Guidelines for the Management of Cataract in India

A VISION 2020: The Right to Sight INDIA Publication

Developed by

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Conceived and developed with support from

Sightsavers

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Foreword

National Programme for Control of Blindness (NPCB) which was launched in the year 1976 as a 100% centrally sponsored scheme with the goal of reducing the prevalence of blindness to 0.3% by 2020 has made remarkable progress ever since with the prevalence of blindness coming down to 1% (2006-07). However, cataract still remains the largest cause of visual impairment and avoidable blindness (62.6%). India performs around 60 lakhs cataract operations a year and the focus today is on quality surgery with maximum post surgical visual gain. To substantially reduce the national backlog of cataract without compromising on quality, it is imperative to stick to certain minimum quality standards.

With this view in mind, a comprehensive cataract surgery manual has been developed by the collaborative efforts of Public Private Partnership along with VISION 2020: The Right to Sight India.

I would like to encourage the decision makers, managers and most importantly ophthalmologists, ophthalmic personnel, paramedics and all the other persons involved in ophthalmic surgical services to make use of this valuable tool in reducing the burden of cataract blindness.

Let us all join hands in our endeavour to set India free from avoidable blindness.

(Dr. N.K. Agarwal)

Gullapalli N Rao, MD
Chairman

September 27, 2011

Thank you for asking me to write a foreword for the manual on "Cataract Surgery" developed by "VISION 2020: The Right to Sight – India".

As cataract continues to be the predominant cause of blindness globally, any effort to enhance the quality of cataract surgery and improve the outcomes is laudable. I am delighted that this is accomplished in a comprehensive manner in this manual. While individual approaches on certain issues may vary, this manual certainly fills a void for many ophthalmologists.

I convey my compliments to the entire team on this great effort.

Warmest regards

GULLAPALLI N RAO

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Awarded Padma Shri by the President of India

President

All India Ophthalmological society

Ensuring quality has become integral to the efforts at taking care of the immense burden of blindness is India. Vision 2020: The Right to Sight, India has been at the forefront of efforts at prevention of blindness activities in the country. It is, therefore, heartening to see the manual on cataract surgery being brought out by the organization.

The manual deals with all the protocols necessary for preoperative assessment, intra operative procedures and post operative care for cataract surgery. The manual also deals with the protocols for sterilization and care of instruments and other material required for cataract surgery. A complete section gives the check lists needed at various stages. The thoroughness of the manual in all the aspects shows the amount of hard work that has gone into producing the manual. The aspects of monitoring and surveillance of sterilization procedures and protocols for investigations and management of outbreaks of infection have also received attention.

I am sure this manual will prove to be a major help to those carrying out the important task of taking care of cataract blindness, often in extremely trying circumstances and at great personal sacrifice. I would recommended this manual to all those involved in the care of patients with cataract.

I wish this manual all success in achieving its objective.

Dr. A.K. Grover

Past President

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Acknowledgments

The development of these guidelines was initiated by Sightsavers and is the culmination of consultations with partners, experts and Sightsavers staff to look at best practices for the management of cataract.

It would not have been possible to develop it without the support and generous time provided by several individuals. We are very thankful to Dr Uday Gajiwala of SEWA Rural and Ms Tanuja Joshi of Venu Eye Institute and Research Centre for developing this document with their teams. Their wisdom and knowledge have contributed to a learning that has tremendous implications on the scope and quality of cataract services.

We are grateful to Dr R Ravindran, Chairman of Aravind Eye Care System, Dr Taraprasad Das, Director of LV Prasad Eye Institute Bhubaneshwar and Dr Sara Varughese, Programme Manager (Disability & Rehabilitation) of World Health Organization for their technical expertise in reviewing and finalizing this document.

We appreciate the leadership and encouragement of Ms Sujaya Krishnan, Joint Secretary and Dr NK Agarwal, Deputy Director General (Ophthalmology), Ministry of Health and Family Welfare, Government of India in our efforts to eradicate avoidable blindness from India.

We very much value the participation of various hospitals in India, many of them VISION 2020 India members, in developing these guidelines, and are thankful to them for their generosity in sharing their experiences and learning.

We appreciate the valuable inputs from Sightsavers, especially Ms Elizabeth Kurian, Regional Director India and Mr Pankaj Vishwakarma, Head of Programme Development in the conceptualization and development of this document that is a useful reference guide for the management of cataract.

Dr. Col. M. Deshpande VSM
President
VISION 2020: The Right to Sight India

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Standardization

Every organization strives for value and volume growth. These are primarily driven by better quality of services and products, higher volumes of satisfied clients and sales. Safety and sustainability play a major role in creating higher value and volume. These goals can be achieved by standardization of all processes and procedures.

How does standardization help?

It helps through six important factors; namely, 1. Enhanced efficiency, 2. Reduced complications, 3. Improved monitoring, 4. Cost effectiveness, 5. Replication, and 6. Costing and budgeting

Standardization enhances efficiency.

As all members of a team are trained and aware of standard protocols, they are able to identify deviations as soon as they occur, and rectify the same. In absence of a team leader, the team can continue to work efficiently by adhering to the standard protocols. Further any and all members of the team can participate in the training and orientation of newcomers.

Standardization helps monitoring.

Regular monitoring of results helps quality enhancement, as early detection of complications and their causes can help in timely and relevant interventions.

Standardization helps reducing complications.

On most occasions, complications occur due to deviations from protocols. When protocols and procedures are standardized and implemented, even minor deviations can be identified and steps for rectification introduced. Timely identification and immediate management of complications can help in reducing morbidity.

Standardization increases cost effectiveness.

Institution of standard procedures leads to adoption of standard instruments, equipment and consumables. This way, not only the inventory can be controlled more efficiently but even bulk purchases of these items and spares can be done at specially negotiated competitive rates, thereby helping in cost containment.

Standardization helps replication.

Once the procedures and protocols have been standardized, they can be easily documented and effectively implemented. The major advantage is that they can then be applied and implemented anywhere- in the same organization at different locations or in an external organization doing similar work.

Standardization helps costing and budgeting.

Standardization of procedures and a controlled inventory helps in assessing the cost of services at various levels. This helps at the time of planning for new projects, as the costs and budgets can be worked out more effectively.

Limitations of standardization

Standardisation of procedures means that all persons working in the organization adhere to these, leaving no room for personal preferences or choices. Standardization of course leaves little room for innovation, hence standards and protocols should be periodically reviewed and upgraded when required.

What all can be standardized?

In a service oriented organization, the following can be standardized.

1. Documentation
2. Reporting
3. Monitoring/Audit
4. Instruments and equipments
    a. Inventory
    b. Purchase procedures and schedules
    c. Maintenance schedules
5. Consumables
6. Procedures and protocols
7. Training programs

Cataract Surgery Modules

1. Case selection for cataract surgery
2. Pre-operative protocol for assessment for cataract surgery
3. Pre-operative protocol for management of systemic disease
4. Biometry
5. Surgical protocol for cataract surgery
6. Post operative protocol for management of uncomplicated cases

1 Case Selection for Cataract Surgery

1.1 Criteria for surgery and timing of admission

Cataract is a common disorder of the elderly and is seen in more than 60% of the population above the age of 50 years. Hence it is prudent to have guidelines for uniform, standardized and evidence based care. For this purpose we have divided the patients into two groups; those with visual acuity of 6/60 or less and those who have visual acuity of 6/36 or better. The purpose of this protocol is to have uniformity amongst the staff in communicating with patients.

Uncorrected Snellen visual acuity 6/24 or less

Subjective. Patient is unable to carry out routine work or the desired activities. It is good to know his/ her perception of disability's impact on the life style.

Objective. This could be any patients with appropriate amount of cataract (nuclear sclerosis/ posterior sub capsular cataract / cortical cataract or a combination).

Guideline for Timing of Surgery

- Cataract surgery within a month- in cases of bilateral cataract and fellow eye vision > 6/60
- Cataract surgery within a week- in cases of bilateral cataract and fellow eye vision is < 6/60
- Cataract surgery immediately- affected eye vision is finger count is close to face (FCF) and cataract is advanced.

Uncorrected Snellen visual acuity 6/18 or better

It is recognized that some patients with visual acuity of 6/18 or better may still have significant functional visual disabilities that may benefit from cataract surgery. However, with this level of visual acuity the risks of surgery relative to the potential for improvement of vision are higher. In this instance the cataract surgery is justified and appropriate, when some of the subjective and objective criteria are met.

Subjective.

- When the ability to carry out essential or desired activity is impaired, based on the patient's own assessment of his visual disability.
- Patient's complaints of disabling glare

Objective .

- Central, posterior sub capsular cataract
- Cortical cataract extending into the pupillary area
- Nuclear sclerosis, associated with high lenticular myopia (> 3 diopters)
- Whenever there is a need for detailed evaluation of posterior segment by fundus fluoresce in angiography (FFA) or laser photocoagulation is indicated (as in diabetic maculopathy, PDR, AMD etc.)

However, it is preferable to have a thorough evaluation of the posterior pole to ensure that cataract is the cause for defective vision and if necessary one should obtain a second opinion in these cases.

Timing of surgery

Here the timing of admission should be left to the patient's choice, unless there is urgency in treating the posterior segment pathology.

- The patient should be educated about the benefits of cataract surgery and the expected reduction in disability outweighs the potential cost and inconvenience of the surgery.

1.2. Contraindications

- Surgery will not improve the vision by at least two lines nor is required for posterior segment evaluation or treatment.
- The patient is medically unfit
- The patient does not desire cataract surgery.

Summary

While it is true that cataract is only an aging process and today's technological advances enables safe surgery at any stage of cataract, both subjective and objective criteria should be considered before advising cataract surgery. Involvement of the patient and the family in decision making process helps immensely.

2 Preoperative Cataract Surgery Protocol

2.1 Standardized pre-operative assessment for cataract surgery

The purpose of the pre operative assessment is to

- Confirm the diagnosis of visually significant cataract
- Ensure that 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 understanding of specific risks, if any
- Assess systemic problems and manage it

2.1.1. Admission

Ideally, admission is done a day prior to the surgery for one-eyed and high-risk patients. Patients on day care can come two hours prior to surgery provided they have completed pre operative work up at least one day prior to surgery.

2.1.2. History

a. A large number of patients who require cataract surgery have concomitant chronic medical conditions that may affect the general condition, surgery or its outcome. Hence relevant history pertaining to the medical fitness of the patient to withstand the surgical stress, post-operative medication and general care should be recorded before surgery.
b. Any known drug allergy.

