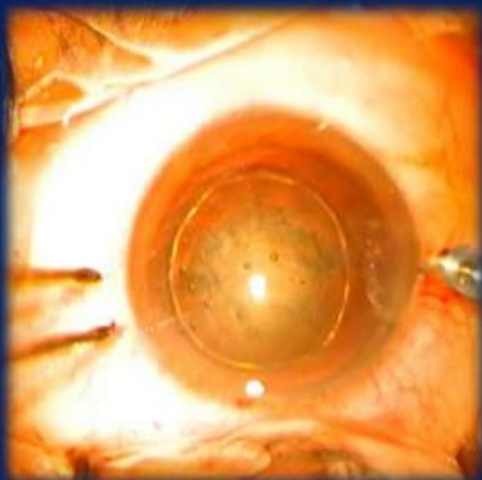


CATARACT SURGERY PROTOCOL



NEPAL OPHTHALMIC SOCIETY

With support from-

*International Agency for Prevention of Blindness and
Apex Body for Eye Health, Ministry of Health & Population, Nepal*

March 2015

Foreword

Cataract is the major cause of blindness and cataract surgery is the most commonly performed surgeries in Nepal. Good cataract outcome depends on pre-operative selection of patients, the skills and knowledge of the eye surgeon, the surgical technique, the surgical facilities and environment, the post-operative care and the optical correction provided.

In order to develop the protocol a workshop was held under the aegis of Nepal Ophthalmic Society with support from International Agency for Prevention of Blindness and Apex Body for Eye Health, Ministry of Health and population, Government of Nepal. All eye hospitals representative performing more than twenty thousand surgeries per year in Nepal were invited for the workshop. Dr R.D. Ravindran, chairman and director of Aravind Eye Care Sytem participated as an external expert. A draft was prepared with the contribution from the participant of the workshop that was further discussed and final draft was prepared.

I thank the entire participant for their valuable suggestion and time. Special thanks to Dr Reeta Gurung (immediate past president of Nepal Ophthalmic Society), Dr Gopal Prasad Pokharel (regional Co chair of IAPB), Dr Eli Pradhan (member of editorial committee of Nepalese Journal of Ophthalmology) for taking initiative to prepare cataract surgery protocol. This document would not have been possible without initiative and support from International Agency for Prevention of Blindness (IAPB).

The aim of this protocol is to assist ophthalmic surgeon working in different settings to minimize the intra-operative and post-operative complications related with cataract surgeries so as to improve cataract surgical outcome. These guidelines are mere suggestions for good outcome and not for any legal proceedings and safeguarding.

Dr Sanjay Kumar Singh
President, Nepal Ophthalmic Society
March 2015

Need for a standard cataract protocol

Nepal has more than two dozen eye hospitals and over 300,000 cataract surgeries are performed every year. We ophthalmologists are trained in many different institutes and training centres and some of us have developed own procedures and protocols for cataract surgery. To perform safe cataract surgery with good quality outcome, uniform minimum standard of clinical practice needs to be in place. It will result in a satisfied patient who will have a good quality of life. Additionally the outcome results of different hospitals and surgeon can be compared.

This protocol is not a cook book but it tries to provide a standard approach in dealing with cataract surgeries and follow up of patients. The aim is to further improve the visual outcome and quality of life of cataract operated patients. Newer technologies are being developed and we need to adapt them in our hospitals.

I congratulate Nepal Ophthalmic Society for taking the lead in developing this protocol and I hope that when ophthalmologists use it in their practice in hospitals they will suggest changes which will be incorporated in the future edition.

My sincere thanks to International Agency for Prevention of Blindness (IAPB) and Nepal Ophthalmic Society as well as Ministry of Health & Population for supporting this effort. Publishing the Protocol is important but utilizing it in daily practice will be an achievement.

I thank all participants in many meetings and workshops and feel honored to have been part of the team.

Dr. Gopal P. Pokharel MD MPH
Co-Chair-Nepal, International Agency for Prevention of Blindness
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Acknowledgement

It was a great honour to be considered as the editor of the cataract surgery protocol developed by Nepal Ophthalmic Society (NOS).

Clinical guidelines aim to help health professionals and patients make the best decisions about treatment or care for a particular condition or situation. Wrong site, wrong procedure or wrong person surgery needs be eliminated. This protocol aims to achieve this goal. It does not intend to exhaust clinician but to have consistent implementation of a standardized approach using a universal, consensus-based protocol.

I would like to thank Dr Sanjeeb Bhandari, Dr Purushottam Joshi, Dr Salma KC Rai, Dr Lila Raj Puri, who have contributed in constructing this protocol, in spite of their busy schedule. I would like to express my sincere gratification to Dr Reeta Gurung, immediate past President of NOS and Dr Sanjay Kumar Singh, President of NOS for their continuous support and Dr Gopal Prasad Pokharel for his guidance throughout. Finally, this has not been possible without the financial support from International Agency for Prevention of Blindness (IAPB), hence, my heartfelt thanks to IAPB.

