Guidelines For:

QUALITY CATARACT MANAGEMENT

In Secondary Level Eye Centres

Developed by:

Venu Eye Institute & Research Centre and Sewa Rural

along with Sightsavers International

Foreword
Cataract Management : Best Practices

In recent years significant emphasis has been placed on eye care programmes that target people who are blind from cataract. This has led to reductions in levels of avoidable blindness, particularly in countries such as India where some 5 million cataract operations are conducted annually. Experienced surgeons can carry out more than a thousand surgeries a year. The cost of surgery is relatively low – as little as $20 in some countries and cataract surgery has been shown to be one of the most cost effective of all health care interventions.

So why may we ask does cataract remain the single most important cause of blindness in the world? It is estimated that globally some 17.6 million people are blind due to cataract – 39% of the world's 45million blind people.

There are many barriers to the uptake of cataract surgical services but one of the most important is the quality of the surgery and the subsequent visual outcome of the patient. It is a sad fact that not all cataract operations result in the restoration of sight and that not all surgical centres meet the expected quality standards laid down by the World Health organization. In poor rural communities particularly, nothing is likely to reduce the demand for cataract surgery more than someone returning from a hospital having had a cataract operation and telling their neighbours that they still cannot see.

It is for this reason that this manual, which focuses on best practice in managing cataract, is so important. It is extremely practical and will be of considerable assistance for surgeons, other ophthalmic staff and programme managers involved in the delivery of cataract surgical centres.

I would like to commend all those involved in the initiative to produce this manual – particularly Dr. Uday Gajiwala Associate Director, Eye care programmes of Sewa Rural, Gujarat; Dr. Harsh Goel, Consultant and Dr. Subodh Sinha, Consultant of Venu Eye Institute Delhi and Pankaj Vishwakarma, Regional Programme Officer of Sightsavers India. The manual will serve many people well both within India and in many other countries.

Peter Ackland
Director of Overseas Programmes
Sightsavers International
January 2007

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The National Programme for the Control of Blindness has made remarkable progress ever since its inception in 1976, with the prevalence of blindness coming down to 1.1%. Though cataract remains the largest cause of visual impairment in India, its contribution to blindness has reduced from 80% in 1989 to 63% currently. The country does around 5 million cataract operations a year and increasing attention is given to outcome.

Sightsavers International has been working in India since 1966 for the eradication of avoidable blindness and the inclusion of those with irreversible blindness. Sightsavers has developed a manual to provide guidelines to eye centres regarding the minimum standards to be followed in managing cataract.

This manual will be useful for decision makers, managers, and most importantly, ophthalmic personnel – ophthalmologists and paramedics in maintaining quality standards in cataract management.

I congratulate Sightsavers International for this laudable effort and would encourage all persons involved in ophthalmic services to make use of the valuable information provided in this document.

With regards.

Yours Sincerely,

Rjose

(Dr. (Mrs.) R.Jose)

Elizabeth Kurian
Regional Director
Sightsavers International – India Region

Acknowledgements

The development of these guidelines was initiated by Sightsavers International – India Region and is the culmination of consultations with partners, experts and Sightsavers staff to look at quality in cataract management in a context that is feasible for secondary eye centres in the more challenging environments in India. It largely addresses basic practice that cannot be compromised upon, and has been developed as a working document in view of the advances in technology expected over time.

It would not have been possible to develop it without the support and generous time provided by several individuals.

We are extremely thankful to Ms Tanuja Joshi, Dr Harsh Goel and Dr Subodh Sinha from Venu Eye Institute & Research Centre, Delhi and Dr Uday Gajiwala and Dr. Rajesh Patel of SEWA Rural, Gujarat for developing this document. Their wisdom and knowledge have contributed to a learning that has tremendous implications on the quality of services and thereby quality of lives of people after cataract surgery.

We appreciate the support and direction provided by the National Programme for the Control of Blindness (NPCB), under the leadership of Dr Rachel Jose - Additional Director General (Ophthalmology). NPCB India has emerged as a leading government initiative worldwide and we look forward to continuing working together through VISION 2020: The Right to Sight - India for the eradication of avoidable blindness.

We are thankful to Dr Rajesh Noah, Executive Director, VISION 2020: The Right to Sight – India for facilitating expert review of this document and for building it further as a VISION 2020: The Right to Sight resource.

We are grateful to Dr Abhishek Dagar of Venu Eye Institute & Research Centre for support with the editing and Mr. Amit Kundaliya from their EDP Department for the layout.

We appreciate the valuable support of Sightsavers staff, especially Pankaj Vishwakarma, Regional Programme Officer, in the development of this document, that can serve as a reference guide not only for India, but any developing country that has/intends services to manage cataract.