2.1.3. Examination

a. Visual acuity for both eyes, including projection of light for those with vision less than 3/60 with poor view of the fundus
b. Slit lamp examination for cataract grading, corneal details and fundus examination
c. Intraocular pressure (IOP) (If done using a contact procedure, should be done one day prior to surgery and not on the day of surgery)
d. Patency of lacrimal duct – including application of pressure over the sac region (ROPLAS) (If sac syringing is done, should be done one day prior to surgery)

e. All patients are preferably seen by the operating surgeon. If is not feasible, the surgeon must examine all one-eyed patients, all those with associated complications requiring deviation from regular surgical technique, and all those posted for re-surgery.
f. Slit lamp examination to look for conjunctival congestion, discharge, cornea, AC depth, lens opacity and phacodonesis.
g. Pupillary reaction to rule out posterior segment disorders
h. Posterior segment evaluation of both eyes, if the fundus can be visualized. Indirect ophthalmoscopy is advised to examine patients with advanced cataracts..
i. Refraction of both eyes to cross check IOL power. If there is any mistake in biometry, this will help

2.1.4. Pre - Operative counseling

a. Explain about anesthesia, surgical procedure, the level of pain they may experience during surgery specifically after draping the patient.
b. Explain possible conversion to routine ECCE/SICS with IOL in cases with small pupil, hard lens or advanced cataract who have opted for phacoemulsification.
c. Explain the post operative follow up and state the Do's and Don'ts in the immediate post operative period. Group counseling might be appropriate and it is necessary to encourage questions.

2.1.5. Investigations

a) Routine Investigations: For all cases

1. Blood pressure – 140 / 90 mm of hg
2. Blood sugar – Fasting - <140 mg/dl PP2BS - < 180 mg/dl.
3. Biometry
4. Syringing
5. Body weight

b) Additional investigations

1. ECG for adults (known cardiac patients, and those with history suggestive of cardiac ailments), very old people (>70 years)

c) Additional investigations: For GA cases

1. Blood Count, Hb%
2. ECG, chest x-ray for adults
3. Pre operative evaluation by anesthetist.

d) Conjunctival culture is required in the following cases

a) One- eyed patients
b) Prior Dacryocystectomy (DCT)
c) History of chronic infection eg. Blepharitis
d) Recently healed corneal ulcer

2.1.6 Surgical Plan

The doctor doing the pre operative assessment should also formulate a surgical plan including the following:

- Type of anaesthesia (Including need for stand by anesthetist)
- IOL type and power (order special lenses if required)
- Incision placement and astigmatism reduction procedures if appropriate
- Complexity of surgery e.g. small pupil, pseudoexfoliation, previous eye surgery etc.

2.1.7 Special precautions:

- One-eyed patient should be specially identified for extra care
- One eyed and diabetic patients to be given preference in surgery list

2.2 Hygiene

- All patients should wash their face with soap and water.
- The patients (at least from outreach camps) should be encouraged to have a bath with an antiseptic soap and to wash their hair.
- Hair cut and shaving (for men, when religion permits) prior to surgery.
- Clean clothes to be worn
- No clipping of eye lashes after using plastic drapes.

2.3 Pre-operative medication

- The ward nurse should then clean the brow region and lid margin with 10% povidone iodine solution
- Broad spectrum topical antibiotics (such as ciprofloxacin or ofloxacin) may be used during the perioperative period. The recommendation is antibiotic eye drops six times a day prior to the surgery and every 20 minutes for two hours prior to surgery.
- Diazepam 5 mg or similar anti anxiety medications may be considered for very anxious patients. It could be more useful in hypertensive patients along with their already prescribed anti hypertensive medications.
- Povidone Iodine 5% topical applied 5 minutes before surgery is the most important pre operative measure.

There is no evidence to suggest that pre operative oral or parenteral antibiotics are useful.

Instructions regarding dilatation

- Tropicamide 1% with phenylephrine 2.5% eye drops; 1 drop every 20 minutes. 2 to 3 times, about 90 minutes before surgery.
- Plain Tropicamide 1% for hypertensives and cardiac cases
- Ketorolac 0.5% eye drops 3 times every 15 minutes to sustain the papillary dilatation and to minimize post operative cystoids macular edema.
- Constrict pupil for secondary AC IOL

Day of surgery

- Change of street clothes to OR clothes is mandatory
- Light food before surgery is advisable

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Summary

Meticulous preoperative preparation helps a good cataract surgery. It is necessary to develop appropriate check lists and all health care personnel in care of the patient must be involved. Involvement of the family members helps a great deal in getting patient cooperation.

3 Pre operative Protocol for Systemic Disease Management

Decision making regarding patients with systemic diseases

A large number of patients who require cataract surgery could have concomitant chronic medical conditions. Hence relevant history pertaining to the medical fitness of the patient to withstand the surgical stress, post-operative medication and general care should be recorded before surgery. The chapter briefly describes the criteria for admission of patients with co-existing systemic problem. These guidelines are only recommendations and can be modified in consultation with the physicians.

3.1 Diabetes Mellitus

Blood glucose is checked for everyone who undergoes a cataract surgery and this is rechecked on the day of surgery also for all known diabetics. It is necessary to maintain a special record for the monitoring of blood sugar and medications. The recommended values are: Fasting blood sugar (FBS) < 140 mgs% and Random blood sugar (RBS) is < 180 mgs % on the day of surgery. Following FBS, patients should be advised to have their normal breakfast. If they are on oral anti diabetic drugs, they should skip the morning dose of the medications only on the day of surgery. If on insulin, 1/3rd of the dose should be administered in the morning. This is done to avoid hypoglycemia during the pri operative period. The subsequent doses should be taken as per the routine of the individual patient.

3.2 Hypertension

Blood pressure (BP) is checked for everyone who undergoes a cataract surgery and this is rechecked on the day of surgery, irrespective of hypertensive status. It is necessary to maintain a special record for the monitoring of BP and the medications. The recommended maximum blood pressure is 140/90 mm of hg or less on the day of surgery. The following recommendations should be followed for all hypertensive patients.

- The patient should take the prescribed anti- hypertensive medication on the day of surgery..
- Avoid adrenaline in local anaesthesia and Phenylephrine eye drops for dilatation.

Use of sedatives a day before starting anti-hypertensive drug may work well in all out-reach patients. It is prudent to check BP in the ward before sending them to the OR.

3.3 Cardiac artery disease

A detailed physician evaluation is required and his recommendations should be followed.

- Surgery may be done a minimum of 3-6 months after myocardial Infarction
- Oral antiplatelet need not be stopped for cataract surgery
- If on oral anticoagulants, check for prothrombin time (PT). Surgery can be done if PT is less than 18 seconds.
- Continue routine medication on the day of surgery
- Phenylephrine should not be used for pupillary dilation.
- Administer local anesthesia without adrenaline in anesthetic solution
- Provide a stretcher or wheel chair to avoid exertions and stress.
- Cautery should not be used in patients with pace makers.

It is preferable to have a Stand by physician or anesthetist during the anesthetic block and surgery for cardiac monitoring.

3.4 Asthmatics

Criteria for admission include

- Asthma under control with drugs
- Continue the medicines during hospital stay
- Minimal or no wheeze before surgery and if present to give IV bronchodilators or steroids
- Avoid plastic drapes and take special care for ventilation while draping for surgery
- Use Oxygen / Nebulizer during surgery if the patient is uncomfortable.
- Inj. Deriphylline / Dexamethasone IV, SOS
- Switch off the air-conditioner (optional)
- Avoid NSAIDS. If needed to use tablet Nimusulide / Paracetamol

3.5 Renal Failure/renal transplant

- A physician should certify fitness for surgery.
- Avoid tablet acetazolamide and NSAIDS. If pain killers are required, paracetamol is safer.
- Avoid systemic amino glycosides.
- If already on maintenance dose of oral steroids, double the dosage for a short interval (one to two weeks) following surgery.

3.6 Septic foci

- Check for dental infection, history of purulent discharge, skin infections etc.,
- Treat adequately before surgery.

Examination and advice of a Physician is essential for the following:

- Uncontrolled Diabetes mellitus and Hypertension
  - if BP >170/100
  - RBS > 200 mg%
- Known cardiac patients
- Recently diagnosed uncontrolled asthmatics
- Renal failure/transplants
- Liver disease
- Known bleeding disorders
- Obese or emaciated patients

Patients with systemic illnesses are encouraged to go back to their treating physicians for control of their problem before admission.
Pre operative check list should be prepared by the ward nurse to check whether all the above mentioned activities have been carried out.

Pre Operative Check List

Name of Patient _____Medical Record No. _____

1. Investigation

Hb (if under GA) _____Blood Sugar _____BP. _____

Weight _____Others._____

2. Eye examination: Eye _____

Vision _____Sac _____ Xylocaine Sensitivity _____

IOP _____IOL Power _____

3. Obtained written consent ? Y☐ N☐ Attached GVP consent form ?

4. Does the patient have DM? Y☐ N☐

5. Does the patient have Hypertension? Y☐ N☐

6. Eye prepared for operation ? Y☐ N☐ Put Povidone Iodine drop ?

7. Eyebrows & Eyelashes painted with Povidone Iodine Y☐ N☐

8. Eye dilated for operation ? Y☐ N☐ Dilated adequately?

9. Is it cataract (IOL) surgery ? Y☐ N☐ IOL brought as per No.?

10. Did medical officer examine ? Y☐ N☐

11. Examination by Anesthetist: _____

12. Did patient have a bath / wash face? (Comment on patient hygiene)

_____

__

_____

Suggestion of Doctor

_____

_____

Date : _____

Signature of ward Nurse : _____

4
Biometry (IOL Power Calculation)

At present there are several options to measure the IOL power. The commonly used techniques involve using the ultrasound for estimating the axial length and the keratometer to measure the corneal curvature. Recently equipments based on partial coherence interferometry are used to measure both the axial length and the corneal curvature. Of the two, one using the keratometry and ultrasound is common. This is because a good number of patients in our country have advanced cataracts or posterior sub capsular cataracts, where the interferometry based techniques fail. The purpose of this chapter is to share guidelines regarding the procedure to ensure good quality biometry in every patient.

When using the USG techniques, it is imperative to get good readings of corneal curvature with the keratometer before measuring the axial length.

4.1. The following points should be noted when performing keratometry:

- The keratometer should be calibrated for each observer
- Should be ideally recalibrated after 20 cases for single observer
- Calibration at 45 D / 7.5 mm Horizontal / Vertical
- Adjust eye piece to make mires coincide
- Always do Keratometry first before tonometry or any other corneal contact procedures.

4.2. Re measure the corneal curvature of both eyes if:

- Corneal curvature is less than 40 D or more than 47 D
- The difference in corneal cylinder is more than 1 D between eyes
- The corneal cylinder correlates poorly with the refraction cylinder

In practice, biometry is commonly done using the ultrasonography technique using the applanation method. The better option is the water bath technique. With water bath, one can eliminate the error induced by pressure associated with applanation technique.

4.3. Equipment setting

In either of the techniques, equipment setting is important.
- The A-scan unit should be calibrated daily, before using it on the first patient
- Use the test block provided by company
- Default settings of the unit should be used unless indicated
- If applanation technique is used, corneal compression must be monitored by anterior chamber depth (ACD)

Irrespective of the technique, one should look for the characteristics of quality A – scan technique.