Sincerely,

Dr Eli Pradhan, MD, MRCSEd(UK)
Editor,
Nepalese Journal of Ophthalmology

Abbreviations: Acronyms

AC	Anterior Chamber
AECS	Aravinda Eye Care Centre
AMBU	Automated Manual Breathing Unit
BSS	Balanced Salt Solution
ECCE	Extra Capsular Cataract Surgery
EtO	Ethylene Oxide
GA	General Anaesthesia
IOL	Intra-Ocular Lens
KOH	Potassium Hydroxide
LA	Local Anaesthesia
LAICO	Lions Aravind Institute of Community Ophthalmology
MDG	Millennium Developmental Goal
NEE	Never Ever Events
NPCB	National Programme for Control of Blindness
NSAID	Non Steroidal Anti-inflammatory Drugs
OR	Operation Room
OT	Operation Table
RBH	Retrobulbar Haemorrhage
RL	Ringer Lactate
SCSP	Standard cataract surgical protocol
SDA	Sabouraud Dextrose Agar
SICS	Small Incision Cataract Surgery
WHO	World Health Organization

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1. Background

Blindness has profound human and economic consequences in all societies due to loss of independence, self-esteem and economic productivity among those affected and their families.¹⁻³ There are also additional costs involved in providing special needs education for children and rehabilitation services for those with irreversible loss of vision. Globally blindness affects approximately 45 million people.⁴⁻⁵ Cataract is the commonest cause of avoidable blindness (19 million) and the second commonest cause of visual impairment after refractive error. The vast majority of individuals with visual loss due to cataract live in developing countries. The disproportionate magnitude of cataract in developing countries is due to the social determinants of health which are consequences of poverty in its broadest sense i.e. greater exposure to risk factors on one hand and inadequate access to and/or provision and uptake of services on the other.⁶⁻⁹

Cataract occurs when the normally clear lens of the eye becomes cloudy leading to gradual, progressive loss of vision (usually in both eyes) which can ultimately lead to blindness. Cataracts, which are straightforward to diagnose, are primarily an age related disorder, affecting individuals worldwide. Although cataracts cannot be prevented they can be treated by highly cost effective surgery which leads to good visual outcomes.^{3,10} Indeed, there is now a considerable body of high quality evidence from clinical trials and other studies which demonstrates the cost effectiveness of the surgical techniques most frequently used in low and middle income countries (i.e. small incision cataract surgery) and that intraocular lens (IOL) implantation dramatically improves visual outcomes.¹¹⁻¹³ The World Health Organization (WHO) has established standards for visual acuity after cataract surgery and tools for monitoring visual outcomes have been developed.¹⁴⁻¹⁵ However, evidence from population based surveys indicates that visual acuity outcomes following cataract surgery are not always as good as they might be.¹⁶⁻¹⁷

Studies have shown that successful cataract surgery can have a dramatic impact on individuals' lives including being able to return to their previous activities including income generation which has an impact on alleviating poverty. Services for cataract, therefore, contribute directly to the achievement of the MDGs as well as improving quality of life.¹⁸⁻²¹

- Despite technical advances in the management of cataract, the volume of cataract surgery in low and middle income countries is usually inadequate to control cataract blindness. For example, the cataract surgical rate is less than 500/million/year in many of the countries in sub-Saharan African as compared with a cataract surgical rate of 7,000/million population in most industrialized countries.²²⁻²³ The low output is due to a combination of factors including weak health systems, insufficient community awareness and participation, poverty, and poor infrastructure and primary health care.

Control of cataract through the provision of high quality services which are scalable, adaptable, cost effective and responsive to the population remains a priority.

Services for cataract have the following steps: case detection and referral, examination with management decisions, pre-operative assessment and counseling, quality surgery, and good post operative care. Proper implementation of all these steps minimizes the risk of poor visual outcome for the patients and harm to the reputation of the service provider. Good visual outcome as defined by WHO standards and customer satisfaction are the key factors to achieve improvement in quality of life and both should be considered in developing services for cataract.

The aims of modern cataract surgery include:

- Restoration of vision to meet the patient's needs
- Achievement of the desired refractive outcome
- Improvement in quality of life
- Ensuring patient safety and satisfaction

Aim of the guidelines

The aim of these guidelines is to identify good clinical practice, set standards of patient care and safety and provide a benchmark for outcomes within which high quality cataract surgery can be practiced.

2. Cataract Care

2.1. Clinical responsibility

Management of cataract is a multi-professional approach, which involves inputs from ophthalmologists, optometrists, ophthalmic assistants, nurses and technicians. The ultimate responsibility for diagnosis and management of the patient lies with the ophthalmologist in charge. The decision on whether to proceed to surgery should be made by the patient in discussion with an ophthalmologist. Cataract surgery should be performed by an ophthalmic surgeon although much of the process may be undertaken by the non-medical members of the team provided that they have received adequate training and are supervised.

2.2. Referral

Referral for cataract surgery may be made by adequately trained eye workers, ophthalmic assistants, optometrists or general practitioners, or may be diagnosed by ophthalmologists during regular eye examination.

Whatever method of referral is used there are important underlying principles:

- Patient should have sufficient cataract to account for the visual symptoms
- cataract should affect the patient's lifestyle
- risks and benefits of surgery should be discussed with the patient
- patient should wish to undergo cataract surgery
- This information along with a recent sight test should form the minimum data.

Other indications for cataract surgery include facilitating treatment and / or monitoring posterior segment disease e.g. diabetic retinopathy, correcting anisometropia or treating lens induced ocular disease.