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Regional Director, Sightsavers International – India Region
&
Treasurer, VISION 2020: The Right to Sight - India

October 2008

Sightsavers International's Mission: We are an international organisation working with partners in developing countries to eliminate avoidable blindness and promote equality of opportunity for disabled people.

Saving Sight Changing Lives

Table of contents

Chapter - 1
STANDARDISATION

1.1 Some definitions

(Source: Oxford Reference Dictionary 2001, OUP)

Standard (origin: Old French ***estendart***)
Noun: 1. A level of quality or achievement.
2. A required or agreed level of quality or achievement.
3. Something used as a measure in order to make comparisons.
Adjective: 1. Used or accepted as normal or average
2. (Of a size, measure etc) regularly used or produced.

Standardise
Verb: Cause to conform to a standard
Derivatives: Standardisation/ Standardisation

1.2 The need for Standardisation

Every organization strives for the following three goals:
1. Better quality of services/products
2. Higher volumes in terms of clients/sales
3. Sustainability
4. Safety
All four goals can be achieved by Standardisation.

1.3 How does Standardisation help?

Standardisation helps through:
1. Enhanced efficiency
2. Reduced complications
3. Improved monitoring
4. Cost effectiveness
5. Replication
6. Costing and budgeting

1.3.1 How does Standardisation enhance 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, because even a minor deviation from the standard protocol is easy to identify and rectify. In the absence of team leader, the team can continue to work efficiently by adhering to the standard protocols. Also, when new entrants join a particular team, all members of the team can participate in the training and orientation of the newcomers.

1.3.2 How does Standardisation help in monitoring?

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

1.3.3 How does Standardisation help in 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.

1.3.4 How does Standardisation increase cost effectiveness?

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

1.3.5 How does Standardisation help in 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.
- In an external organization doing similar kind of work.

1.3.6 How does Standardisation help in costing & budgeting?

Standardisation 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.

1.4 Standardisation: limitations

Standardisation of procedures means that all persons working in the organization adhere to these, which do not leave any room for personal preferences or idiosyncrasies. Such a situation may lead to minor irritants and ego related issues. However, in the interest of smooth functioning of the organization, it is imperative that such minor irritants are not allowed to derail the processes and protocols of the organization. Standardisation also leaves little room for innovation, hence should be periodically reviewed and upgraded if required.

1.5 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 & schedules
    c. Maintenance schedules
5. Consumables
6. Procedures and protocols
7. Training programmes

Chapter - 2

Preop Vision Testing

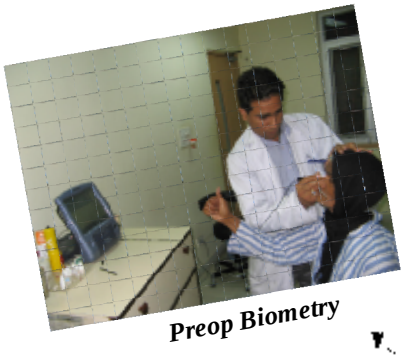
Preop File Documentation

Preop Slit Lamp Examination

Betadine Eye Drops Prior to Surgery

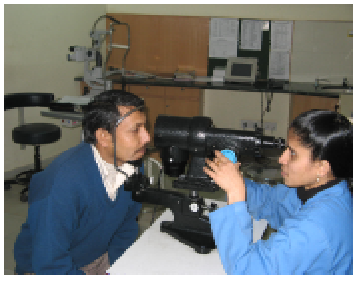
DIAGNOSIS AND PRE-OPERATIVE PROTOCOLS

Indirect Ophthalmoscopy



Preop Biometry

Preop Blood Pressure Check



Keratometry

DIAGNOSIS AND PRE-OPERATIVE PROTOCOLS

2.1 AIM OF EVALUATING AND MANAGING CATARACT

1. Does lens opacity correspond / contribute to degree of visual impairment?
2. Will lens removal provide sufficient functional improvement to warrant surgery?
3. Is the patient sufficiently healthy to tolerate surgery?
4. Is the patient or another responsible person capable of participating in post-operative care?
5. Is the lens opacity secondary to a systemic or ocular condition that must be considered when planning surgery?

2.2 CATARACT DIAGNOSIS

2.2.1 Complaints

The chief complaints related to cataract are:

- Painless gradual, progressive reduction of Functional vison.
- Glare, especially while driving at night.
- Monocular diplopia / polyopia.
- Frequent spectacles change.
- Reduced contrast sensitivity.

