jaipur.
[3]M.V.N University, Faridabad.

Abstract

A cataract is a clouding of the natural intraocular crystalline lens that focuses the light entering the eye onto the retina. This cloudiness can cause a decrease in vision and may lead to eventual blindness if left untreated. Cataracts often develop slowly and painlessly, so vision and lifestyle can be affected without a person realizing it. Worldwide, cataracts are the number one cause of preventable blindness. Modern cataract surgery, which is the removal of the cloudy lens and implantation of a clear intraocular lens (IOL), is the only definitive treatment for Cataracts often develops slowly with a gradual decline in vision that cannot be corrected with glasses. Common complaints include blurry vision, difficulty reading in dim light, and poor vision at night, glare and halos around lights, and occasionally double vision. Other signs of cataracts include frequent changes in the prescription of glasses and a new ability to read without reading glasses in patients over 55.

There are several types of cataract including age related, traumatic, and metabolic. Age related is the most common type and the pathogenesis is multifactorial and not fully understood. A traumatic cataract can occur following both blunt and penetrating eye injuries as well as after electrocution, chemical burns, and exposure to radiation. Metabolic cataracts occur in uncontrolled diabetics, patients with galactosemia, Wilson disease, and Myotonic dystrophy.

Key words: Blurry vision, IOL, Galactosemia, Wilson disease, Myotonic dystrophy, Traumatic.

***Corresponding Author: Singh Amarjeet,** Innovative College of Pharmacy, Gr. Noida U.P.

Introduction

What is a cataract?

A cataract is a painless, cloudy area in the lens of the eye. The lens is enclosed in a lining called the lens capsule. Cataract surgery separates the cataract from the lens capsule. In most cases, the lens will be replaced with an intraocular lens implant (IOL). If an IOL cannot be used, contact lenses or eyeglasses must be worn to compensate for the lack of a natural lens.

What causes cataracts?

There is no way to prevent cataracts, but they can be caused by:

- Natural changes to the eye due to the aging process

- Trauma to the eye
- Some medications or toxic chemicals
- Birth defects

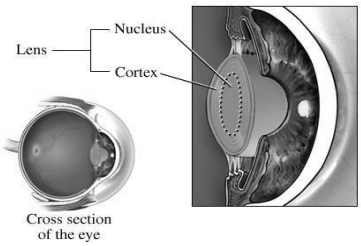

Figure 1. Cross section of the eye

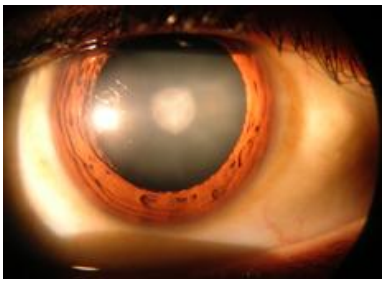

Figure 2. Magnified view of a cataract in a human eye seen on examination with a slit lamp

Types of cataract surgery

There are two types of cataract surgery with lens implantation.

1. **Phacoemulsification:** In this type of surgery, the incisions are small and sound waves (ultrasound) are used to break up the lens into small pieces. This is the most common way to do cataract surgery [1].

2. **Extracapsular surgery:** In this type of surgery, the lens and the front part of the lens capsule is opened. The lens is then removed in one piece. Sometimes a small incision is used and the lens is broken into small pieces. Extracapsular surgery is also called extracapsular cataract extraction, or ECCE and is rarely done these days [2].

Risk factors of cataract include-

- Swelling and fluid in the centre of nerve layer (cystoids macular edema).
- Infection in the eye(endophthalmitis).
- Swelling of the clear covering of the eye (corneal edema).
- Bleeding in the front of the eye (hyphema).
- Sagging of the upper eyelid (ptosis)

Postoperative complications along with their diagnosis and treatment-

1. Endophthalmitis

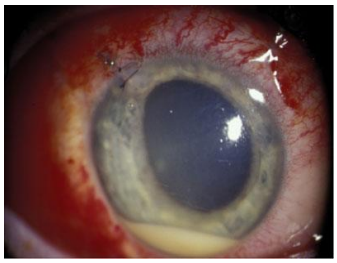

Figure 3. Hypopyon in an eye with endophthalmitis.