2.3. Only-eye surgery

Indications for cataract surgery in one-eyed patients are the same as for two-eyed patients, but it is the responsibility of the ophthalmologist to explain the possibility of total blindness if severe complications occur. An experienced cataract surgeon should perform a one-eyed patient's cataract operation.

2.4. Second eye cataract surgery

Cataract surgery on second eye has resulted in significant improvement in visual function, daily activities of living and quality of life beyond those achieved after surgery on the first eye. Improvement in visual symptoms after surgery on second eye has been shown in various studies. The benefits of surgery which are recognized clinically and its value should be considered in the management of cataract on second eye.²⁴⁻²⁶

2.5. Out-patient Appointment/Assessment

The purpose of the out-patient appointment/Assessment is to:

- confirm the diagnosis of visually significant cataract
- ensure the cataract is the cause of the visual symptoms
- determine if there is co-existing ocular pathology
- ensure the patient wishes to undergo surgery and understands the risks and benefits of surgery
- choose the type and power of the intraocular lens

2.6. Diagnosis and Evaluation of visual impairment

- A detailed visual history should be taken, in particular establishing near and distance vision and past history of eye disease, binocular function and amblyopia.
- A full medical history should be taken which should include
 - General health evaluation (Diabetes, Hypertension, Cardiac, Asthmatics, other systemic problems)
 - Note of current medication with particular emphasis on drugs that may increase the risk of surgery (eg Tamsulosin, other alpha-antagonists and anticoagulants)²⁷⁻²⁹
 - Record of allergies
 - Assessment of patient's ability to co-operate with the procedure and lie reasonably flat during surgery

2.7. Ophthalmic Examination

2.7.1. A complete ophthalmic examination

It should include:

- Measurement of visual acuity with an updated refraction
- Pupil examination
- External eye examination including lids and lashes.
- Measurement of intraocular pressure, syringing of lacrimal apparatus (optional)
- Full slit lamp examination
- Dilated examination of the cataract and fundus
- Biometry (To keep in mind for Long and Short eyes)

2.7.2. Special investigations

If the view of the fundus is obscured, useful information is gained from a careful examination of the pupil responses, the assessment of light perception or using entoptic tests (Purkinje effect). B-scan ultrasonography will establish that the retina is attached and identify any intraocular masses..

2.7.3. Following history taking and examination:

- Discussion should take place with the patient about
 - Risks and benefits of cataract surgery including any risks specific to them
 - Preferred refractive aim and the need for refractive balance between the two eyes
 - Type of anesthesia
 - Opportunity for patients to ask questions
- If the patient wishes to proceed to surgery the patient should be given a date for surgery

2.7.4. The surgeon should formulate a surgical plan including:

- Type of anesthesia
- IOL type and power (order special lenses if required)
- Incision placement and astigmatism reduction procedures if appropriate
- Stratification of surgical risk based on the expected complexity of surgery e.g. small pupil, pseudoexfoliation, previous eye surgery.

These features will allow the risk of the operation to be determined and the level of surgical experience required.

The vast majority of patients are suitable for day surgery under local anesthesia and this is the accepted model of care.

2.7.5. Routine Investigations

For all cases:

Blood Pressure
Blood Sugar

Additional Investigations for general anesthesia cases

Blood Count, HB%
ECG for adults, Chest X-ray
Evaluation by anesthetist

2.7.6. Physician Consultation

Physician opinion/clearance is required under following circumstances

- Uncontrolled diabetes and hypertension
- Cardiac problems
- Systemic problems, if any

2.7.7. Decision making in patients with certain systemic diseases

2.7.7.1. Diabetes³⁰

- Criteria for surgery
 - Random blood sugar < 200 mg/dl
 - Fasting blood sugar < 126 mg/dl

2.7.7.2. Hypertension³¹

- Criteria for surgery
 - Uncomplicated Hypertension < 140/90 mm Hg

2.7.7.3. Cardiac cases

- Criteria for surgery
 - Physician clearance essential

2.7.7.4. Asthmatics

- Criteria for surgery
 - Asthma should be controlled with drugs
 - Medicines should be continued during hospital stay

2.7.7.5. Septic foci

- Antibiotics³²
 - Topical antibiotic 4 times a day

- Anti-anxiety³³ (Optional)
Alprazolam (0.5mg/1mg) or Diazepam 5mg previous night
- Acetazolamide³⁴ (Optional)
500mg previous night and/or 2 – 3 hrs before surgery

2.8. Patients cleanliness

- Head bath previous day
- Clean clothes to be worn
- Avoid using vermilion, ash etc; to the forehead

3. The Per-operative Protocol

The peri-operative period / per-operative period is the time period describing the duration of a patient's surgical procedure. Peri-operative generally refers to the three phases of surgery: pre-operative, intra-operative, and post-operative. The goal of peri-operative care is to provide better conditions for patients before operation, during operation, and after operation.

Period covered in this protocol:

Dispatch from in-patient ward to the OT (Operation Theatre) table.