2.2.2 Relevant History

The relevant history pertaining to the medical fitness of the patient to withstand the surgical stress, post-operative medication and general care are recorded before surgery. Also the prognosis of visual recovery after surgery is discussed.

a) Systemic

Essential:

- HT /DM /IHD/COPD
- Recent Fever
- Allergies/Bleeding Disorders/Septic Focus.
- Systemic medication/Surgeries, especially organ transplants.
- Known sensitivity to Local Anaesthetics.
- Subjective visual disability, depending upon the patient's
    - o Occupation
    - o Life Style
    - o Addictions

Desirable:

- History of exposure to HIV and Jaundice.
- Blood pressure recording and blood sugar examinations are conducted at screening camp site itself. This is to be done to avoid bringing medically unfit patient to hospital.

b) Ocular

Essential:

- Previous use of spectacles/Contact Lenses.
- Family history of eye diseases.
- Trauma, lazy eye, Redness of eye.
- Other ocular conditions.
- Previous surgery in any eye.
- Any ocular medication.

2.2.3 Examination

a) Systemic

Essential:

- Blood pressure
    - o Systolic < 140 mm of Hg
    - o Diastolic < 90 mm of Hg
- Blood sugar
    - o FBS < 110 mg %,
    - o PPBS < 140 mg %
- Control of COPD (patient should be able to lie down comfortably through out the surgery)
- Stoppage of antiplatelets / anticoagulant medications minimum 3 days before surgery.

Desirable

- ECG in all patients above the age of 40 years.
- Physician's / Cardiologist / Anaesthetist clearance.

b) External

The external examination is carried out to detect / exclude the following:

Essential:

- Strabismus (to rule out ambylopia in the eye to be operated).
- Lid diseases and deformities (to be treated before cataract surgery).
- Lacrimal system function: If the surgery is contemplated within 48 hours, ROPLAS test is sufficient; Syringing is avoided as it may cause

undue trauma, besides dislodging commensal / pathogenic micro organisms which are otherwise dormant. (Sac surgery is done first and then intra ocular surgery is done at least two weeks after sac surgery).

- Pupillary reactions (direct and consensual).

Desirable:

- Complete pre operative work up to be done at the camp site to reduce the rejection rate.

c) Ocular

Any lenticular opacity is a cataract. What remains to be decided is whether and when the patient requires surgery. The current concept of classifying cataracts as operable and pre-operable is also subjective, based partly, upon the subjective visual disability of the particular patient and his visual need. The following should guide the examiner:

Essential:

- Recording the Visual Acuity, Presenting and Pinhole assisted / Best Corrected VA in both eyes. (Perception of light and projection of rays has to be accurate in all cases).
- Torch light Assisted Magnified / Unmagnified Examination is Not Sufficient.
- Complete ocular examination with Slit lamp to exclude ocular co- morbidity, especially corneal disorders.
- Slit lamp assisted Cataract grading.
- Dilated Fundus Examination, in both eyes.
- Intra-Ocular Pressure (IOP) estimation of both eyes.
- Keratometry and Biometry of both eyes is required to calculate the required IOL power.
- It is advisable to explain, in advance, about the visual prognosis to the patients and attendants.
- In cases of guarded / poor visual prognosis the cause need to be assessed and a special written informed consent is obtained from the patient attendant, in his language.

Desirable:

- Intra-Ocular Pressure (IOP) estimation is ideally by Applanation Tonometer.
- USG B-Scan in Mature Cataracts, Traumatic Cataracts and Vitreo-Retinal disease patients is required to rule out posterior segment pathology.
- Macular Functions (Red and green colour perception and differentiation and / or Maddox rod test).

2.3 PRE-OPERATIVE PROTOCOLS

The following are guidelines for pre-operative management in Cataract Surgery

Essential:

- Labelling of the case sheets and the patient for systemic disorder and special situations.
- Systemic diseases, if any, warrant proper documentation and treatment prior to surgery. Take physician and cardiology clearance if required.
- Dont operate on the day of admission when contact procedures like tonometry and biometry have been carried out.
- Topical antimicrobials, for a minimum of 24 hours pre-operatively and 5% topical Povidone iodine Eye drops before surgery are preferred.
- No sublingual anti hypertensive agents is given to control blood pressure quickly.
- Systemic Acetazolamide is not recommended for routine use rather, it can be used only if pre-operatively the IOP is raised.
- Sedatives are best avoided; these are used only if indicated.
- Pre operative counselling with patient and relatives.
- Written Informed Consent preferably in local language for the surgical procedure.
- Separate Consent For High Risk / Poor Prognosis patients is a necessity for legal reasons.
- The patient have a head bath, face wash and shave (Male Patient) prior to surgery.

- Marking the eye, prior to operation, aids in proper identification.
- For pupillary dilatation: Mydriatic + NSAIDS Phenylephrine in patients with IHD & HT is avoided.
- To maintain sterility of OT, patients wear head cap / clean gown / foot covers when entering Operation Theatre.
- One-eyed patients, cataract with other ocular co-morbidity, complicated cataracts and paediatric cataracts are marked and operated by experienced surgeons.