4.4. Principal echo spikes

Normally five principal echo spikes are present.
- Corneal
- Anterior lens
- Posterior lens
- Retina
- Sclera and orbital fat

The echo heights show the quality of the scan. The person doing the scan should be aware of it and check whether the echo heights are adequate:
- Anterior lens echo is 90% or more of maximum height
- Posterior lens echo is between 50% and 75% of maximum height
- Retinal echo is 75% or more of maximum height
- In addition check, whether each rise angle is clear; the take off of the retinal spike must be clean and form a 90° angle from the baseline.

To get good results, obtain at least three scans (Ideally 5-10) on each eye that are within 15mm of one another. Average the 5–10 most consistent results giving the lowest standard deviation (ideally < 0.06 mm).

4.5. Re – measure the axial length of both eyes if:

- Axial length measurement is less than 22 mm or more than 25 mm in either eye
- The difference between the two eyes is more than 0.3 mm

- The axial length measurement does not correlate with the refraction, hyperopes should have short eyes and myopes should have long eyes
- When re-measurement is indicated, it should preferably be done by a second ophthalmic assistant masked to the first measurement

4.6. Choice of IOL formulae

There are several formulas available for calculation of the IOL power. The SRK II is regarded as a very good general formula. Based on the axial length, the following formulae are recommended to give the best results as per the guidelines published by the Royal College of Ophthalmology as well as by the American Academy of Ophthalmology (AAO).

Axial length	Formula
< 22mm	Hoffer Q
22 - 24.5mm	SRK II
24.6 - 26 mm	Holladay I.
> 26mm	SRK/T

The following are some of the practical guidelines to minimize the post operative ametropic surprises.

It is recommended to repeat the whole process in the following circumstances.
- IOL power less than 19D (or) more than 24.5D.
- IOL power difference between two eyes is more than 1.0Ds.
- Variation in axial length reading.
- Above 2.0 Dcyl in K-Reading.
- Difference between two eyes >1.5Ds

The ophthalmologist should specifically counsel the patients in the following situations;
- In large deviations between eyes, one should also counsel the patient about possible amblyopia.
- With astigmatism of more than 1.5Dcyl, the possibility of residual correction or the option of toric IOL should be discussed.
- With short axial lengths, of less than 22.0mm (or) in long eyes of more than 26.0mm, the chances of intra operative complications are high and hence the surgeon should be aware of these values. This will help to take appropriate measures to prevent them.

Special Condition

1. Silicone oil

In Silicone oil filled eyes, to check axial length,

i. In IOL Master – Silicone oil filled eye mode is used.
ii. A Scan Biometry – Axial length x 0.71

(For example if the axial length comes on 26.00mm, the actual axial length is 26.0x0.71=18.46mm)

2. Previous Refractive surgery done (RK/Lasik)

i. Post Refractive surgery eye (RK/Lasik) Lasik formula should be used.

3. High myopic patient

In High myopic patient, two refractionists should cross check biometry reading. SRK T formula should be used along with SRK II and should be discussed with the surgeon.

4. High Hypermetropic patient

For Short Axial Length (<22mm) Hoffer Q Formula should be used along with SRK II and should be discussed with the surgeon.

5. Irregular Astigmatism / Mires not clear

In irregular astigmatism / mires not clear, K-Reading of other eye should be checked.

6. Miscellaneous

i. Retinal detachment patient- Check manual method for K reading and A scan.

ii. When both Eyes are operated within 15 days interval, refraction should be done for the first operated eye and one should note the spherical equivalent and correct for the fellow eye.

Summary

Biometry and correct IOL power calculation is a critical factor for good visual recovery and a satisfied patient.

5 Operating Room protocol for Cataract Surgery

5.1 Responsibilities of the person in charge of the preparation cum anaesthesia room

- Check the emergency trolley medications (adrenaline, atropine, deriphylline, dexamethasone, hydrocortisone, phenergan, mephentin, diazepam, oxygen cylinder with kit, I V Kit, syringes, plaster, scissors, I V normal saline, Intubation kit, etc) as per the check list at least twice a week.
- Check the case records to ensure patient identity. If there are two or more patients with the same name, confirm the patients residential address, and relative's name and address.
- Confirm the eye to be operated
- The type of surgery to be performed
- Check the case record to see whether all investigations have been completed.
- Inform the surgeon about specific request by patients such as surgery by a particular surgeon and specific clinical problem like pseudoexfoliation (PXF), phacodonesis, prior surgery etc.,
- Reduce waiting time for patients; at the same time maintain an uninterrupted flow of patients to the OR.
- Prioritize surgery for very old, medically challenged patients, one eyed patients, diabetics etc
- Check IOL power and check whether the specific IOL is available

5.2 Anaesthesia

5.2.1 Block Room Preparation

The table/trolley should be thoroughly cleaned everyday with a wet towel and dried. Then it

should be cleaned with disinfectant solution. An autoclaved sterile towel should be placed over the table before placing the required anesthetic solution, syringes, needles etc. Un-sterile items should not be put together with sterile items.

- Hygienic hand wash before each block should be done and surgical hand rub should be applied on hand before giving the block.
- Wearing gloves after hand wash protects us from getting into problems. BUT for aseptic purpose, we must not touch anywhere after hand wash and wearing gloves. If we do not want to use gloves, at least a hygienic hand wash before giving block is required and person should not touch anywhere else after the hand wash before giving the block.
- All the cotton and linen used in the block area should be pre sterilized and indicator strips to be applied over them.
- Pulse Oxymeter can be used to monitor the patient while giving the block. More so if the anaesthetist is not present.
- Only required medicines to be taken out on a day-to-day basis from the store.
- An emergency tray should be kept ready.
- Like needles, syringes also need to be changed for every patient.
- They should do cross check of pre-operative work up (confirm the case, eye to be operated) before giving block.
- Following anesthesia, povidone iodine (5%) eye drops are instilled in the conjunctival sac.

5.2.2 Administration of local anaesthesia

a. Selection of Anesthetic solution

- Normal patients 2% Xylocaine mixed with adrenaline (1:100,000) and Hylase
- Patients with hypertension and cardiac diseases, 2% xylocaine and Sensorcaine (1:1) with hylase.

b. Quantity of anesthetic solution

- For facial block - 4cc
- For retrobulbar block - 2.5 cc to 3 cc
- For peribulbar block - 5cc

c. Needles

- For facial - No.24, 1" disposable needle
- For retrobulbar and peribulbar block - No.22, 1.5 " hypodermic needle

d. Sterilization of needles

- Use disposable needle only. Autocalving of used needles is discouraged.

e. Anaesthesia

- Peribulbar anesthesia is the preferred method for all patients.

f. Hypotony

- Massage is given digitally or by pinky ball applied for 3-5 minutes.
- Massage is contraindicated in the following situations:
  a. Subluxated lens; b. Re surgeries; c. Perforating injury
  Vigorous massage is contraindicated in
  a. Pseudoexfoliation; b. Myopia and c. Traumatic Cataract

g. Akinesia should be checked before sending the patient for surgery.
h. Avoid corneal exposure. If the palpebral aperture is open, close the lids with a meditape across the lids.
i. Detect, manage and refer complications of anesthetic blocks such as retro bulbar hemorrhage (RBH), scleral perforation etc.

5.2.3 Managing Anesthetic Complications

i. Vasovagal syncope is the commonest complication

a) The patient is made to lie down in supine position and the legs are elevated.
b) The room should be airy.
c) The patients clothes should be loosened
d) Monitor pulse, BP and airway
e) To keep resuscitation equipment ready like - oxygen cylinder, endotracheal tube, laryngoscope, Ambu bag, scalp vein set, emergency drugs.
f) To inform anesthetist or physician if patient does not show adequate recovery.

ii. Seizures

a) Make the patient lie down
b) Turn face to the side
c) Insert a mouth gag
d) Intravenous diazepam may be required
e) Oxygen therapy

iii. Retro bulbar hemorrhage

a) Saline pad and bandage
b) Start patient on oral acetazolamide
c) Check IOP
d) Lateral canthotomy, if needed
e) Postpone surgery
f) If the fundus is visible check that the central retinal artery is not occluded.
g) Check the eye after an hour for corneal edema, arterial pulsation, globe perforation etc.,

iv. Globe perforation

a) Even if a globe perforation has occurred, surgery can be completed. This will help the retina consultant see the break easily on the next day and seal it effectively. However, if the surgeon feels, the case can be postponed.

5.3 Administration of I.V. Mannitol

5.3.1 Indications

a) Secondary IOL implantation
b) IOL exchange / explantation
c) Subluxated cataract
d) Posterior polar cataract
e) Glaucoma patients occasionally

5.3.2 Technique

a) 100 - 150 ml is given over 15 to 20 minutes half to one hour before surgery
b) Patients have to void urine before starting IV mannitol
c) Avoid in uncontrolled HT, cardiac patients, renal diseases
d) Before starting the drip, check BP and do a CVS examination
e) Patient is moved on the stretcher and is told to avoid ambulation for 6 hours.

5.4 Decision regarding postponing the case

a) Diabetes mellitus – FBS > 140 mg %
b) BP - diastolic > 90 mm Hg; systolic > 140 mm Hg
c) Severe wheezing
d) Any complication of local anaesthesia
e) Positive Conjunctival cultures
f) Local factors - any infection of lids and adnexa, IOP > 30mm Hg despite medications except lens induced glaucoma.

In all such situation it is a good practice to discuss with the patient in presence of the family.

Summary

Good operative preparation demands a synergistic action of all health care personnel involved in cataract surgery. A good preoperative care and strict adherence to prescribed protocol builds confidence in the patient and the surgical team.

6 Post Operative Protocol for Management of Uncomplicated Cases Following Cataract Surgery

6.1. Care on the day of surgery

Following uneventful cataract surgery, the patients may be given oral Paracetamol 500 mg for pain relief, repeated after 8 hours if needed. If oral Acetazolamide (500 mg) is not given before surgery, it may be given as the IOP is likely to rise during the first few hours after surgery. Three to four hours following surgery, one can start applying topical antibiotic (same as the one used preoperatively) every two to four hours along with NSAID eye drops once every six hours. In addition cycloplegics, preferably Homatropine 2% applied twice daily. After six to eight hours following surgery, topical steroids can be started once every four hours on the first day.

6.2. First postoperative checkup

The patient is examined the day following surgery. One should look for the following:

- Vision with and without pin hole
- Anterior segment of the eye
  - Section - Apposition of Wound / Wound Leak / Gape
  - Cornea - Epithelial Defect, Edema, SK
  - A.C. - Hyphema, Hypopyon, Cortical Matter, Depth, Vitreous knuckle
  - Iris - Iritis, Fibrinous reaction
  - IOL - Centration and stability
  - Pupil - Shape , Mobility, Vitreous
  - PC - Opacity, Rent, Zonular dialysis
  - Vitreous - Vitreous cells, Blood, Pigments

- Fundus
  - Red Glow
  - Fundus examination (slit lamp/ Direct/ indirect)
- Specify the cause, if the visual acuity is poor (<6/18)

The aim of postoperative examination is to look for complications and any early sign of inflammation or infection.