The main tasks to be performed after the patient come from the ward to the OT before transferring him to the operating table are as follows: -

3.1. Identification of the patient

3.2. Anaesthesia

3.3. Sterilization – Instruments and Operation Theater / surgeon and assistant scrubbing

3.4. CPR Trolley, Basic life support and Emergency drugs

3.5. Miscellaneous

- a. Fire Extinguisher
- b. Non ambulatory patients
- c. Air condition
- d. Stock keeping, Storage and Security

3.1. Identification of the patient

Prior to the block, following are checked for the accurate identification of the patient and the intended surgical procedure. Accurate identification of the patient is essential and safety checklist must be there to avoid: “Never Ever Events (NEE)” which are: -

- a. Wrong patient (same / similar names)
- b. Wrong eye
- c. Wrong procedure (also includes wrong lens implant)

Recommended check list for accurate identification and prevent NEE:

- a. Surgeons, anesthetists, nurses and allied health personnel must be aware of such risks.
- b. “TIME OUT”: Safety steps prior to giving anaesthesia
 - a. Identify patient (Patient name, address, birth date, operative eye). Check the medical registration number as two persons from the same place may have the same name.
 - b. Mark correct eye as long as patient is alert not on patient’s request but what is planned and written by the ophthalmologist in the OPD Card
 - c. Confirm site after surgical marking
 - d. Confirm procedure and correct lens power. The patient from the ward first comes to the anaesthesia / block room.

TIME OUT is to be repeated before starting surgery as well.

3.2. Anaesthesia

Almost all routine cataract surgery on adults can be performed under local anaesthesia. However very rarely GA (General Anaesthesia) is necessary. Most patients presenting for cataract surgery are elderly and have pre-existing medical problems. A local anaesthetic will usually be associated with lower morbidity and it causes least disruption to daily routine.

The goal of LA (Local Anaesthesia) for intraocular surgery is to:

- a. Provide pain-free surgery
- b. Minimize the risk of systemic complications
- c. Facilitate the surgical procedure
- d. Reduce the risk of surgical complications

3.2.1. General anaesthesia (GA)

Indications

- Decline to have LA even after careful counseling and an explanation of the risks involved.
- Confused patients who are unable to comply with instructions, or unable to communicate and whose safety might be compromised
- Marked uncontrolled tremor
- Medical condition severe enough to limit acceptable positioning
- Pediatric cataract surgery
- Previously experienced a severe reaction, allergy or other complication to local anaesthesia

3.2.2. Local anaesthetic techniques

Local anaesthesia for cataract surgery is administered either by injection or topical application to the conjunctiva. There are many techniques of local anaesthesia and practice varies widely throughout the world and within the Nepal. The following techniques are used:

- a. Topical anaesthesia, alone or in conjunction with preservative-free intracameral local anaesthetic
- b. Peribulbar anaesthesia

Peribulbar anaesthesia is the choice of anaesthesia. But it also depends on the type of surgery, competence level of surgeon and the willingness of the patient. So it is decided after mutual understanding after the informed consent.

3.3. Sterilization

3.3.1. OT Sterilization

When starting OT for the first time, at least three fumigations are to be done & preferably three negative cultures of OT are to be ensured.

Fumigation by formaldehyde is the usual practice. It is obsolete in view of toxic nature of Formalin. Too frequent use and inhalation is hazardous. Several new safe chemicals are available eg Ballicoid Rasant. It is recommended to use Bacillocid rasant instead of the usual formaldehyde.³⁵⁻³⁹ It is an effective compound with very good cost benefit ratio, good material compatibility, and excellent cleaning properties and has no residues. It has the advantage of being a formaldehyde free disinfectant cleaner with low use concentration. Its active ingredients

are Glutaraldehyde 100mg/g, benzylC12-18- alkyldimethylammonium chlorides 60mg/g, didecyldimethylammonium chloride 60mg/g.

3.3.2. Microbiological monitoring of OT³⁹

- Swab from the main OT and corridor once every three months
- Quality of air – blood agar and SDA near OT table and kept for 30 min every three months
- Blood Agar incubated at 37°C for 48 hours and SDA incubated at 27°C for seven days
- Bacterial colony count of > 10 per plate and fungal colony of > 1 per plate is unacceptable.

3.3.3. Sterility of Instruments

Autoclave should be done for all available instruments in contact with eye, in the start of the cases and in between cases.

Monitoring of sterilization: chemical indicators - Three indicators, one on the outside wrap second on inside wrap, third inside the tray.³⁹

For tubings, plastic instruments and sharp instruments ethylene oxide (EtO) sterilizer may be used.

3.4. Cardiopulmonary Resuscitation Trolley (CPR)

A trolley with AMBU bag, laryngoscope, endotracheal tube of different sizes, oxygen cylinder, and other necessary instruments and essential medicines recommended by anesthesiologist should be always available in the theater.

All OT staffs including non clinical staff should be familiar of its place of storage and when asked in emergency, should be able to identify and give to doctors or other person doing resuscitation. Periodic check of the battery and bulb of the laryngoscope and expiry dates of the emergency medicines should be done.

3.5. Miscellaneous

3.5.1. Fire Extinguisher

The OT staff must be well versed in the use of fire extinguisher.

3.5.2. Non-ambulatory patients

The OT must have wheel chairs or transporting bed to take care of non ambulatory patients.

3.5.3. Air Condition maintenance

Air Condition maintenance and cleaning filters every week; servicing and cleaning every month.