Desirable:

- Eyelash trimming is avoided after learning the technique of covering eye lashes under plastic drape.
- Feet wash of the patient.

Chapter - 3

SURGICAL PROTOCOLS

Preop Bloodpresure Check

Blood Sugar Testing

Patient Shoecover

Betadine Paint

Block

Phaco Machine

Instrument Packing

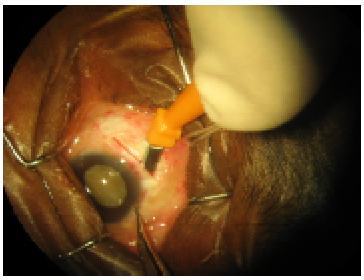
Surgeon Scrubbing

Surgeon Gloving

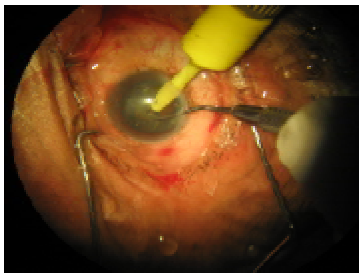
Surgery Under GA

Patient Monitoring During Surgery

Surgery



Manual small incision Cataract Surgery



Phacomulsification

Following are simple instructions on how to wear sterile pre-powdered gloves, without an assistant's help.

1. Hold the folded cuff of the right glove from the in turned side with your naked left hand, and gently push your right hand in. Pull up the right glove carefully, always holding it from the inside.



2. Now hold the left glove, by insinuating your right hand fingers, gently under the folded cuff, so as to always touch from the 'outer' more sterile area. Pull up the left glove gently as the right one, but now be careful, to hold it from the 'outside'. In the end both the gloves should be covering the sleeve of the gown, without leaving any bare wrist.



SURGICAL PROTOCOLS

3.1 TYPE OF CATARACT SURGERY

It is imperative to decide about the type of cataract surgery in advance. Type of Cataract, hardness of the nucleus (nuclear sclerosis), associated ocular morbidity, status of cornea, equipments available in OR and surgical experience of the operating surgeon are important factors while deciding the type of cataract surgery in a particular patient.

In a patient with hard brown nucleus, Phaco surgery is avoided particularly in a setup where facilities of specular microscopy, kerotoplasty and vitreo-retinal surgery are not available.

Young patients with only central PSC or early cortical cataract can remain unsatisfied after conventional ECCE and PCIOL due to delayed rehabilitation and high post operative astigmatism. In these patients Phaco with foldable IOL is the ideal technique. In absence of Phaco machines, Temporal SICS with PCIOL is an optional surgical technique. Paediatric cataract surgeries can preferably be done by an experienced surgeon as surgical planning and post operative management of Paediatric cataract is equally important.

3.2 TREAT WITH CAUTION IN TRICKY SITUATIONS

- One eyed patients, children and young patients with poor prognosis / high risk patients,and complicated / combined procedures are operated by experienced and competent surgeon as chances of intra and post operative complications can lead to dissatisfaction among these patients.
- Patients requiring special attention as mentioned above should be especially marked and should not be the first or the last cases of the day.

3.3 SOME BASIC RULES TO REMEMBER

- Case records are checked at every stage to avoid any mixup such as wrong patient and wrong eye, for that eye to be operated needs to be marked with marker pen or sticking plaster.
- Needles must be disposed after single use.
- Surgical instruments are sterilized after each case.
- Both surgeon and assistant scrub after every surgery.
- One suture is used for one surgery. The remaining can be recycled after proper sterilization.
- Ringer lactate in glass bottle and visco-elastic autoclaved and cooled are use.
- Standard IOL Power is not used. Biometry and Keratometry needs are advocated in all patients undergoing cataract surgeries.
- Proper documentation of procedure and complications is done.
- Surgery is postponed or deferred if IOP is more than 30 mm of Hg in spite of all medications, except in lens-induced glaucoma.
- OR list should be prepared.

3.4 ANAESTHESIA

- It is important to keep the emergency kit ready (Details in Annexure no. 8) and all equipments for cardiopulmonary resuscitation in the place where anaesthesia is given. One person in OR can be given responsibility of checking emergency kit and equipments before start of OR services.
- Standby anaesthetist is advisable where feasible and is a must if the patient is having severe cardiopulmonary diseases.
- Communication with patient is important while anaesthesia is given to detect any anaesthesia related complication at the earliest.
- Topical Anaesthesia may be used in appropiate cases for phacomulsification surgery.
- Peribulbar area is painted with 10% Povidone Iodine.
- Peribulbar anaesthesia is preferred. The anaesthetic solution consists of a 1:1 mixture of 2% lignocaine with adrenaline and bupivacaine 0.5%; hyalyronidase in the concentration of 25 IU/ml.
- Retrobulbar + facial (O'Brien's) is an option. Lid infiltration reinforcement for facial nerve block is avoided.
- Care is taken while giving anaesthesia in a high myopic patient to avoid globe perforation.
- Ocular Hypotony – a soft eye is required for

ECCE and PCIOL. Adequate hypotony using super pinky/gentle digital massage is done.