6.3. Discharge Timing

- Base Hospital patients – 1st post operative day. In case of topical phaco surgery the patient can be discharged the same day, after 6 hours.
- Outreach Camp patients – Ideally on the 2nd post operative day.

Keeping the outreach patients for one extra night helps for following reasons:

- A second opportunity for good post operative counseling
- Health education
- Engage them as future ambassadors

6.4. Postoperative medications:

6.4.1 Definite medications:

a) Topical antibiotics 4 to 6 times daily for 7 days after surgery
b) Combined Antibiotic and steroids (40 – 50 days)
   - 5 times a day - 10 days
   - 4 times a day - 10 days
   - 3 times a day - 10 days
   - 2 times a day - 10 days
   - 1 time a day - 10 days

Post-op care

Instilling eye drops:

- Wash your hands with soap and water. Allow it to dry.
- Open the dropper bottle without touching the tip.
- Ask the patient to raise the chin Hold the lower eye lid down with your finger tips.
- Gently put one drop of the drug into the lower fornix.
- Release the lower lid and ask the patient to close the eye gently.
- Close the dropper, don't leave it open.
- Wipe the drug on the cheek, don't rub the eye or wipe the lids.

6.4.2 Optional

a) Cycloplegics (Homoatropine) – 2 -3 times a day for 2 weeks

Systemic antibiotics are not necessary.

6.5 Precautions

- Early resumption of routine activities is encouraged
- Normal diet is allowed from the day of surgery
- No head bath for 2 weeks , but head can be washed by extending the neck and ensuring that water does not spill to the eye
- Avoid bathing in ponds or rivers for 3 months
- TV viewing and reading is allowed if the patient is comfortable
- Avoid driving two wheelers without protecting glasses
- Avoid lifting heavy weights for patients who undergone ECCE with sutures

- Dark glasses should be used for one month for outdoor activities
- Prostration or bending of head for saying prayers is permissible after 7 days
- After suture removal avoid pond or river baths for at least 1 week and instill topical antibiotics 6 times a day for a week.

6.6 Danger signs for which the patient is advised to report immediately:

- Redness
- Pain
- Sudden diminution of vision

6.7 Follow up Visits

Following tests are recommended in the follow-up visits immediately after the first post operative day visit:

- First follow up – After 7 to 10 days (Optional)
  - Vision with pinhole,
  - Slit lamp exam.
  - Fundus exam.
  - If visual acuity is not good (< 6/18) look for cystoids macular edema (CME); topical NSAID could be considered
- Second follow up – After 30 - 45 days ;
  - Refraction, Slit lamp exam, Fundus exam.
  - If visual acuity is not good (< 6/12) look for the causes including CME.
  - Further follow up when required or after 6 months.

6.8 Spectacles prescription

Spectacles could be prescribed 3-4 weeks following phacoemulsification and 8 weeks following SICS/ ECCE. It is a good practice to see patients 3 months after surgery. ECCE-IOL patients will need suture removal during this visit.

Summary

A well designed post operative care regimen and care for complication, if any, is important for success of the cataract surgery.

Sterilization Module

1. Protocols for operating rooms sterilization for ophthalmic surgery
2. Protocols for sterilization of instruments
3. Aseptic protocols for sterile procedures for staff in ophthalmic surgery
4. Monitoring and surveillance of sterilization procedures
5. Protocols for investigation and management in outbreak of endophthalmiits
6. Annexure
    - Daily cleaning check list for eye OT.
    - Weekly cleaning check list eye OT.
    - Monthly cleaning check list eye OT.
    - Quarterly cleaning check list eye OT.
    - Monitoring of the autoclaving procedure
    - Weekly autoclave report

1 Ophthalmic Surgery or Sterilization Protocol

Post operative endophthalmitis is a devastating and potentially vision threatening complication following intraocular surgery. Despite improvements in aseptic techniques, sterilization protocols and instrumentation, there are still incidences of cluster infection following cataract surgery. There are five possible factors: patient personal hygiene, contaminated surgical supplies, faulty sterilization protocols, inadvertent touch and environment - individually or combinations of these factors. Prevention of postoperative endophthalmitis is important to ensure good postoperative results. Keeping in mind the diversity and economic conditions of the country we need a universally acceptable, evidence- based and cost effective protocol.

Sterilization Practices

Understanding the following basic terminologies and their subtle differences is essential before we discuss the details of each step.

- Sanitation is a process capable of reducing the number of microbial contaminants to a relatively safe level. Compared with sterilization and disinfection, sanitation provides the lowest margin of safety.
- Disinfection kills or eliminates nearly all pathogenic micro-organisms on inanimate surfaces but not necessarily bacterial spores.
- Sterilization is the act or process of destroying all forms of microbial life, including spores.

Sterilization practices can be standardized as follows for the following areas

- Cleaning and decontamination protocols for environment and equipment
- Sterilization of surgical instruments
- Sterile protocols involving OR staff
- Managing clinical wastes from the OR
- Monitoring of surgical supplies.
- Monitoring Protocols
- Surveillance and Outbreak control.

1.1 OR Layout and Environmental Control

A proper OR layout ensures effective and continued sterilization. One such simple schematic drawing of OR lay out is shown below

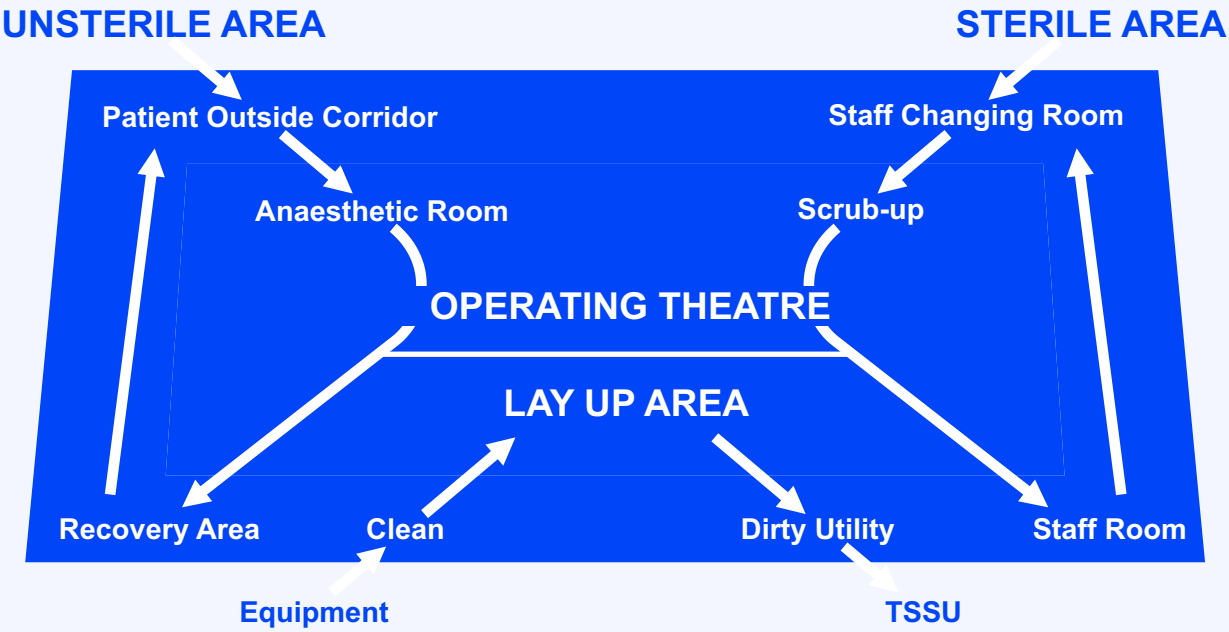


Figure. Schematic Drawing of the layout of the operation theatre

The OR should be situated in an area away from public movement and ideally should have the following features:

- The sterile and unsterile areas are segregated, preferably by an air lock or buffer zone.
- The sterile and unsterile zones inside the OT are separated by coloured lines – scrubbed staff remains in the sterile zone and the circulating staff & patients remain within the unsterile zone.
- The sterile and unsterile zone inside the operating room must be demarcated by colored lines - scrubbed staff remains in sterile zone.
- Preferably, the entrances for patients and staff should be separate
- Separate areas for storing sterile and unsterile items.
- The operating room should preferably have seamless walls and a non-porous floor. (Use of marble is contraindicated).
- There should not be any surface where dust might accumulate.
- Doors of the OR are always kept closed and movement restricted.
- Restrict the number of personnel to the minimum during surgery

To incorporate the above features, the OR should be designed in a way that it incorporates four major zones:

- **Outer zone** acts as a reception area, and is accessible to all.

- **Clean zone** comprises the changing room and patient preparation room. This is a transfer zone and is accessible only to OR staff.
- **Aseptic zone** is a sterile area, and includes the space for scrub and gowning, the actual operating area as well as the area where instruments are cleaned and sterilized.
- **Disposal zone** stores used linen before sending to the laundry. The used disposables are segregated and then disposed off.

1.2 Ventilation

Central air-conditioning of the operating room is ideal and in case where resources are not a constraint, Ventilation / Heating Ventilation Air Conditioning (HVAC) system may be installed. These systems include HEPA (High Efficiency Particulate Air) filters, maintain indoor air temperature, humidity, and odors, clean the contaminated air and minimize the risk of transmission of air borne microorganisms. When not possible, the ORs should be well ventilated and air conditioned with a split air conditioner. In addition, the air circulating inside the ORs should be filtered using readily available devices in the market. This can be done by equipments containing 0.3 µ filtering device such as a HEPA filter along with ultra violet (UV) lights. These are not very expensive
.

Parameters for Operating Room Ventilation

The following is recommended for operating rooms

	Parameter		Desired range
-	Temperature	-	20 - 23^0 C
-	Relative humidity	-	30-60%
-	Air movement	-	From clean to less clean areas, laminar flow
-	Air changes	-	Minimum 15 total air changes per hour

The above mentioned additional expenses for ventilation also ensure better sterility of the operating room. This is likely to reduce the postoperative infection. Use of fans in the operating rooms is not recommended, as it adds to turbulence and lifts the dust particles.

1.3 Cleaning and Decontamination

Cleaning followed by disinfection are the corner stone's for decontamination. In the OR, the floor, foot switch of microscope, surfaces, sinks and drains must be cleaned regularly as per the following protocol.
The ideal disinfectant should be broad spectrum, safe and economical. There is a wide choice available. Commonly used agents include sodium hypochlorite, iodophores, hydrogen peroxide (stabilized with silver), chlohexidine gluconate combinations etc.

Schedules for the cleaning of Equipment & Environmental surfaces: OR Sanitation

1.3.1 Before surgery

- Equipments like microscopes should be cleaned separately with Isopropyl alcohol except lens.
- Instrument trolley, operating tables, saline stands, revolving chairs (surgeon seat) should be cleaned daily with antiseptic liquid concentrate (Chlorhexidine gluconate 75% - 10 ml diluted with 500ml of water or 10% Benzalkonium chloride).
- Microscope head and equipments like Phacoemulsifiers, cautery box should be sprayed with Bacillocid 25 spray.