3.5.4. Stock keeping, Storage and Security

Good stock keeping for maintaining essential supplies – when there may be long delays between ordering supplies and their arrival.

There has to be a system of monitoring stores and the rate at which consumables are used with strict system of stock keeping.

Equipment and supplies should be stored in a dry and safe place.

4. Complication of Local Anaesthesia and their management

4.1. Retrobulbar Hemorrhage: (RBH)

RBH is characterized by a sudden rise of IOP and usually requires postponing the surgery.

Medical Treatment:

The carbonic anhydrase inhibitor-Oral 500 mg Acetazolamide stat, then 250 mg q.i.d acetazolamide).

The hyper-osmotic agent, mannitol 20%, is administered as a rapid intravenous infusion of 1.5 - 2 g / kg over 30 min, with the first 12.5 g over the first 3 min.

Oxygen therapy (95% O₂, 5% CO₂) may decrease the ischemic insult by dilating intraocular vessels.

Intravenous methylprednisolone, 100 mg, may decrease inflammation and edema and provide some neuroprotection to the optic nerve by stabilizing cell membranes.

Topical β -blockers decrease intraocular pressure by lowering aqueous humor secretion.

- Surgical Treatment
 - The primary surgical treatment is to relieve orbital compression. This can often be achieved via a lateral canthotomy and inferior cantholysis.

4.2. Penetration or perforation of the globe:

This is more likely to occur in myopic eyes, which are longer but also thinner than normal.

A diagnosis of perforation may be made if there is pain at the time the block is performed, sudden loss of vision, hypotonia, a poor red reflex or vitreous haemorrhage.

Perforation may be avoided by carefully inserting the needle tangentially and by not going "up and in" until the needle tip is clearly past the equator of the globe.

4.3. Oculocardiac reflex

It is the bradycardia, which may follow traction on the extra ocular muscle of eye.

An effective local block ablates the oculocardiac reflex by providing afferent block of the reflex pathway however the institution of the block and especially rapid distension of the tissues by the solution or by haemorrhage might occasionally provoke it.

Careful monitoring is essential for early detection.

Removal of the inciting stimulus immediately.

The surgeon, or practitioner, working on the eye should be asked to cease their activity and release the applied pressure or traction on the eyeball.

This often results in the restoration of normal sinus rhythm of the heart.

If not, the use of an antimuscarinic acetylcholine antagonist, eg. atropine, is used and the surgical procedure can be continued.

In extreme cases, such as the development of asystole, cardiopulmonary resuscitation may be required.

4.4. Penetration of Optic Nerve Sheath

To avoid this complication, give the block while patient eye is in primary position.

The signs and symptoms include disorientation, amaurosis fugax, aphasia, hemiplegia, unconsciousness, convulsions, and respiratory or cardiac arrest a few minutes after the injection.

This situation requires prompt recognition and treatment (including airway control, respiratory support and early referral for cardiac intervention).

Topical anaesthesia

4% lignocaine is used as the topical anaesthesia. It is used one drop three times at an interval of 5 minutes.

5. Operation Room protocol

5.1. Follow Check List all cases before start the surgery ⁴⁰

- Eye clean with 5% Povidone solution on the OT table.
- Sterile drape to be used in all cases.
- BSS/RL by central store to be used as infusion fluid.
- Irrigation fluid should not be stored in the open cups. It has to be loaded straight into syringes from BSS/RL bottles/pouches.
- Viscoelastic material to be used in all cases.
- Antibiotic to be applied at the end of surgery.

5.2. Operation Room Table Procedure⁴¹

Ensure that the patient is comfortable on the table.

- Head and body properly aligned.
- Surgical area is cleaned with Povidone iodine.
- Draping is done with sterile drapes.
- Ample amount of air supply.
- Clean Operation table for next patient
- Change gloves each case preferably
- Intra cameral Cefuroxime 0.1ml, Subconjunctival injection Dexamethasone-Gentamycin
- Apply eye shield and bandaging
- Transfer patient

5.3. OR List should be prepared

5.4. Scrubbing

Wash hands with soap and water

Use antiseptic solution Betadine 7.5%

To wash hands with brush⁴²

Start from Palm to palm→Left dorsum over right palm and vice versa→Palm to palm with fingers→rotational rubbing on the thumb of wrist right and left hand.

5.5. Operation Room (OR)

OR room is divided into four zones⁴³

Outer zone: acts a reception area is accessible to all.

- * Clean zone: changing room and is accessible only for OR staffs (transfer zone)
- * Aseptic zone: sterile area and includes the space for scrub and gowning, preparation and the operating area.
- * Disposal zone: the used linen is kept before sending to the laundry.

5.6. Miscellaneous

Slippers for toilet use and OR are kept separate.