- Super pinky/digital massage is avoided in eyes with subluxated lenses, re surgeries and perforating injuries.
- It is important to document repetition of anaesthesia and inform the surgeon about any repetition such.
- After anaesthesia, instillation of Povidone iodine 5% eye drops helps to maintain sterility of eye.

Desirable

- Secure IV line using butterfly or vinflow in high risk cases, it may be required in an emergency situation.

3.5 OR TABLE PROCEDURES

- It is ensured that the patient is comfortable on the operation table.
- The patients's head and body properly aligned and NIBP / pulse oxymeter probes are applied to monitor the cardiopulmonary status during the surgery.
- Surgical area is cleaned with Povidone iodine 10% and is allowed to dry for minimum two minutes.
- Draping is done with sterlile disposable drapes taking complete sterlile precautions.
- Ample amount of air supply to the patient is ensured to prevent suffocation.

3.6 SURGICAL STEPS

3.6.1 Extra-Capsular Cataract Surgery

Separation of eyelid:

The aim is maximum exposure and minimum pressure on the globe. Lid speculum is convenient to use.

Bridle suture:

Superior rectus bridle suture helps to keep the eyeball rotated downward, and to lift a deeply set globe from the orbit. A round-body curved needle with 4 - 0 silk suture is used.

Conjunctival flap:

Superior fornix based conjunctival flap is preferred over the limbus-based conjunctival flap as it gives better view.

Cautery:

Adequate bipolar cautery is done for hemostasis. Vigorous cautery is avoided. Cautery is contraindicated in old scleritis / scleral thinning.

Corneo-scleral section:

Corneal scleral section, bi- or tri-planar is done for better wound stability. A half-thickness groove is made with a disposable blade (no.15 or no.11) or razor blade tip on a Castroviejo blade breaker. Location of the groove is usually midlimbal. Size of incision depends on the expected size of nucleus.

Anterior Capsulotomy:

Anterior chamber is entered at a point around 10 to 11'o clock position. Aqueous is replaced with visco-elastic. Anterior capsulotomy is made with bent 26 G disposable needle attached on to a syringe or utrata forceps.

The anterior chamber is deepened adequately before entry to protect the corneal endothelium and iris. Anterior capsulotomy is preferably done under higher magnification. Continuous Curvilinear Capsulorrhexis (CCC) is an ideal anterior capsulotomy technique, with envelope technique being an optional choice. Anterior chamber is maintained deep while doing anterior capsulotomy. Following anterior capsulotomy corneoscleral incision is completed using corneoscleral scissors.

Hydrodissection:

Good hydrodissection helps in subsequent steps such as nucleus delivery and irrigation – aspiration of cortex. Hydrodissection could be avoided in posterior polar cataract and traumatic cataract.

Nucleus delivery:

Nucleus delivery is done using bimanual technique.

One instrument, which is usually a Muscle hook, is placed just within the limbus at 6'o clock. The other instrument, which is usually a Collubri forceps or a vectis, is placed with the other hand at 12 'o clock about 2 mm behind the wound on the sclera, is pressed gently posteriorly toward the centre of the globe. Endothelial damage by nucleus dragging against the endothelium should be avoided. If there is any difficulty in nucleus delivery, possible reasons such as inadequate incision, incomplete capsulotomy and small or rigid pupil could be assured and appropriately advised.

Cortical irrigation/aspiration:

The cortex is removed by a manual irrigation-aspiration system. A closed and deep anterior chamber is ensured before starting irrigation-aspiration system. The wound is closed with 2 interrupted sutures. Ensure coaxial illumination of the microscope and good clarity of the cornea. Cortex at 12 o'clock position is removed by introducing the canula from one end of the corneoscleral incision. During cortical removal, 'Ring reflex' acts as a useful guide in preventing posterior capsular rent.

IOL implantation:

This is best done under viscoelastics after ensuring that the anterior chamber is deep. The power and other specifications of the IOL as printed on its container must be checked and tallied with the patients' case record before IOL implantation.

Peripheral Iridectomy:

Peripheral iridectomy is done in specific situations such as in case of vitreous prolapse (not necessary if good vitrectomy is performed), in patients with diabetes and uveitis, when the IOP is borderline and in Anterior Chamber lens implant.