Infectious endophthalmitis is defined as serious intraocular inflammatory condition causing severe inflammation involving both the anterior and posterior segments of the eye after intraocular surgery and also results in infection of the vitreous cavity. Typically, postoperative endophthalmitis is caused by the peri-operative introduction of microbial organisms, posterior capsular rupture, retained lens material, contamination of sterilized instruments [4,6].
Currently, the three most accepted methods of reducing the risk are to use an appropriate antiseptic solution (povidone-iodine), adequate draping of the surgical field to exclude the eyelashes and the use of intracameral antibiotics, such as cefuroxime at the conclusion of surgery. Therapeutics generally involves administration of intravitreal broad spectrum antibiotics with associated vitreous tap/biopsy (VTB) or pars plana vitrectomy (PPV)[3,7].

2. Pseudophakic Retinal Detachment

Pseudophakic patients have a 5.5 times higher risk of retinal detachment than phakic patients. Risk factors for retinal detachment in pseudophakic patients include vitreous loss during cataract surgery, high myopia, lattice

degeneration, and history of prior retinal detachment in the fellow eye [5]. Patients may present with symptoms of floaters, flashes of light, and visual field defects. Multiple surgical options exist for the repair, but generally for pseudophakic patients with a retinal detachment, a pars plana vitrectomy is the surgical procedure of choice.

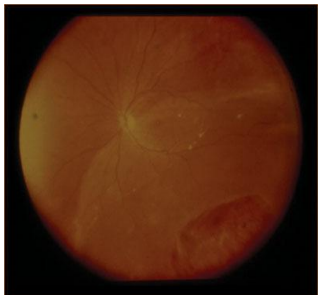

Figure 4. An inferior retinal detachment

3. Dropped nucleus

Loss of nuclear material into the vitreous cavity carries a major risk of loss of sight which complicates 0.1% to 1% of cases of cataract extractions (Figure 5) Removing a dropped nucleus or even nuclear fragments is essential as it can either lead to long-standing uveitis, vitritis, cystoids macular oedema, and secondary glaucoma [10].

Figure 5. Dropped nucleus

Clinical studies implicate posterior extension of breaks in the capsulorrhexis as a common cause of this complication. Congenital posterior polar cataract, which predisposes to posterior capsular dehiscence, is another risk factor for dropped nucleus. A higher incidence of posterior capsule tear and vitreous loss is associated with pseudoexfoliation, diabetes mellitus, trauma, hard or brunescent nuclei, and white cataract. Outcomes are typically excellent when there is minimal vitreous manipulation and traction and the residual lens material is removed in a controlled fashion by three-port PPV with phacofragmentation.

4. Raised intraocular pressure

An increase in intraocular pressure frequently occurs after otherwise uneventful phacoemulsification cataract surgery. Some individuals, however, may experience pain, corneal oedema, glaucomatous nerve damage, or anterior ischemic optic neuropathy. As many as 18% to 45% of patients may experience an intraocular pressure greater than 28 mm Hg following phacoemulsification, but most pressures will return to normal by 24 hours postoperatively. There are several classes of drugs used to treat postoperative increases in intraocular pressure including: oral and topical carbonic anhydrase inhibitors (acetazolamide, methazolamide), prostaglandin analogues (latanoprost, bimatoprost), alpha agonists (apraclonidine andbrimonidine), beta blockers (timolol and levobunolol), and miotics (intracameral carbachol, pilocarpine)[14].

5. Iris Prolapse

Figure 6. Iris Prolapse

Iris prolapse can result from inadequate wound closure, accidental trauma, or raise intraocular pressure. Iris prolapse is extremely rare following small incision surgery but may occur after extracapsular cataract extraction (Figure 6). Complications include defective wound healing, chronic anterior uveitis, excessive

astigmatism, endophthalmitis, cystoid macular oedema and epithelial in growth. Peribulbar or retrobulbar anaesthesia is necessary for iris manipulation. Treatment depends on the time interval between cataract surgery and identification of the prolapse. In cases of iris prolapse of less than 48 hours duration, the iris tissue can be reposited [11].