Dress code is maintained

5.7. Cleaning and Decontamination⁴¹

OR

Equipment

Linen

Personnel

Corridor

Environment

5.7.1. Cleaning Schedule

OR daily with

- Block room 2 times (Morning and Afternoon)
- Changing room 2 times (Morning and Afternoon)
- Doctors room 2 times (Morning and Afternoon)
- Scrub area 5 times

5.7.2. Microscopes, Sink and Drain

1. Lens clean with lens paper
2. Fans, light, clocks, inside the OR is wiped once a week
3. AC filter is cleaned once a week

5.7.3. Bio-Medical Waste Management

Buckets with colour coding⁴⁴

1. Transparent colour: Sharps instruments like : Needles, Cannula, Broken ampule etc
2. Yellow colour: Cotton, Gauze, Wastes, Soiled etc
3. Green colour : Wrappers, Drapers, Caps, Masks, Eye drape etc
4. Orange colour : Gloves, Rubber, Plastic, Drip set

5.7.4. Clean Instruments⁴⁵

1. Bowl cleaning technique.
2. The tooth brush is changed once a week.

5.8. Treat with caution in difficult situations

1. One eye patient
2. High risk patient
3. Children
4. Young patient
5. Poor prognosis patient and

6. Complicated cases

Combined procedures are operated by experienced surgeon as chances of intra and post operative complications can lead to dissatisfaction among these patients.

Patients requiring special attention as mentioned above should be specially marked and should not be the first or last cases of the day.

5.9. Basic Rules to Remember

- Case records are checked at every stage to avoid any mix up.
- Always mark the site with marker, pen, and sticker/tape.
- Needles must be disposed after single use.
- Surgical instruments are sterilized after each use.

5.9.1. Instructions for Observing the Surgery

1. Hands are kept behind the back.
2. Sterile field is not touched or crossed.
3. Leaning over the sterile field is avoided.
4. Crossing foot clearance from sterile area is strictly observed.
5. Excessive coughing/ sneezing inside the OR is avoided.
6. Any casual observers /VIPs inside the OR are not allowed.
7. Woolen wear of any kind is not allow inside the OR as it attacks and harbors dust and microorganism.

5.9.2. Contraindication for Surgery⁴⁶

1. The patient does not desire surgery
2. Glasses or other visual aids provide functional vision satisfactory to the patient
3. The patient's quality of the life is not compromised
4. The patient is medically unfit
5. The patient has concomitant disease where functional improvement is unlikely

5.9.3. Second Eye Surgery⁴⁰

- Never operate both eyes at the same time.

- Operate on the other eye at least after a week.

6. Management of complications:

**Planned Extra Capsular Cataract Extraction (ECCE) /
Small Incision Cataract Surgery with Intra Ocular Lens (IOL) / without IOL /
Phacoemulsification**

6.1. Lid Oedema / Chemosis

On the first postoperative day, it can be managed with NSAID. One has to look for signs of infection if there is associated severe pain and severe discharge.⁴⁷

6.2. Wound gaping, Iris Prolapse, Broken sutures:

These cases require re-suturing with Iris Prolapse reposition. . Explain the condition, to the patient and about the second procedure⁴⁸

6.3. Cornea

a) Superficial Keratitis / Descemet's Membrane (DM) Folds & Oedema:

Observation, frequent Steroid Drops, Antiglaucoma topical drops or oral acetazolamide, if needed (Clinical judgement)

b) DM Detachment:

Air Injection into Anterior Chamber with reposition of DM

c) Epithelial Defect:

Antibiotic Ointment and Bandage. Review the next day.⁴⁹

6.4. Anterior Chamber (AC)

a) Shallow AC:

Look for integrity of the wound, intra ocular pressure and treat accordingly.

Examine Fundus- If it is due to Choroidal detachment, treat with systemic steroids. Drainage can be planned if needed, after 5 days.

b) Hyphema:

Give bed rest, topical steroids, dilatation of pupil and Diamox. Plan for AC wash if required, depending on the amount and type of Hyphaema.

c) Loose cortex:

Irrigation and aspiration of the cortical material should be done under the following circumstances.

- If there is a piece of nucleus or epinucleus left behind
- If there is cortex behind the IOL
- If there is a piece of cortex in AC ^{50,51,52}

d) Hypopyon:

Clinical judgement as to whether it is inflammatory or infection is the first step. If inflammatory start on intensive steroid treatment along with cycloplegic⁵³

6.5. Endophthalmitis

Acute Endophthalmitis: Increasing pain with deteriorating vision associated with Fibrin, Hypopyon and reduced fundal glow within few days after surgery.

Sub acute Endophthalmitis: Insidious onset of pain, reduced vision, anterior chamber & vitreous inflammation within weeks to months after surgery.

6.5.1. AC/Vitreous taps for Grams, Giemsa, KOH, and Calcofluor stain (as per facility & need).

6.5.2. Inoculation of AC/ Vitreous taps in Blood agar, BHI broths, SDA.

6.5.3. Intravitreal Ceftazidime / Cefazolin (2.25 mg/0.1ml), Vancomycin (1mg/0.1mi) / Amikacin (0.4mg/0.1ml), Dexamethasone (0.4mg) or Triamcinolone. If pseudomonas is isolated or suspected intravitreal Amikacin may be injected.

Inj. intravitreal to be repeated after 48 hrs, if there has been no clinical improvement)

Tablet Moxifloxacin 400 mg orally once daily for 10 days.

Or

Tablet Ciprofloxacin 500 mg BD to be given for 7 days

In culture negative cases Clathromycin 500mg BD can be given.

Oral steroid may be considered in selected cases.

Pre operative culture report should be reviewed.

Fresh culture and sensitivity from conjunctiva can be taken, as very often the infecting organisms have been cultured from the conjunctiva.