Wound closure:

The aim of corneal scleral suturing is to have a water–tight and secure closure with minimum induced astigmatism.The sutures is adequately tight, equidistant radial sutures with equal bites. The number of sutures depend on the length of section. To avoid irritation, the suture ends are trimmed close to knots and the knots are buried in cornea or covered by conjunctiva properly. Conjunctival flap is repositioned and sub-conjunctival injection of antibiotic and steroid is given.

3.6.2 Small Incision Cataract Surgery:

Manual small incision cataract surgery offers nearly all advantages of phacoemulsification besides having some added advantages. When compared to conventional ECCE with PCIOL, manual SICS offers better wound stability, early rehabilitation and greater patient comfort, less post-operative astigmatism and less post-operative visits. Manual SICS has some advantages over phacoemulsification as this technique is machine independent, has wider applicability and easier learning curve.

Cases ideal for beginners:

The following types of cataracts are ideal for manual SICS

- Nucleus sclerosis grade 1 and 2
- Normal anterior chamber depth
- Clear and healthy cornea
- Well dilated pupil
- No associated ocular morbidity

Speculum and Bridle Suture:

The bridle suture is placed beneath the tendon of the superior rectus/ lateral rectus muscle depending on the site of incision. This is specifically important in manual SICS as it is an essential step which not only fixes the globe during the initial steps of surgery like tunnelling and paracentesis but also provides a counter traction force during procedures like nucleus and epinucleus delivery, thereby enhancing the efficiency of these techniques.

Conjunctival Flap:

A small fornix based conjunctival flap (8mm length and 4mm width) is preferred. Gentle and just adequate cautery is then applied.

Side Port Incision:
One side port entry is usually made using a 15 degree super blade at the 10 o'clock position or perpendicular to the centre of tunnel, in the clear cornea. Through the side port entry viscoelastic is injected to make the eye ball firm to allow easy construction of corneal scleral tunnel.

Wound construction:
The construction of the scleral tunnel consists of the following steps:
- External scleral incision
- Sclerocorneal tunnelling
- Internal corneal incision into the anterior chamber

External scleral incision:
External scleral incision or scleral groove could be one-third to half – thickness 1.5 to 2 mm from the surgical limbus. Frown – shaped incision is preferred. Center of the frown incision should be 1.5 mm from the clear cornea. Temporal SICS is considered better then superior SICS. The length of the external scleral incision depends on nucleus density. Usually an external scleral groove of 6 – 6.5mm length is made. Instruments that are commonly used for making the external groove are razor blade fragments or a # 15 surgical knife or a diamond knife.

Sclero-corneal tunnelling:
The sclero-corneal tunnelling is preferrably done with a bevel-up crescent blade. It is uniform in thickness and extended up to 1-1.5mm into the clear cornea. During tunnelling forward, raise the tip and depress the heel of the blade to prevent premature entry into the anterior chamber.

Internal corneal incision:
This is done using a sharp 3.2 mm keratome. The heel of the keratome is raised until a dimple appears on the corneal surface. Extension of internal corneal incision is made using the same keratome or a 5mm keratome.

Capsulotomy:
Unlike Phacoemulsification, manual SICS is done with any type of capsulotomy but large CCC or CCC with relaxing incision is preferred.

Prolapse of Nucleus:
Adequate hydrodissection and hydrodilineation is mandatory for prolapse of nucleus into anterior chamber. Prolapse of nucleus into the anterior chamber is done by hydroprolapsing method, mechanical method using Sinsky Hook or by bimanual technique using two instruments.

Nucleus Extraction:
Nucleus extraction is done by any of the following methods depending on the surgeon's preference
- Irrigating Vectis Technique
- Blumenthal's Technique
- Viscoexpression Technique
- Phaco Sandwich Technique
- Phacofracture Technique
- Fish Hook Technique

It is important to protect corneal endothelium, iris and posterior capsule from mechanical injury during nucleus extraction by using plenty of visco-elastics.

Cortex aspiration:
The cortex aspiration in SICS by manual technique is done in the same manner as in ECCE except for a management of 12 o'clock cortex. 12 o'clock cortex can be managed by using J shaped canula or adopting sideport approach.

IOL implantation:
IOL implantation is done under visco-elastics after tallying with patient's records

Wound closure:
Stromal hydration of the tunnel (Not done universelly) and sideport is done and tunnel integrity is checked. In case of any doubt regarding wound leakage, suturing is done. Horizontal suture are preferred over vertical suture. Repositioning of conjunctiva is done and subconjunctival injection of antibiotic and steroid is given, in the inferior fornix.

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u This manual brings standard protocols and strategies for combating blindness due to Cataract. Phacoemulsification, may not be the prime strategy for treating cataract across the community, especially in the rural Indian set-up. This manual also includes a brief review of the essential surgical steps in an annexure, keeping in mind the ever improving standards in eye surgery.