1.3.2 During Surgery

- Spills / blood splashed in the vicinity of the sterile field is cleaned with a cloth and then with a germicide. All instruments opened for a procedure whether used or not are treated as contaminated.
- The floor should be mopped with a new mop in case of fluid spills on the floor
- The operating table /should be wiped with bacillocid if wet

1.3.3 Cleaning at the end of the list:

Operating room, scrub utility, corridor, furnishings and equipment to be cleaned.

Furnishings

- The furniture, equipment, light are damp dusted with a detergent germicide. Attention should be paid to horizontal surfaces, as dust and lint which transport microorganisms settle on them.

Corridor

- The floor must be swept and cleaned by wet mopping followed by cleaning with antiseptic solution. In addition to the operating rooms, corridor, sterilization area, patient holding areas also must also be cleaned.

Equipment

- Microscopes are cleaned with 15% cetrimide and 3% chlorhexidine gluconate daily, except lens.

Scrub utility

- Liquid soap and scrub solution dispenser is cleaned daily.
- Scrub sink is cleaned daily with brush and bleaching powder, dried and mopped with 1% sodium hypochlorite.
- Drain is cleansed with 1% sodium hypochlorite.

Operating room

Fumigation / Fogging: In our settings it is a common practice to fumigate the operating room with formalin once in a week. This ancient routine is still widely practiced (though no longer in the western world), and remains a primary method of decontamination in our country. It has no role in modern operating rooms with centralized air conditioning and fitted with HEPA filters. We all must recognize that formalin is a carcinogen.

- If fumigator (oticare) is not available use 35 ml. of 40% formalin with 10 gms. of potassium permanganate ($KMnO_4$) in a basin for a space of 1000 cu. ft. and seal for 24 hours.
- A new method of fumigation has been evolved using 'Aldekol', a mixture containing 6% formaldehyde, 6% glutaraldehyde and 5% benzalkonium chloride. To sterilize 4000 cu ft., 325 ml. of aldekol is dissolved in 150 ml of water and sprayed by aerosol for 30 minutes. The room

is then closed for 2 hours following which fumes are allowed to clear by putting on the exhaust or air-conditioning, In effect, the operation theatre is sterile in just over 3 hours.
    - This is not an alternative to mechanical cleaning of surface. The fogging should be done only after thorough cleaning and mopping of the floor, walls and all the furniture in the OR.

1.3.4 Weekend cleaning

- Ideally all the equipments including the furniture should be moved out of the operating room.
- The floor and the walls should be washed by detergents and by pouring adequate amounts of water. All the areas should be subsequently disinfected with antiseptic solutions.
- The routine preventive maintenance of the equipments and furniture should be done at the end of the week.
    - Lenses of the microscope are cleaned once a week with lens cleaning solutions.
    - Fans, lights, clocks inside the OR are wiped once a week, with 1% sodium hypochlorite solution.
    - AC filters should be removed, dusted and washed with copious amounts of water once a week and sun dried.

1.3.5 Water Tank cleaning and disinfection

Water is an important reservoir of microorganisms like Pseudomonas species. If the OR does not have a dedicated water tank, it is advisable to treat the water at the user end by some means prior to it being used in the OR.

- Overhead water tank is cleaned with bleaching powder at least once a month and should be documented. The level of chlorination is checked regularly.

1.3.6 Pest Control

It is essential to keep the OR free of pests like flies, mosquitoes cockroaches and other pests. There has to be a regular schedule for pest control. The procedure should be carried out when the air handling unit is shut down. Commercially available products in domestic use will be sufficient.

1.4 Managing clinical wastes from the OR

The waste emerging from the operating room consists of the following:

- Patient contaminated wastes viz disposable plastics drapes, linen and gauze contaminated with blood and body fluids.
- Sharps, gloves, wrapping paper and other wrappers
- Anatomical body parts and tissues following enucleation, evisceration etc

All sharps including needles, IV cannula, scalpel blades etc, should be segregated into puncture proof containers at source. Infectious wastes requiring disposal like gloves, plastics, cotton, gauze etc. could be segregated into colour coded bags for transportation to the site of

treatment. Biopsy material could be transported in appropriately sealed containers/bags for pathological examination.

2
Protocols for Sterilization of Instruments

Sterilization Process

This is one of the most critical procedures requiring stringent monitoring. Appropriate packing of surgical instruments also needs attention. Sufficient number of surgical instrument sets are needed in a high volume set up as lack of them will lead to inadequate sterilization of instruments in between surgeries. Ideally each operating table should have 4 instrument sets.

2.1 Cleaning of surgical instruments

The used instruments are cleaned thoroughly in order to remove any tissue debris or body fluid deposits before they are re sterilized. It should be done at the end of the day after all surgeries as well as in between surgeries, the process for which is described below.

Steps in Cleaning of instruments:

- **Separation:** The instruments are separated from the tubing and the sharp instruments are separated from the blunt instruments.
- **Cleaning is done either by ultrasonic cleaner or by using four bowls if done manually.**
    - **Ultrasonic cleaner** is used to clean the tissue debris and body fluid deposits from the instruments. Distilled water is used in the chamber of the cleaner, to which an enzyme solution is added to facilitate the cleaning process. The ideal cycle time for one batch of instruments is 30 minutes. This should ideally be done for sharp instruments every day and for blunt instruments every week. Keep all the joints open so that they are exposed to the cleaning process.
    - **Four Bowl Cleaning method** is equally effective. Demineralised water is taken in four bowls. The instruments are placed in the first bowl Containing surfactant cleaning solution. After cleaning in the first bowl, the instruments are transferred to the next bowl and cleaned one more time. It goes through all four bowls. A clean soft toothbrush is used to clean the blunt instruments thoroughly. Special attention is needed to clean at the hinges, and the tips of fine and delicate instruments. The cannulated instruments should be flushed with sterile demineralised water or Ringer lactate solution or BSS solution thrice

followed by air. After cleaning, the instruments are dried with hot air, tipped with individual plastic sleeves and packed in individual perforated boxes/trays. The toothbrush is changed weekly and should be disinfected daily by immersing in a chemical solution like 2% Glutaraldehyde.

- Packing of the instruments: The instruments are put together to make the set and are kept wrapped using thick cloth and placed in a perforated tray. The instruments trays for a particular operating room are then placed in a surgical drum for sterilization. Each instrument set should have an indicator tape to show the completeness of sterilization.

2.2 Sterilization of surgical instruments

Several methods of sterilization like, steam under pressure (Autoclaving), Dry heat (Hot Air Oven), chemical sterilization (Glutaraldehyde / Acetone), Ethylene oxide (ETO) and Hydrogen peroxide are available. Steam is the preferred method. It is the only method of autoclaving. It is the only method to sterilize most of the instruments, not associated with any toxic reactions like TASS; it is also economical.

With every mode of sterilization, maintaining adequate temperature, pressure, concentration, duration of exposure is important and can vary for different manufacturers. To guide the readers / users the parameters in regular practice are given for the various methods. However it is important to check with the suppliers about the ideal settings.

2.2.1 Mode of sterilization of instruments at the end of the day

For sterilization at the end of the day, either **autoclaving using long cycle exposure or gas sterilization is preferred.**

Steam sterilization under pressure (Autoclaving)

Of the two methods, autoclaving is the most preferred method. This is dependable, nontoxic, inexpensive, sporicidal and can penetrate fabrics well. It is called long cycle autoclaving and is the preferred method for regular sterilization after cleaning and decontamination at the conclusion of all surgeries. It is a safe method of sterilization, as it kills bacteria,viruses, fungus and their spores.
In a regular autoclave, linen wrapped articles are sterilized at 121^{0}C + 20 Psi pressure. The parameters for sterilization are given below.

The parameters for sterilization of various items are:

Items	Pressure (Pound per sq inch – psi)	Temperature	Holding Time
Blunt instruments, dressing, glass, silicon materials, linen, vessels	20 psi	121°C	20 Min
Rubber items	20 psi	121°C	20 Min
Liquids	20 psi	110°C	20 Min

*Holding time; Time after attaining required temperature & pressure

After autoclaving, the instruments as well as other sterilized items should be used within 48 hours, unless they are kept wrapped inside air tight sealed bags. With surgical drums, once opened the contents must be used immediately.

Indicator tape should be used in every cycle. As a routine three tapes should be placed within each of the drums, one each at the bottom, middle and at the top. On the day of surgery the assisting sterile nurse should check it and hand them over to the running nurse to place them on a register, which should be checked and signed by the surgeon before starting the surgery.

Gas sterilization

Several articles used in ophthalmic surgery cannot be autoclaved or placed in a chemical solution or in a hot air oven. These can be effectively sterilized using either an ethylene oxide (ETO) sterilizer or a formalin gas chamber. Both are extremely toxic, carcinogenic and ETO is potentially explosive. Instruments like Cryoprobe, Vitrectomy Cutter, and Cautery wire can be sterilized using the gaseous agents.

Ethylene oxide sterilization:

- Remove all lubricants from instruments.
- They should be cleaned and should be absolutely dry.
- Pack them in special polythene bags with indicator tape inside the bag.
- As they are carcinogenic and also mutagenic, the equipment should be kept in an isolated room with an exhaust. The exhaust tube from the equipment should be taken and left above the roof of the building.
- Due to their toxic nature, an aeration period of minimum 72 hours for the sterilized items is a mandatory requirement before they are used.
- Sterilized materials should be packaged, labeled, and stored in a manner to ensure sterility, and each item should be marked with the sterilization date. A microbiological control is mandatory.

2.2.3 Mode of sterilization of instruments in between surgery

- In between surgery the instrument sets should be sterilized using short cycle autoclaving.

Short cycle autoclaving

- In between surgeries, the instruments are ideally sterilized using a flash or high speed autoclave. if not available a single drum autoclave can be used .
- Adequate number of surgical instrument sets should be made available and the practice of boiling should be discontinued.
- The instruments are cleaned using clean mineral or boiled filtered water and a clean brush. The cannulated instruments should be flushed with sterile BSS / RL solution followed by air before sterilisation.
- The instruments are then placed back in the instrument tray. The trays are placed inside a surgical drum, which can hold up to 6 sets.
- The drum is placed in the autoclave and it will take 10 to 12 minutes for the autoclaving to be over.
- The parameters are 134°c, + 30Psi, 7 to 10 minutes of exposure. This ensures adequate

sterilization and the whole process for cleaning and sterilizing six sets will take about 20 minutes.

- In a high volume set up at least two nursing personnel should be allocated for this activity.

Dry heat sterilization (hot air oven)

It is done for articles which can be damaged by steam, e.g. Sharp instruments, Glass syringes etc. Sterilization occurs at 170^{0}C for two hours or at 180^{0} C for one hour. The method is seldom used and is useful for glassware used in the laboratories.

2.3 Shelf Life of Sterilized Items (Method of Sterilization and Shelf Life)

Method	Shelf life
Autoclaving in drums or linen	48 hours
Autoclaving with double packing	28 days
ETO sterilization with double packing	1 year

To conclude, autoclaving is suitable for everything except for plastic items, for which ETO sterilization can be used. Aeration time after ETO sterilization is a minimum of 24 hours (or follow manufacturer's instructions). In between surgeries again steam sterilization using a high speed or flash autoclave can be used.