6. Corneal oedema

Postoperative localized stromal and/or epithelial oedema, especially in the half of the cornea near the main section indicates intraoperative trauma. Factors that predispose to corneal oedema following cataract surgery include the following: intraoperative mechanical endothelial trauma, prior endothelial disease or cell loss, excessive postoperative inflammation, and prolonged postoperative elevation of intraocular pressure [17].

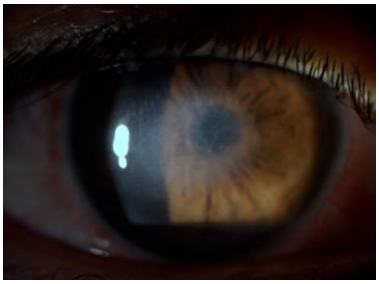

Figure 7. Corneal Oedema

Pseudophakic bullous keratopathy describes the irreversible oedema and endothelial cell damage that occurs after cataract surgery. Postoperatively corneal oedema and inflammation should be aggressively treated with topical corticosteroids, topical and/or systemic antiglaucoma medication and intraocular pressure should be controlled below 20 mmHg.

7. Toxic anterior segment syndrome

Toxic anterior segment syndrome is an acute, sterile, anterior segment inflammation that can occur after any anterior segment surgery. Anterior segment findings include fibrin formation with occasional hypopyon and, in later stages, inflammatory membranes that can cause pupil distortion and glaucoma.

Toxic anterior segment syndrome has numerous causes such as contaminants on surgical instruments, products introduced into the eye during surgery, such as irrigating solutions or ophthalmic medications. Management of toxic anterior segment syndrome involves use of topical steroids every hour and non-steroidal anti-inflammatory drugs (NSAIDs) every 6 hours [12,13].

8. Secondary cataract or posterior capsule opacification

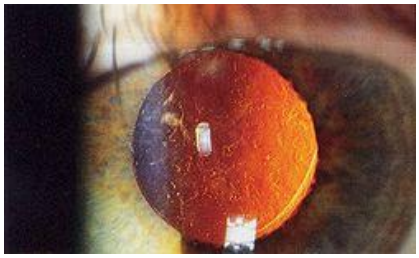

Figure 8. Slit lamp photo of IOL showing Posterior capsular opacification visible few months after implantation of Intraocular lens in eye, seen on retroillumination.

As a physiological change expected after cataract surgery, the posterior capsular cells undergo hyperplasia and cellular migration, showing up as a thickening, opacification and clouding of the posterior lens capsule (which is left behind when the cataract was removed, for placement of the IOL).

Posterior capsule opacification can be safely and painlessly corrected using a laser device to make small holes in the posterior lens capsule of the crystalline. It usually is a quick outpatient procedure that uses a Nd-YAG laser (neodymium-yttrium-aluminum-garnet) to disrupt and clear the central portion of the opacified posterior lens capsule (posterior capsulotomy)[19].

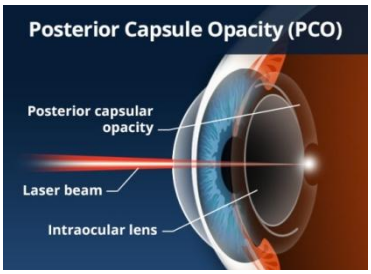

Figure 9. Posterior capsule opacification

Figure 10. A procedure called a YAG laser capsulotomy can quickly and effectively restore vision following posterior capsular opacification

9. Cystoid Macular Edema

Figure 11. Color photograph demonstrating fluid-filled spaces in cystoid macular edema

Cystoid macular edema is a common cause of visual decline after uncomplicated cataract surgery[15]. Clinical CME is described as vessel leakage with visual acuity of 20/40 or worse, and if the edema persists for greater than six months, it is referred to as chronic CME. A few risk factors for CME include pre-existing ocular inflammation, diabetic retinopathy, presence of epiretinal membrane or vitreoretinal traction, vitreous loss, retained lens fragments[16].