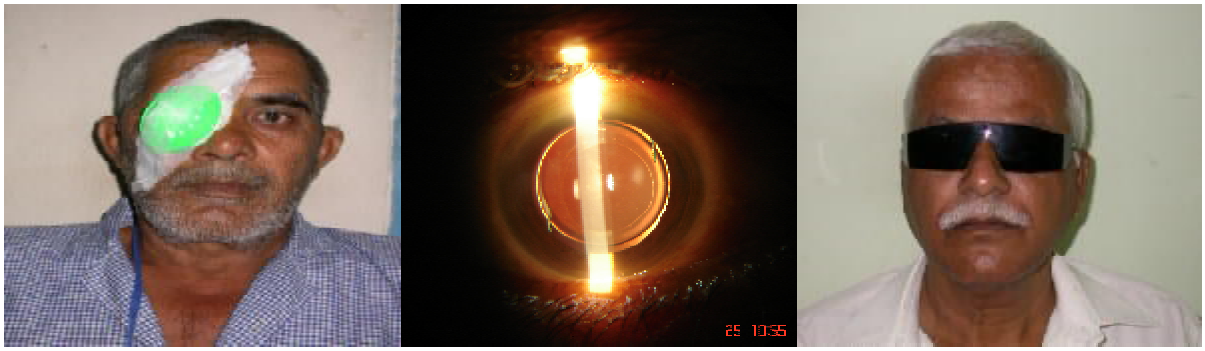
Chapter - 4

CATARACT SURGERY POST OPERATIVE PROTOCOL

Postop Examination

Refraction

Postop Care



After Surgery

CATARACT SURGERY POST OPERATIVE PROTOCOL

Postoperative care after cataract surgery is important as postoperative complications could sometimes lead to loss of vision.

4.1 POSTOPERATIVE MEDICATIONS (Day 0)

All medications for systemic diseases need to be continued but medications for diabetes is modified on the day of surgery if the patient is anorexic. Analgesic tablet is given if necessary. Oral Carbonic anhydrase inhibitor to be given postoperatively if elevated pressure is anticipated. In apprehensive patients sedative is given on the day of surgery.

4.2 1st FOLLOW UP: POST- OPERATIVE DAY-1

The eye-patch is removed in the morning taking all antiseptic precautions. The eye is cleaned with sterile saline swabs followed by instillation of antibiotic drop. Unaided and pinhole visual acuity is checked by optometrist/ophthalmic assistant followed by instillation of cycloplegic drop. (Not mandatory)

Patient can be managed as day care surgery. In that case patient should be examined the next morning.

4.2.1 Slit Lamp Examination

Slit lamp examination is done in all patients by doctor.

The following findings are looked for by *a slit lamp biomicroscopy* examination (adequate pupillary dilatation may be needed).

- Eyelids - swelling / inflammation
- Section - Apposition of wound / wound leak / gape. Sutures tight or loose
- Cornea - Epithelial defect, Edema, Striate Keratitis
- Anterior Chamber - Hyphema, Hypopyon, Cortical matter, Depth
- Iris - Iritis, Fibrinous reaction
- IOL - Centration
- Pupil - round, mobility, Vitreous in pupillary region
- Posterior capsule(PC)- Opacity, Rent
- Vitreous - Vitreous disturbance
- Fundus - Red glow

The main aim of postoperative examination is to look for any complications or early sign of infection, as treatment substantially changes. Steroid and antibiotic drop is instilled and any other medication as advised is started. The patient is discharged or stays as needed. If there is no visual improvement or visual acuity is < 6/18 and anterior segment examination does not explain the reason for low vision, a dilated fundus examination is done on the first postoperative day.

4.2.2 Patient Education on Discharge

On discharge, the patient is explained about:

- Medications
- Precautions
- Routine follow up
- S.O.S. Calls

Special Instruction during Discharge:

Encourage mobility and early resumption of routine activities

- No head bath for 4 weeks, but can wash hair as head thrown back.
- Normal diet from the day of operation.
- No river or pond bath (dip in) for 3 months.
- After suture removal no pond or river bath for at least 1 week.
- TV viewing & reading if comfortable.
- Not to drive two wheelers without protective glasses.
- Not to lift heavy weight in case of ECCE with sutures.
- Dark glasses to be used for one month for outdoor activities till regular glasses have been prescribed.
- Bending of head for prayers, may be done 7 days after surgery.