2.4 Disinfection Of Other Articles Used In Patient Care

Other instruments used in outpatient department as well as in wards should be kept free of infective agents. Disinfection is an adequate method of rendering clean instruments which do not penetrate the skin and high level disinfection is effective against microorganisms like M.tuberculosis and Enterovirus. Instruments like tonometers, Chittle's forceps etc. are sterilized by disinfections. Disinfection can be achieved by thermal methods.

Thermal method of disinfection is reliable, non-toxic, can be easily controlled and doesn't leave any residue. Boiling at 100^{O} C for 5 minutes is lethal for Hepatitis B and HIV viruses and Mycobacterium. Addition of 2% solution of Sodium bicarbonate (NaHCO3) is helpful in preventing corrosion due to boiling.

2.5 Disinfection and reuse of linen

- Contaminated linen may be a source of infection and are placed in a separate plastic bin after the surgery in impervious bags for transportation.
- Aprons and drape sheets must be washed with detergent and dried in covered area
- The surgical coat should be autoclaved in a loosely packed, separate drum or packed into a bundle with an indicator strip pasted.

Area	Procedures	Accepted Practice
No. of standard surgical sets	One surgeoon with one OT table	4 sets
Cleaning Procedures	Manual Cleaning	Use four bowls. First wash in the disinfectant and cleaning with a soft toothbrush followed by three washes with distilled water
Blunt Instruments	Prior to Surgery Between Cases	Steam sterilization Flash Autoclave
Sharp Instruments	Prior to Surgery Between Cases Cryoprobe	Steam sterilization, ETO sterilization Flash Autoclave ETO
Heat Labile Instruments	Vitrectomy cutter Cautery	Ethylene Oxide gas sterilization
Linen	Surgeons Dress Aprons Drape Sheets	Steam Sterilization Steam Sterilization Disposable
Hand Washing	Prior to Surgery	Hand scrubbing with povidone iodine scrub or chlorhexidine for five minutes
Surgical Supplies	Irrigating Solution	Steam sterilization before opening the seal
Theater Sterilization / Disinfections	Floor Fumigation of OT Air Conditioners Walls Theatre Trolleys	Chlorhexidine, Lysol Formaldehyde Filters removed and washed with soap and water weekly Washed with water and disinfectant weekly Disinfectant
Patient	Dress for OR	Sterile dress if provided by the hospital, shoe covers and cap

3 Aseptic Protocols

3.1 Surgical Attire

The use of barriers like scrub suits, caps, gloves and gowns seems prudent to minimize the exposure of the patient to the skin, mucous membrane or hair of the surgical team member and to protect the surgical team members from exposure to blood borne pathogens of the patient. All personnel working in the operating rooms must wear clean surgical attire in place of their street clothes. Operating room clothes are not worn outside this area.

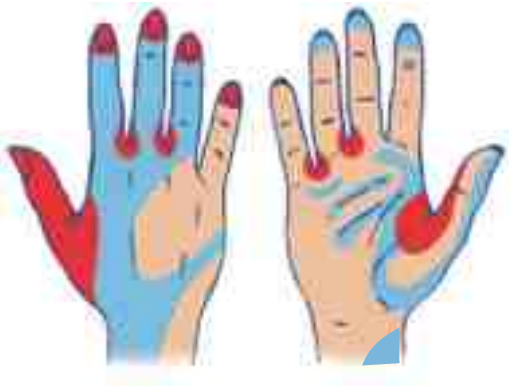
- **Scrub suits:** Surgical attire is designed for maximum skin coverage since skin squamers are a potential source of microbial contamination.
- **Caps:** Head and facial hair must be covered.
- **Masks:** Disposable well fitting deflector masks are worn. Cloth masks are ineffective barriers for microorganisms, particularly once they get moistened during breathing.
- **Shoes/ Shoe covers:** Dedicated footwear is recommended for the use in the OR. The foot wear should be designed to protect the wearer from spills of blood and body fluids.
    - Slippers for toilet use and OR are kept separate. Slippers are washed daily with detergent and dried.
- **Sterile Gloves:** Sterile gloves are worn by all scrubbed members of the surgical team and should be changed for every case.
- **Gowns and drapes:** These create a barrier between the surgical operative field and potential sources of microorganisms. They are ideally made of material impermeable to liquids.

3.2 Decontamination of hands

Surgical hand washing, as the name suggests, is required before performing any surgical procedure. Important points to consider are:

- All ornaments are removed from the hands at the time of scrubbing.
- Quality of Water: Clean, boiled water is best for decontamination of hands. Alternatively, chlorinated tap water can be used.

- Wash hands and arms to two inches above the elbow and clean fingernails under running water.
- Wet scrub and apply antimicrobial soap solution
- Surgical Scrub: Chlorhexidine 4% or Povidone Iodine 10% is used. Using liquid soap is recommended before using the scrub solution.
- Rinse the hand and arm, keeping the arm above elbow level. First scrub of the day includes thorough cleaning underneath the finger nails. Begin scrubbing palm, outer and inner aspect of each finger, fingernails, dorsum of the hand and circumferentially work up to the elbow.
- Hands are dried before DONING the gloves. Sterile towels are used for drying. Drying should not be done all the way up to the elbow.
- Other important factors that influence the effectiveness of the scrub, besides the choices of the agent, are the technique, the condition of the hands and the techniques used for drying.



Areas missed while scrubbing

- **Most often**
- **Less often**
- **Never**

Recommended Scrubbing Technique

Palm to palm

Rotational rubbing of the left and right wrist Left Palm

Left Dorsum over Right Palm

Palm to palm with fingers interfaced

Right Dorsum over

Rotational rubbing on the tips of fingers & thumb of right hand in left hand and right palm then opposite

Back of fingers into the opposite rotational rubbing of thumb with palms with fingers interlocked the opposite hand

Rotational rubbing of thumb with the opposite hand

3.3 Operating room etiquettes

It is important to layout and follow some etiquette in the OR depending on the role of a particular person.

Gowning and Gloving Technique

Gowning:

Sterile gowns are always folded inside out to avoid contamination. As it is impossible to render the hands sterile, they must not come in contact with the outside of the gown or gloves.

Procedure:
- Pick up the gown holding it well away from the trolley and your own body.
- Hold the neck band and unroll until the sleeves are seen.
- Slide both hands and arms into the sleeves at the same time.
- The floor nurse/assistant slides her hands under the gown at the shoulder and pulls out and fastens all the back tapes.
- Cover the back with the back flap with the help of the un-scrub nurse.

Remember:
- Do not keep the hands lower than the waist line.
- Do not keep the hands near ones neck or shoulder.
- Do not touch the axillary area once gowned.
- Do not touch the back of the gown.

Removal of Gown at the end of the Procedure:
- The circulating nurse will unfasten the gown.
- The gown is carefully removed by the scrub nurse leaving the gloves on.
- The gown with the inside folded out is placed in the appropriate bin.
- The gloves are then removed by holding the inside of the cuff and placed in appropriate container.

Gloving:

- Pairs of sterile gloves are packed in such a way as to facilitate handling without touching the outside of the gloves with bare hands.
- A 2" cuff is folded on each glove.
- There are two methods of gloving, the open method and the closed method.

Procedure for wearing gloves

Open Method:
- Always take chlorhexidine or its equivalent solution on bare hands before Gloving.
- Pick up the first glove by gripping its cuff with one hand and slip the other hand in.
- With the gloved hand, pick up the second glove by slipping hand under the cuff (outside of the

glove) and slip the ungloved hand in and release the grip.
- At this stage adjust the fingers of the gloves properly.
- If gowned, the cuff of the second glove is pulled over the stockinet sleeve of the gown.
- The cuff of other glove is then pulled over the stockinet sleeve.

Closed Method:
- Hands are not pushed beyond the stockinet cuffs of the gown.
- The cuff of the left hand glove is grasped through the stockinet part of the right sleeve.
- The left hand is inserted into the glove and the glove grasped by the right hand is pulled over the left hand.
- After stretching the cuff, the glove is pulled over the sleeve, and the hand is forced through the stockinet cuff into the glove.
- The second glove is put on in a similar manner except that the cuff can be grasped with the already gloved hand and the right hand is forced through the stockinet cuff into the glove.
- Glove powder can cause irritation and induce postoperative complication (Sterile Uveitis). Hence, it should be wiped off with a sterile wet mop.
- Take chlorhexidine or its equivalent solution on gloved hands to form a layer and allow it to dry before starting the surgeries.

Removal of Gloves (for both types of gloves):
- To prevent outer surface of gloves from contaminating hands, the gloved fingers of one hand grip the outer surface of the cuff and pull off inside out.
- To prevent contamination of the ungloved hand, the inside of the cuff of the opposite glove is held and pulled off the hand.
- Gloves are discarded into the designated container.

Activities Between two Surgeries

- After the surgery the scrub nurse hands over the used instruments to the sterilization room nurse for cleaning and re-sterilization.
- RL, Visco elastics and SICS blades should not be passed on to next patients.Visco elastics should be discarded. Ringer Lactate should be either discarded if we can afford cost wise or else can be autoclaved once.
- SICS Blades must also be changed after each surgery which can be autoclaved.
- Ideally one must re-scrub between the two surgeries for 3 minutes if we do not touch elsewhere and circulating staff remove the scrubbed person's gown. Else scrubbing for full 7 minutes is recommended. We must have our own protocol.
- Minimum requirement is to change the gloves after each surgery.
- Each time, fresh trolley should be prepared (Remove everything from the trolley at the end of the surgery and prepare it afresh for the next surgery).
- IV set; Visco elastics and Inj. RL should be used fresh for each surgery.
- For each surgery autoclaved set of instruments must be used.Flash autoclave can be used to sterilize the instruments in short period of time in between the surgeries if there are less instrument sets than no. of surgeries.
- Microscope Knobs must also be changed which should be autoclaved.
- Ideally Phaco probe and tubings must also be changed after each surgery but we must work our own protocol.

When a person is scrubbed for Surgery

- Follow correct gowning and gloving technique. In order to minimize the risk of contaminating the sterile operative set up during the process of gowning and gloving, a separate table should be used. Only the scrub nurse should gown and glove herself, the rest should avoid self-gowning and gloving.
- Remember that the back of the gown area and the area below the waist are considered unsterile. Region of armpit and the area around neck also. Some people suggest that the area of the sleeve above the elbow also is considered unsterile.
- Gloved hands are kept above the waist or on top of the sterile field and clasped in front.
- For coughing or sneezing, step back from the sterile field and turn away.
- Avoid light banter, unwanted or irrelevant talks inside the OR.