Vitreous incarceration in the wound may be treated with Nd:YAG laser vitreolysis, and in cases of vitreomacular traction (VMT), pars plana vitrectomy may be needed.

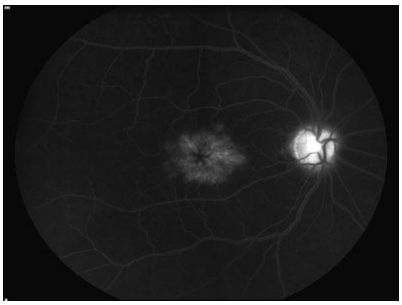

Figure 12. Fluorescein angiogram showing the classic petaloid appearance of cystoid macular edema

10. Dislocated Intraocular Lenses

Another example of cataract surgery complications is malpositioned or dislocated intraocular lenses. The capsular bag in which intraocular lens is placed is extremely thin and can sometimes rupture or break which decrease the visual acuity. Also, the capsular bag itself may dislocate due to weakness or breakage of the fibers (zonules) that hold it in place, resulting in a condition known as zonular dialysis. This condition places the risk of malpositioning or dislocation of the lens implant. When an intraocular lens implant is malpositioned or dislocated, the cataract surgeon can probably reposition it in a second procedure[18].

11. Retained Lens Fragments

Risk factors for RLF include limited pupillary dilation, traumatic cataract, and patient movement during surgery. The primary ocular effects of RLF are pronounced inflammation and intraocular pressure elevation. Over the long term, chronic inflammation can lead to development of peripheral anterior synechiae and chronic angle-closure glaucoma.

Once lens fragments have gone posteriorly during cataract surgery, the cataract surgeon should perform a limited anterior vitrectomy and remove the cortical material in the anterior segment. Postoperative management involves

frequent topical corticosteroids, cycloplegics, and IOP-lowering medications [8, 9]. Prompt referral to a vitreoretinal surgeon is recommended.

12. Post Operative Instructions For Cataract Patients

Patching the eye after surgery is a matter of routine. The eye patch is usually worn only overnight and then removed for the rest of the post-operative period. It can offer protection, reduce discomfort, but really has no "healing" attributes.

The Lid Should be Closed against the Eye

A properly placed eye patch, for any reason, should be a "pressure patch," meaning that the taped patch should exert enough pressure on the eye to keep the lid closed. This also ensures that the eye cannot rub against the patch itself.

Pain Reduced

Whatever "discomfort" (doctor language for pain) there might be after the operation is decreased by blocking light. While the eye is still able to move underneath the closed lid, there is some additional comfort created by decreased blinking. The cornea is a very sensitive tissue. Small abrasions can cause great sensitivity to light. Corneal abrasions, even those unrelated to surgery, usually heal rapidly, with or without patching.

Protection

The eye is dirty, so there is no protective effect from the patch, unlike, say, a true bandage. Remember that the eye, nose and mouth are all connected.

In the old days, when cataract surgery required a "large" incision to be made into the eye, a shield was placed on top of the patch. This shield would offer physical protection until the incision healed and became stronger.

Special Situations

There are a few special situations where patching is important after eye surgery. Occasionally the surgical wounds are not tightly sealed (i.e. the eye is leaking) and an additional day or two of patching is required. If patching doesn't suffice, then a short trip back to the operating room might be warranted.

Figure 13. A protective patch will be placed over the eye following cataract surgery

Common DO'S and DON'TS After Cataract Surgery

DO	DO NOT
• Use your eye drops on the schedule provided by your ophthalmologist. • Resume light daily activities such as reading, writing, watching TV and walking. • Keep physical activity light. • Wear your protective eye covering while you sleep and avoid sleeping on the side that has been operated on. • Bathe and shower with your eyes closed	• Rub your eye or get anything in your eye, even water, which can increase the chance of infection. • Swim or use a hot tub, for at least 2 weeks. • Drive for 24 hours after surgery. • Do any strenuous activity, especially bending and lifting anything 15 to 20 pounds or more. • Wear any eye make-up until you consult with your ophthalmologist

Post Operative Care:[20]

1. **Eye shield:** Please use eye shield for protection when you sleep. You may use dark glasses during daytime. Please wash

the eye shield and glasses with soap and water each day and dry the same before use.