Recheck the patency of the Lacrimal duct and Diabetic status.^{52,53}

6.5.4. In Sub-acute cases intra-vitreous steroid may be withheld till fungal etiology is excluded.

6.5.5. Therapeutic Vitrectomy to be decided if there is no response to topical & intra-vitreous injection and in patients presenting with vision less than hand movement or perception of light and if there is presence of residual vitreous debris.

6.5.6. If there is no facility, need for immediate referral to appropriate centre after vitreous tap & intravitreal antibiotics as above. Benefit of vitrectomy after six weeks is not known.

6.6. Iris:

Iritis: Mild / Moderate / Severe and fibrin membrane

If no infection, if only inflammation start steroids good dilation, S/C steroids and systemic steroids whenever indicated.⁵³

6.7. Pupil:

Peaking of the pupil is commonly due to incarceration of anterior capsular flap or vitreous in the wound or due to sphincter tear. Rarely it is due to haptic in AC or iris incarceration in the wound.⁵³

6.8. IOL position:

Look for centration, subluxation, and dislocation.
Haptic in AC: Repositioning at the earliest.⁵³

6.9. Posterior capsular rent:

The rent could be associated with vitreous disturbance or without vitreous disturbance.
Management - If vitreous present in the wound, vitrectomy should be done. All the vitreous should be removed from the wound. Continue steroids for a longer time along with NSAID.⁴⁹

6.10. Leucocoria or Poor vision with normal anterior segment

This needs detail posterior segment examination and in cases of poor visibility, B Scan Ultrasonography should be done.⁵³

6.11. Nucleus Drop / IOL Drop:

It requires immediate intervention by vitreo-retinal surgeon.
If the facility is not available then refer the case immediately. Start Tablet Acetazolamide and Tablet prednisolone and then refer.⁴⁷

7. Timing of re-surgeries:

7.1. Cases which have to be taken immediately:

- a) Haptic in AC
- b) Iris prolapse
- c) Broken sutures
- d) Wound gaping

7.2. Decentration (Clinical judgment to be used).⁵²⁻⁵³

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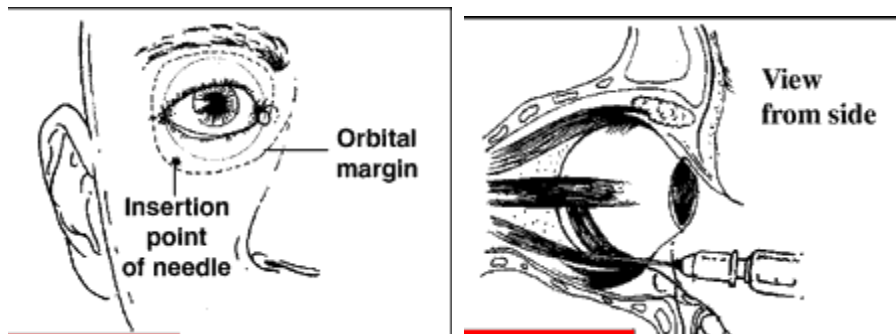
ANNEX 1: Peribulbar Anaesthesia

Preparations

A 5ml syringe is prepared containing 5ml lignocaine 2% with 1:200,000 adrenaline. Hyaluronidase 750 IU units is added.

A 22 gauge, 2.5 cm disposable needle is attached to the syringe.

The patient lies supine and is asked to look directly ahead focusing on a fixed point on the ceiling, so that the eyes are in the neutral position.



Procedure

It is given by the trained ophthalmic assistant under ophthalmologist's supervision.

Insertion point of needle is $1/3^{\text{rd}}$ from lateral canthus and $2/3^{\text{rd}}$ from medial canthus.

The needle is advanced in the sagittal plane, parallel to the orbital floor passing under the globe. There is no need to apply pressure to the syringe, as it will easily advance without resistance.

When the needle tip is judged to be past the equator of the globe the direction is changed to point slightly medial (20°) and cephalad (10° upwards) to avoid the bony orbital margin.

Advance the needle until the hub (which is at 2.5 cm) is at the same depth as the iris. Following negative aspiration 5 ml of the solution is slowly injected.

There should not be any resistance while injecting. If resistance is encountered, the tip of the needle may be in one of the extraocular muscles and should be repositioned.

During the injection the lower lid may fill with the anaesthetic mixture and there may be some conjunctival oedema.

ANNEX 2: BASIC CARDIAC LIFE SUPPORT

It is essential that all the staffs, along with non-medical working in the OT should be given training on basic cardiac life support before they are posted to the theater. Continuous Medical Education on basic cardiac life support should be organized at least once in a year. All staff working in the theater should have well orientation of the availability of the oxygen gas cylinder, the tools to use it, suction machine, tray of emergency medicines and other theater safety guidelines.