When Circulating Instruments For Surgery

- The sterility of the sterile pack is checked before opening, including expiry date.
- Before giving any sterile items, staff will apply sterilium on hands and allow it to dry.
- Items are not passed above the sterile field
- **A sterile package** may be opened on a flat surface or while held in the hands. A sterile item should be covered if it is not used immediately Open the pack away from the body keeping fingers outside the wrapper.
- While opening the flap, the farthest away is opened first with care not to reach over the sterile field. Then the side flap is opened and the flap nearest to the nurse is opened last.
- Pouring sterile solution; The outer surface of the bottle and cap are considered unsterile, whereas the inside area and the solution are considered sterile. The nurse pours the sterile liquid into a sterile container without reaching over the sterile container. While pouring liquids, container is held 6 inches above the sterile field.

Those observing the Surgery (Including the circulating staff)

- Hands are kept behind the back.
- Leaning over the sterile field is avoided.
- Crossing or touching between sterile fields is not done.
- One foot clearance from sterile area is strictly observed.
- Excessive coughing / sneezing inside the OR are avoided.
- Casual observers are not allowed inside the OR.
- Woolen wear of any kind are not allowed inside the OR as it attracts and harbors dust and micro organisms.

Colonized or Infected Surgical Personnel

- Personnel operating with active infection have been linked with outbreaks of infection. Healthcare organizations should implement policies to prevent the transmission of microorganisms from personnel to patients.
- Policies will depend on the infectivity of the person, the type of patient contact and when

necessary the person may be excluded from work.
- The health care personnel may be encouraged to report their illnesses.

Infected Health Care Workers in the OR: HIV, HBV, HCV

- Personnel affected with the above viral infection carry risk of transmitting infection to other health care personnel and to the patients though actual transmission of any blood borne infection from infected health worker to patient is quite low.
- Strict adherence to standard precautions including hand washing, protective barriers and disposal of all sharps helps in controlling any mishap.

All skin lesions on hands are covered with a waterproof dressing and the affected person should not enter the OR complex till the wound is healed. Isolation of infected personnel is important, and the staff is educated about these measures.

4

Monitoring and Surveillance of Sterilization Procedures

Surveillance and monitoring are essential steps in maintenance of sterilization. It is applicable to every facet of the entire process of sterilization including cleaning, packing, autoclaving, antibiotic prophylaxis etc. Good monitoring protocols and surveillance systems enable us to detect deficiencies at an early stage and rectify them and thus prevent mass catastrophe. Sterilization is dependent upon machines and humans; both are prone to error. The causes of sterilization failure can be:

- Inadequate cleaning.
- Item not fully subjected to sterilization process.
- Load failure.
- Pack failure.
- Contamination during handling or storage.

To ensure that the sterility of the OR is not breached or compromised, regular monitoring is essential. The following are monitored:

I. Monitoring of OR environmental sterility (Air, surfaces, water)
II. Monitoring of sterilization procedure (Steam, Gas)
III. Monitoring of effectiveness of sterilization process (Steam, Gas)
IV. Monitoring of surgical supplies (Irrigating fluids, Viscoelastics, intracameral drugs)
V. Surveillance of surgical infections and inflammations
VI. Infection control committee to review outbreaks of infection and to revisit the protocols
VII. Continuous training of personnel and procedures

4.1 Monitoring of OR environmental standards

- An air sample is tested using open dish sedimentation method. In this method culture plates are exposed to the environment for half an hour. Alternately bacterial counter can be used. A fortnightly check is recommended.
- A swab for culture is taken both from sterile and unsterile items on a fortnightly basis.
- Nasal and nail bed swabs of OR personnel are tested on a monthly basis.
- Performance monitoring of the OR ventilation:
  - Regular inspection of filter systems.
  - Pressure differentials across the filters.

- Testing of low or medium efficiency filters and manometer tests for positive pressure.
- Particle counts.
- Pressure differentials qualitatively measured by the smoke test.
- Monitor as to whether intake air is kept clean and free from bird droppings.
- With centralized air conditioners, monitor the ducts for periodical cleaning

4.2 Monitoring Sterilization Procedures

The sterilization procedure is monitored by documentation of cycle time, temperature and pressure gauge by a graphic record. Maintenance of log book is Mandatory. The required details should be entered by the team involved in sterilization either at the end of the day or in between surgeries.

4.3 Monitoring of effectiveness of sterilization process (Steam, Gas)

The effectiveness of the sterilization process can be monitored using chemical or biological indicators.
Steam sterilization

- **Chemical indicators** undergo a change of color on completion of the procedure. One is placed on the outside of each pack and three inside the pack – top, middle and bottom. The indicator tapes must be pasted in a register by the circulating nurse and should be signed by the doctor before starting the first case. A daily Bowie-Dick or similar test for steam penetration in high vacuum autoclaving is recommended. This is dependent only upon the temperature and does not mean that the sterilisation has taken place completely.

- **Biological indicators**
  - Bacillus stearothermophilus spores for monitoring steam and dry heat sterilization.
  - Bacillus subtilis spores for monitoring ethylene oxide sterilization.
  - Preferably should be done every fortnight and the results must be documented.

4.4 Monitoring of surgical supplies

It is also an essential duty of the OR in charge to monitor the supplies used in surgery, which includes the irrigating solutions, viscoelastics, surgical gloves, syringes and other pre packed sterile articles. Some of the guidelines that will help in prevention of surgical site infection are:
Irrigation Solutions
- Should use glass containers, rather than plastic. A collapsible bag is ideal.
- Check clarity of solution and look for any suspended particles.
- Check for leakage and quantity of solution

- In a high volume set up it is preferable to analyze the PH of the Ringer lactate solution and also culture the solution before routine use.
- Ideally the glass container should be autoclaved.

4.5 Surveillance of surgical infections & inflammations

Surveillance of any type of surgical infections (Wound infiltrates, scleral necrosis, endophthalmitis) and unexpected severe inflammations (TASS) with appropriate feedback to the surgeon is important to reduce the risk of such catastrophes. In designing a surveillance protocol, both clinical and microbiological data are essential. The method of data collection should be made easy.

Essential clinical data should consist of the following
- Severity of infection or extent of bacteriological contamination
- Type of operation
- Time period between the procedure and the appearance of infection.

Microbiology laboratory data should be reliable and include
- The complete identification of isolated organisms.
- Their antimicrobial susceptibility tested.

4.6 Create an infection control / quality control team

Team comprises of:
1. Ophthalmologist
2. Nurse in charge of OR
3. Hospital Manager
4. Laboratory In charge

Periodical Tests Done By Infection Control Committee can go a long way in ensuring a safe and effective outcome for most patients undergoing cataract surgery.
- The monitoring protocols should be designed according to the needs of the organisation. Basic principles governing design of monitoring and surveillance have been outlined in the chapter. Readers are encouraged to modify their protocols based on this.
- Both the sterilization procedure and the effectiveness of the sterilization process must be monitored in the following way:
- Checklists of scheduled tasks for cleaning can be prepared on daily, weekly, monthly and quarterly basis.

4.7 Microbiological Parameters, Proposed Frequency of Sampling & Desired Results

Microbiological parameters	Proposed frequency of sampling	Desired result
Monitoring of sterilization process by biological indicators	Monthly	No failures
Monitoring of the OR environment for BCP load	Weekly Especially where the theatre does not have air handling units with adequate filters etc. and physical parameters are not strictly adhered to and monitored	Bacterial Load should be less than 180 per cubic meter or less than 12 colonies when done by sedimentation method using 10 cm diameter agar plate
Assessment of the OR surfaces for presence of Clostridium spores	Utility not very clear except for ensuring Cleanliness	Clostridium spores be absent
Evaluation of operation theatre staff for carriage of Staph. aureus and Beta hemolytic streptococci	Twice a year or more	Carriers and shedders should be adequately treated and reassessed
Air-conditioning units for variable fungal contamination	In dry climatic conditions - 3-4 times in a year In humid climatic conditions- Monthly	Growth of fungi. Adequate disinfection and cleaning measures should be instituted in case of detection
Disinfectant in Use	Monthly	Should adhere to established microbiological standards

5 Checklist for Operating Rooms

1. Daily Cleaning Check List for Eye OR
2. Weekly Cleaning Check List Eye OR
3. Monthly Cleaning Check List Eye OR
4. Quarterly check list
5. Monitoring of the autoclaving procedure
6. Weekly Autoclave Report

Annexure 1

Daily OT cleaning check list for Eye O.T.

Date -

1. Autoclave strip	Y ☐	N ☐	by	
2. Gowns and gloves	Y ☐	N ☐	by	

1. Who checked Pre operative check list?
2. Who checked autoclave strip register?
3. Who filled drum of gowns - gloves? Who checked it?
4. Who checked clarity of Inj. RL?
5. Who did preparation before arrival of surgeon? (Cautery & Microscope in order?)
6. Who did Fumigation & With what? (Formaline, Ecoshield, Bacillocid)
7. Who did cleaning before leaving in evening? (doors should be cleaned every day)
8. Who checked operation & emergency medicines stock?
9. Who put on the U.V. light at night? Who put it off in the morning?
10. Was the chlorination of water tank done yesterday? Who did it?
11. Who checked anesthesia trolley?
12. Who replaced bed sheet of OT table in the evening?
13. Who cleaned equipments / Instruments (Cautery, Suction machine & OT Table) with Na – hypochlorite?
14. Special Note :

Signature of OT – Incharge : _____

Signature of HOD : _____

Annexure 2

Weekly Cleaning Check List Eye OT

Date - Week -

Particulars Checked- ☐ Y ☐ N

1. List of medicines checked? ☐ Y ☐ N By who? _____
(Daily use + Emergency medicines)

2. Eye OT Check list checked? ☐ Y ☐ N (List except medicines) By

3. Did In Charge prepare the list of OT staff posting? ☐ Y ☐ N

4. Who submitted Auto Clave report? Who checked it? ☐ Y ☐ N

5. In charge checked the list of Sunday works done or not done ? ☐ Y ☐ N

6. Cleaning done on Saturday by shifting things ? (Microscope, OT Table) ☐ Y ☐ N

7. Flaming of sink done ? Who did it ? ☐ Y ☐ N

8. Walls and floor of OT cleaned with Sodium Hypochlorite ? ☐ Y ☐ N Who did it ?

9. Autoclave room fumigated on Saturday after cleaning ? ☐ Y ☐ N Who did it ?

10. A/C Filters cleaned ? ☐ Y ☐ N Who cleaned ?

11. Instruments cleaned ? ☐ Y ☐ N (Check blade and change it if necessary). Who cleaned?
(Check two way cannula)

12. Staff nail cut checked ? ☐ Y ☐ N Who checked ?

13. Chlorination checked ? ☐ Y ☐ N Who did it ?

14. Water changed in autoclave machine ? ☐ Y ☐ N Who did it ? (Change every fortnight)

15. Bottle of surgical scrub and bottle of liquid soap cleaned & autoclaved ? ☐ Y ☐ N
Who did it ?

16. Expiry dates of medicines checked ? ☐ Y ☐ N Who did it ?

17. Were the Operating Microscope lenses cleaned ? ☐ Y ☐ N By whom?

18 Special Note :

Signature of O.T. – Incharge: _____ Signature of HOD: _____

Annexure 3

Monthly Cleaning Check List Eye OT

Date - Month -

Particulars Checked - ☐ Y ☐ N

No Particulars Month / Date

1. Overbook of change of OT assistant posting checked ? ☐ Y ☐ N
2. Swab sample culture done on every second Saturday ? ☐ Y ☐ N
3. OT A/C cleaned by air blower cleaner on last Saturday ? ☐ Y ☐ N
4. Did in-charge check the washing of OT on last Saturday ? ☐ Y ☐ N
5. IOL Report completed or not ? ☐ Y ☐ N
6. Lecture delivered and exam conducted for OT staff ? ☐ Y ☐ N
7. Who cleaned the water tank ? On which day ? ☐ Y ☐ N