2. **Washing the face:** Cleaning of the operated eye will be as per the instructions given by the doctor/ nurse. The rest of the face can be mopped with a clean and wet cloth. Avoid splashing water into the operated eye.
3. **Shaving:** Shaving is permitted. But avoid splashing water after shaving. Instead, clean with a wet cloth.
4. **Bathing:** You can bathe below neck from the first postoperative day itself. But avoid head bath for a period of 3-4 weeks.
5. **Use of facial cosmetics:** Avoid cosmetics to the eye such as mascara, eye liners etc for at least 4 weeks.
6. **Physical activity:** Activities such as walking, talking, TV viewing can be resumed immediately after surgery. However, Jogging, swimming, gardening, contact sports, etc may have to be avoided until 4-6 weeks after surgery.
7. **Driving:** Avoid driving till your surgeon gives you permission.
8. **Joining back duties**: Usually you will be allowed to join your duties by 4-6 weeks after surgery depending upon the surgery. You may have to check with your doctor regards to the exact date of joining duty.
9. You may resume your sexual life a week or two after the surgery.
10. **The following symptoms may be expected after most surgeries:** Some amount of redness, watering, foreign body sensation, and glare are common. The severity varies with the type of surgery. These symptoms will reduce with time and usually disappear by 4-6 weeks.
11. If you have any worsening of the symptoms and specifically if there is increasing redness, pain or decreased vision please report as emergency.

Procedure for cleaning the eye:

A. The operated eye needs to be cleaned at least twice a day.
B. The attendant performing this task should wash the hands with soap and water and dry them with a clean towel.
C. You may use the disposable tissue supplied at the hospital for this purpose. Alternately you may place cotton in a clean vessel cover it with a lid for 10 minutes, let it cool down, take the cotton out, squeeze the excess water and use the same to clean.
D. Cleaning the lower lid is done by asking the patient to look up and wiping all the secretions sticking to the lower lid margin.
E. Cleaning the upper lid is done by asking the patient to look down and doing similar procedure.
F. Similarly the outer and inner corners of the eye are cleaned.
G. Once the margins and corners are cleaned, the eye drops can be instilled and then the surrounding areas can also be cleaned.

Procedure for instilling eye ointment:

A. Washing hands as for instilling drops.
B. Lower lid is pulled down.
C. The tube containing the ointment is squeezed gently so that a small thread of the ointment falls in the space between the eyeball and the lid. This should be not more than half a centimeter.
D. By letting the eyelid close, the ointment thread will break.

General instructions for instilling medicines in the eye:

A. Always instill drops before ointment.
B. Leave a gap of 5 minutes between two medications.
C. Keep the eye closed for 5 minutes after applying the medication.
D. Once opened the eye drops are discarded after 10 days.
E. Replace the cap of the bottle immediately after use.
F. Make sure that the right drops are being used for the right number of times.

G. If similar medication is advised for both eyes, it is advisable to have separate bottles for the two eyes.
H. Unused eye medication, once opened is discarded and never used for other persons.

General instructions:

A. Do not rub the eyes.
B. Do not lift heavy weights
C. Do not allow the eye to get injured- the eye shield is meant to protect the eye from physical hurt.
D. Avoid too many visitors for fear of contacting infection- especially avoids visitors with conjunctivitis, cold etc.
E. Do not play with children since there is possibility of getting hurt in the eye.
F. Do not strain at toilet. If needed please take laxative.
G. Avoid use of snuff.
H. Cigarette smoking should be avoided.
I. Alcoholic beverages are best avoided.
J. Avoid using handkerchief to mop the eye. Use sterile tissue only.