Cardiopulmonary Resuscitation (CPR)

- An emergency procedure which is performed in an effort to manually preserve intact brain function until further measures are taken to restore spontaneous blood circulation and breathing in a person in cardiac arrest.
- It is indicated in those who are unresponsive with no breathing or abnormal breathing,

How to Perform CPR

- Attempt to wake victim.
- Begin chest compressions. If the victim is not breathing, place the heel of your hand in the middle of his chest. Put your other hand on top of the first with your fingers interlaced. Compress the chest at least 2 inches (4-5 cm). Allow the chest to completely recoil before the next compression. Compress the chest at a rate of at least 100 pushes per minute. Perform 30 compressions at this rate (should take you about 18 seconds).
- Begin rescue breathing. After 30 compressions, open the victim's airway using the head-tilt, chin-lift method. Pinch the victim's nose and make a seal over the victim's mouth with yours. Use a CPR mask if available.
- Repeat chest compressions. Do 30 more chest compressions just like you did the first time.
- Repeat rescue breaths. Give 2 more breaths just like.

If responsive:
Observe
Get help if necessary

If breathing normally:
Place in recovery position
Get help. Recheck breathing



If signs of a circulation:
Continue rescue breathing
Recheck for signs of a circulation every minute.



Check responsiveness



If not responsive:
Shout for help

Open airway Check breathing



If not breathing normally
Get help

Give two effective breaths



Check for signs of a circulation



If no signs of a circulation or uncertain

Compress chest



Continue CPR

Shake gently
Shout loudly

Tilt head back and lift chin
Look, listen and feel for normal breathing
Take no more than 10 seconds

If possible, get someone else to call or go for help

Seal lips around mouth
Blow slowly until chest rises
Give next breath when chest falls

Check for normal breathing, coughing or movement
Check for a pulse if trained to do so
Take no more than 10 seconds

Give 15 chest compressions
Place heel of hand on lower half of breastbone, and other hand on top
Compress 4-5 cm at a rate of 100/min

Give 2 breaths after every 15 compressions

Continue until qualified help arrives

ANNEX 3: ICO Guidelines



Cataract (Initial and Follow-up Evaluation)

(Ratings: A: Most important, B: Moderately important, C: Relevant but not critical

Strength of Evidence: I: Strong, II: Substantial but lacks some of I, III: consensus of expert opinion in absence of evidence for I & II)

Initial Exam History

- Symptoms **(A:II)**
- Ocular history **(A:III)**
- Systemic history **(A:III)**
- Assessment of visual functional status **(A:II)**

Initial Physical Exam

- Visual acuity, with current correction **(A:III)**
- Measurement of BCVA (with refraction when indicated) **(A:III)**
- Ocular alignment and motility **(A:III)**
- Pupil reactivity and function **(A:III)**
- Measurement of IOP **(A:III)**
- External examination **(A:III)**
- Slit-lamp biomicroscopy **(A:III)**
- Evaluation of the fundus (through a dilated pupil) **(A:III)**
- Assessment of relevant aspects of general and mental health **(B:III)**

Care Management

- Treatment is indicated when visual function no longer meets the patient's needs and cataract surgery provides a reasonable likelihood of improvement. **(A:II)**
- Cataract removal is also indicated when there is evidence of lens-induced diseases or when it is necessary to visualize the fundus in an eye that has the potential for sight. **(A:III)**
- Surgery should not be performed under the following circumstances: **(A:III)** glasses or visual aids provide vision that meets the patient's needs', surgery will not improve visual

function; the patient cannot safely undergo surgery because of coexisting medical or ocular conditions; appropriate postoperative care cannot be obtained.

- Indications for second eye surgery are the same as for the first eye. **(A:II)** (with consideration given to the needs for binocular function)

Preoperative Care

Ophthalmologist who is to perform the surgery has the following responsibilities

Examine the patient preoperatively **(A:III)**

- Ensure that the evaluation accurately documents symptoms, findings and indications for treatment **(A:III)**
- Inform the patient about the risks, benefits and expected outcomes of surgery **(A:III)**
- Formulate surgical plan, including selection of an IOL **(A:III)**
- Review results of presurgical and diagnostic evaluations with the patient **(A:III)**
- Formulate postoperative plans and inform patient of arrangements **(A:III)**

Follow-up Evaluation

- High-risk patients should be seen within 24 hours of surgery. **(A:III)**
- Routine patients should be seen within 48 hours of surgery. **(A:III)**
- Frequency and timing of subsequent visits depend on refraction, visual function, and medical condition of the eye.
- More frequent follow-up usually necessary for high risk patients.
- Components of each postoperative exam should include:
 - Interval history, including new symptoms and use of postoperative medications **(A:III)**
 - Patient's assessment of visual functional status **(A:III)**
 - Assessment of visual function (visual acuity, pinhole testing) **(A:III)**
 - Measurement of IOP **(A:III)**
 - Slit-lamp biomicroscopy **(A:III)**

Nd:YAG Laser Capsulotomy

- Treatment is indicated when vision impaired by posterior capsular opacification does not meet the patient's functional needs or when it critically interferes with visualization of the fundus. **(A:III)**
- Educate about the symptoms of posterior vitreous detachment, retinal tears and detachment and need for immediate examination if these symptoms are noticed. **(A:III)**

Patient Education

- For patients who are functionally monocular, discuss special benefits and risks of surgery, including the risk of blindness. **(A:III)**

* Adapted from the American Academy of Ophthalmology Summary Benchmarks, November 2010 (www.aao.org)

ANNEX 4: Web references

<http://www.aios.org/guidelinesendoph.pdf>

<http://www.acadmed.org.my/>

<http://www.icoph.org>