_____

8. Drum cleaned ? Who did ? Holes checked ?

_____

9. Windows cleaned or not ? ☐ Y ☐ N
10. Special Note : _____

_____

Signature of O.T. Incharge :_____

Signature of HOD : _____

Annexure 4

Quarterly Check List

Date - Quarter -

No of Particulars -

1. Cock filters of scrub area changed ? ☐ Y ☐ N
2. Stock taking done ? ☐ Y ☐ N
3. Stock statement prepared ? ☐ Y ☐ N Copy sent to store ? ☐ Y ☐ N
4. Acid cleaning of water pump of auto clave machine done ? ☐ Y ☐ N
5. Special Note :

Signature of O.T. Incharge :_____

Signature of HOD : _____

Annexure 5

Monitoring of the autoclaving procedure

Autoclave Logbook										
Date	Particular	Pre Vacuum	Steam Pressure	Sterilization	Steam Pressure	Dry Time	Total Time	In Sig.	Out Sig.	Remarks

Annexure 6

Weekly Autoclave Report

Autoclave Repot from_____ to _____ Report prepared on _____

Autoclave by		**Eye OT**	**OPD**	**Total**
Monday	Small			
	Big			
	Tray			
Tuesday	Small			
	Big			
	Tray			
Wednesday	Small			
	Big			
	Tray			
Thursday	Small			
	Big			
	Tray			
Friday	Small			
	Big			
	Tray			
Saturday	Small			
	Big			
	Tray			
Total				

Preparation as per no. of operations	Total Eye OT	Operations done Day	Eye OT	Autoclave No. 1	2	3	4	Total drum+ tray	•When needed •Started in morning	Note
Mon		Mon								
Tue		Tue								
Wed		Wed								
Thur		Thur								
Fri		Fri								
Sat		Sat								

Report Prepared By : _____
Signature of I/C : _____
Signature of HOD : _____
Note : _____

Additional Check lists for OR efficiency

Daily Check List

1. Daily posting of OT staff / Preparation of OT check list.
2. Daily OT Report
3. Daily OT Particulars Report

Weekly Check List

1. Weekly OT staff posting Report
2. Check list of work to be done by OT boy on Sunday
3. Weekly Medicine + Others Check List (Eye OT)

Monthly Check List

1. Monthly over of O.T. Assistant
2. Operation Theatre Training Schedule (Eye OT)

Quarterly Check List

1. Quarterly Check List OT Next Day Planning Report

Annexure 7

Daily posting of OT staff / Preparation of OT check list

Date -

Particulars	**Eye OT**
No.of operations done	
Time of start of operation	
Time of end of operation	
How many Doctors attended OT	
No.of nurses + Field staff	
No.of OT Tables – Assistants	1.
	2.
	3.
No.of OT Assistant	
No.of PCA	
Note:	

Particulars		Kept		Used	
No.of Gowns					
No.of Sheets					
No.of instruments sets					
No.of RL					
No.of gloves					
Inj.Visco	Vial Pf				
Phaco	Probe (No)				
	Needle (No)				
1 to 5 Operation	Gown 1 drum	Gown No.8	6 to 10 Operation	Gown 2 drum	Gown No.16
	1 Drum Sheet	No.of sheet 20		1 Drum Sheet	No.of sheets 40
	Instrument set 1 Drum	6 Sets		Instrument set 1 drum	12 sets
	Inj.RL 1 Drum	6 Nos.		Inj. RL	12 Nos.
	Inj. Viscoment	7 Nos.		Inj.Viscomet	13 Nos.

Report Prepared By : _____

Signature of in charge : _____

Signature of HOD : _____

Note: _____

_____

Annexure 8

Daily OT Report

Date - Day OT Start Time - OT End Time - Total Time -

Name of doctor attended	Names of Nurses attended	Names of Assistants
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6

Note : Enter data in box
Information about patients
Operated
Adults : Age Group

Male : 15 to 35	☐	Female : 15 to 35	☐	Children Age Group	
35 to 50	☐	35 to 50	☐	Infant : < 1yrs:	☐
50 to 60	☐	50 to 60	☐	Boys : 1 to 15	☐
Above 60	☐	Above 60	☐	Girls : 1 to 15	☐

Details about type of operation done:
A)
B)
C)
Total No. of Operations:

1. Total Cataract	☐	1. Squint	☐
2. Phaco with IOL	☐	2. Lid Surgeries	☐
3. Non-Phaco with IOL	☐	3. DCR	☐
(SICS / ECCE)	☐	4. Glaucoma	☐
4. IOL	☐	5. Pterygium	☐
5. Non-IOL	☐	6. Vitrectomy	☐
6. Combined Cataract with AGS	☐	7. Retinal Detachment	☐
8. Corneo / Scleral Tear Repair	☐		
9. Minor	☐		
10. Corneal Surgeries (Keratoplasties)	☐		

Complications:

_____

Annexure 9

Daily OT Particulars Report

S.No.	Particulars	Date
1	Cleaning of anesthesia trolley. Do Dusting	
2	Trolley M Top Tray includes No. 2.5 to 9 Endo – Tracheal tubes small – large catheter for suction No. 0-4 face mask xylocaine jelly Halothane bottle Middle tray includes Laryngoscope with its 3 blades connection connecting trolly & tube **Injection Tray** — Inj. / Filed Inj. / (G.A) **Ampoule** — Atropine / Adrenaline / Mephentine	
	No. 0-4 oral airways connected cylinders filled with Nitrous & Oxygen Small-Large size spanner Both circuit — Upper (Bains) / Lower (Closed) / Children (Pediatrics)	
	Lower tray Adult & pediatric ambu bag with valve & mask	
3	Things needed by Anesthetist except trolley	
	Instruments : Cardiac monitor pulse oximeter, B.P, Stethoscope, Suction machine	
	Medicines	
	Spinal and G.A. Injection Emergency drugs Intra Venous fluids,	
	Filler sign OT In Charge Sign	

- Additional things lying in trolley are shifted to their respective places.
- Cloth covering trolley is changed every week. Old ones are sent for washing.

Annexure 10

Weekly OT staff posting Report

Period from:_____ To _____

Day	Block	Circulation	Assistants						Field Staff	Note about leave
			1	2	3	4	5	6		
Monday										
Tuesday										
Wednessday										
Thursday										
Friday										
Saturday										
Sunday										

Remarks: _____

(2) OT Assistant

Day	Eye OT		Autoclaving
	Main OT	Minor OT	
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

(3) OT PCA

Day	EYE OT	Cloth washing	Instrument cleaning	As per need
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

Remarks:_____Prepared by: _____
Signature of I/C :_____Sign. of HOD:_____

Annexure 11

Check list of work to be done by OT Assistant on Sunday

SL.No.	Particulars	Month/Date	Reason if not done
1	Autoclave of both OT		
2	Cleaning of preparation room of both OT		
3	Cleaning of both Autoclave room		
4	Rolling of linen		
5	Help if emergency OT happens		
6	Folding & arranging clothes in the changing room		
7	Leave for home after checking G/A Trolley with Oxygen / Nitrous oxide cylinder		
8	Chlorination of water in the tank		
9	Cleaning of povidone iodine bottle / liquid soap bottle & its autoclaving		

Report Prepared By : _____

Signature of I/C : _____

Signature of HOD : _____

Annexure 12

Medicine + Others Weekly Check List (Eye OT)

1	Intravitreal Inj.											
2	Gentamycin 80 mg											
3	Dexamethasone 2mg.											
4	Xylocaine 2%											
5	Bupivacaine 0.5%											
6	Ampicillin 500mg											
7	Hyaluronidase											
8	Pilocarpine											
9	Adrenaline											
10	50% Dextrose											
11	Sodabicarb											
12	Dopamine											
13	Alprax											
14	Mefentine											
15	Hydrocortisone											
16	Aminophylline											
17	Deriphylline											
18	Atropine											
19	Pentazoscine											
20	Phenergan											
21	Distilled water											
22	Pentothal 0.5mg											
23	Calcium Gluconate											
24	Chlorpheniramine											
25	Inj. Frusemide											
26	Viscoelastic											

27	Suction Machine (Big)										
28	Torch-3										
29	Anesthesia Trolley with 02N20 Cylinder										
30	Scissors (Big)										
31	IV Set										
32	Scalp vein										
33	Pulse oximeter										
34	Mannitol (100 ml)										
35	Mannitol (350 ml)										
36	Ringer Lactate										
37	5% Dextrose										
38	5 Glucose saline										
39	Oxygen cylinder pressure gauge with flow meter										
40	Nasal prongs										
41	Ambu bag with mask										
42	Laryngoscope with all blades										
43	Endotracheal Tube No. 3,5 to 9										

Filler Sign._____ O.T. – Incharge Sign. _____

Verifying Doctors Sign. _____

Annexure 13

Monthly hand over of O.T. assistant

EYE OT

S.No.	Particular		Month / D. O. C
1	Are coils of all autoclave Machine in order ?	Y/N	
2	Are coils, Ping, Ring, of all autoclave Machine in Position?	Y/N	
3	Are E.T.O. machine & High speed Machine functional?	Y/N	
4	Is table for preparation clean and well set?	Y/N	
5	Is autoclave room thoroughly clean?	Y/N	
6	Are broken punctured drums, tray segregated?	Y/N	
7	Is daily autoclave report prepared everyday? NOTE:	Y/N	

Signature of person handing over	Name	Designation	Signature
Signature of person taking over			
Signature of O.T. In charge			
Signature of Verifier			

Filler Sign : _____

O.T. - In charge Sign : _____

Verifying Doctors Sign : _____

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VISION 2020: The Right to Sight is the global initiative for the elimination of avoidable blindness, a joint programme of the World Health Organization and the International Agency for the Prevention of Blindness with an international membership of NGOs, professional associations, eye care institutions and corporations. VISION 2020: The Right to Sight INDIA is a key driver of this initiative in India.

Vision

An India free of avoidable blindness, where every citizen enjoys the gift of sight and the visually challenged have enhanced quality of life as a right.

Mission

To work with eye care organizations in India for the elimination of avoidable blindness by provision of equitable and affordable services as well as rehabilitation of visually challenged persons through development of appropriate policies, quality standards, advocacy, training, and promotion of best practices with a special emphasis on the poor and marginalized sections of society and underserved areas.

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