Eye Medications

WEEK 1-		
1. VIGAMOX (tan top)  4x (breakfast, lunch, dinner, bedtime)	2. PREDFORTE/ PREDNISOLONE 1% (white or pink top)  4x	3. ACULAR/KETOROLAC or VOLTAREN/DICLOFENAC (gray top)  4x
WEEK 2,3-		
	1. PREDFORTE/ PREDNISOLONE 1% (white or pink top)  2x (breakfast and bedtime)	2. ACULAR/KETOROLAC or VOLTAREN/DICLOFENAC (gray top)  2x
WEEK 4,5,6		
	1. PREDFORTE/ PREDNISOLONE 1% (white or pink top)  1x (breakfast)	2. ACULAR/KETOROLAC or VOLTAREN/DICLOFENAC (gray top)  1x

References

1. Pande M, Dabbs TR. Incidence of lens matter dislocation during phacoemulsification. J Cataract Refract Surg1996; 22:737-42.
2. Gilliland GD, Hutton WL, Fuller DG. Retained intravitreal lens fragments after cataract surgery. Ophthalmology 1992; 99:1263-7.
3. Scott IU, Flynn HW Jr. Smiddy WE, et al. Clinical features and outcomes of pars plana vitrectomy in

patients with retained lens fragments. Ophthalmology 2003; 110:1567-72.
4. Eifrig CW, Flynn HW Jr., Scott IU, Newton J. Acute-onset postoperative endophthalmitis: Review of incidence and visual outcomes (1995-2001). Ophthalmic Surg Lasers 2002; 33:373-8.
5. Nagaki Y, Hayasaka S, Kadoi C, et al. Bacterial endophthalmitis after small-incision cataract surgery. effect of incision placement and intraocular lens type. J Cataract Refract Surg 2003; 29:20-6.
6. Ciulla TA, Starr MB, Masket S. Bacterial endophthalmitis prophylaxis for cataract surgery: an evidence-based update. Ophthalmology 2002; 109:13-24.
7. Results of the Endophthalmitis Vitrectomy Study. A randomized trial of immediate vitrectomy and of intravenous antibiotics for the treatment of postoperative bacterial endophthalmitis. Endophthalmitis Vitrectomy Study Group. Arch Ophthalmol 1995; 113:1479-96.
8. Kim JE, Flynn HW, Jr., Rubsamen PE, et al. Endophthalmitis in patients with retained lens fragments after phacoemulsification. Ophthalmology 1996; 103:575-8.
9. Sunaric-Megevand G, Pournaras CJ. Current approach to postoperative endophthalmitis. Br J Oph thalmol 1997; 81:1006-15.
10. Aasuri MK, Kompella VB, Majji AB. Risk factors for and management of dropped nucleus during phacoemulsification. J Cataract Refract Surg 2001; 27:1428-32.
11. Allan BD. Mechanism of iris prolapsed, A qualitative analysis and implications for surgical technique. J Cataract Refract Surg. 1995; 21(2):182-186.
12. Mammalis N, Edelhauser HF, Dawson DG, Chew J, LeBoyer RM, Werner L. Toxic anterior segment syndrome. J Cataract Refract Surg 2006; 32:324.
13. Holland SP, Morck DW, Lee TL. Update on toxic anterior segment syndrome. Curr Opin Ophthalmol 2007;18:4.
14. Research Team. Arch Ophthalmol 1994;112:239-52.
15. Flach AJ. The incidence, pathogenesis and treatment of cystoid macular edema following cataract surgery. Trans Am Ophthalmol Soc 1998; 96:557-634.
16. Heier JS, Topping TM, Baumann W, et al. Ketorolac versus prednisolone versus combination therapy in the treatment of acute pseudophakic cystoid macular edema. Ophthalmology 2000; 107:2034-8.
17. Benhamou N, Massin P, Haouchine B, et al. Intravitreal triamcinolone for refractory pseudophakic macular edema. Am J Ophthalmol 2003; 135:246-9.
18. Ursell PG, Spalton DJ, Pande MV, et al. Relationship between intraocular lens biomaterials and posterior capsule opacification. J Cataract Refract Surg 1998; 24:352–60.
19. Spalton DJ. Posterior capsular opacification after cataract surgery. Eye 1999; 13(Pt 3b):489–92.
20. Post operative care, http://www.sankaranethralaya.org/.