To report immediately if they have:

- Redness
- Pain
- Sudden diminution of vision
- Discharge and/or excessive watering

4.3 2nd FOLLOW UP: AT 1 WEEK AFTER SURGERY

Unaided and pinhole visual acuity is checked by optometrist/ophthalmic assistant which is followed by slit lamp examination (except in out reach where binocular loupes are the more practical option) by doctor. Tapering of steroids and antibiotic drop and any other medication is done. If there is no improvement in vision, Keratometry and dilatation for refraction, acceptance and fundus examination is repeated and if possible, review of the patient with senior doctor, revision of treatment is done. Regular follow up of the patient is advised as required. In outreach follow ups, any patient with complications is immediately brought to the base hospital for management. Should endophthalmitis be either suspected or diagnosed, the patient is referred to the nearest VR surgeon / tertiary centre after giving intra vitral injection of appropriate antibiotics.(kindly see Annexure 12 on page no. 72)

4.4 3rd FOLLOW UP: AT 4 WEEKS AFTER SURGERY

Same protocol is followed as in second follow up except in cases where Phaco or Manual SICS had been done. Refraction is done and prescription of appropriate spectacles is given. If there is no improvement in vision, detailed examination is done and further follow up or intervention is advised.

4.5 4th FOLLOW UP: AT 6 WEEKS AFTER SURGERY

4th follow up is usually needed in case of ECCE. After taking unaided and pinhole visual acuity by optometrist / ophthalmic assistant and Slit lamp and Fundus examination by surgeon, 8-0 suture removal (should not be used to an extent possible) is done in OPD under Slit lamp or in the Operation theatre in case the sutures are covered with conjunctiva. 10-0 suture removal is required if there is an astigmatism of > 3D or there is suture related irritation / watering and it can be done in OPD or in OR. Antibiotic drops are continued for one week.

4.6 5th FOLLOW UP: AT 8 WEEK AFTER SURGERY

5th follow up is needed in cases of ECCE. Refraction with subjective correction is done and appropriate glasses prescription is given. Patients not improving are further examined and treated. Cause of poor post operative visual outcomes should be documented.

Chapter - 5

STERILIZATION PROTOCOLS FOR OT IN OPHTHALMOLOGY

Aquaguards in scrub area

Air Cleaner with UV Light & Filter

Four Bowl Cleaning Technique

Dehumidifier

Daily Cleaning of Equipments in OT with Sodium Hypochlorite

Daily Cleaning of walls in OT with Sodium Hypochlorite

Horizontal High Speed Sterililser

ETO Sterilisation

Instrument Wash

Flushing of Canulas

Cleaning Instruments by Scrubbing

Ultrasonic Cleaner

Automatic Soap Dispenser

Trolley Preparation for Cataract Surgery

Instrument Box

CC TV in Operating Area

UV Light

STERILIZATION PROTOCOLS FOR OT IN OPHTHALMOLOGY

Frequently, we come across reports of postsurgery cluster infection. The reasons for this could be patient related, surgical supply related or surgical protocol related. One of the important protocol is proper sterilization in the OR.

It would be prudent to revise some of the definitions related to this issue, before dealing with the subject in detail.

Sterilization:
Is the act or process of destroying all forms of microbial life, including spores.

Disinfection:
Kills or eliminates nearly all pathogenic micro-organisms on inanimate surfaces but not necessarily bacterial spores.

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.

When we deal with the sterilization protocols for OR, the following needs to be addressed:

- OR Layout
- Decontamination
- Cleaning
- Disinfection
- High Level disinfection
- Sterilization

5.1 OR LAY OUT

A proper theatre layout is important to ensure that the area is not only effectively sterilized, but also the sterility is maintained during its use. An improper design can lead to entry of pathogenic micro-organisms into the OR, thereby compromising its sterility. Schematic drawing of the theatre lay out depicting the flow is annexed.

The recommended features of a proper OR are:

5.1.1 General

The OR is away from public movement. The sterile and unsterile areas is segregated, preferably by an Air lock or buffer zone. The entrances for patients and staff is separate and doors for sterile and unsterile items is also separate. The operating area has full - wall glazed tiles, and a non-porous floor, preferably Kota stone. There should not be any surface where dust might accumulate. The autoclaving room is at a distance from the main operating area. No ceiling fans are fixed in the operation room. Installation of split AC is preferred over window AC in the operation room. Window AC can also be used terminal filter.

5.1.2 Ventilation

The operation theatre should be well ventilated, and the air circulating inside should be filtered, preferably by a 0.3 micron or a HEPA (high efficiency particulate air) filter. The theatre has positive pressure ventilation and a vertical unidirectional flow of air on the operating table. It is recommended that the operation theatre has a minimum of 15 air exchanges per hour, and, Class 100 air is the highest ideal. (may not be required for eye OR).

5.1.3 Major Zones of OR

The OR has four major zones:

- **Outer zone,** which acts as a reception area, and is accessible to all.
- **Clean zone** comprises the changing 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, preparation room and the operating area.
- **Disposal zone** where the used linen is kept before sending to the laundry, the used disposables are segregated and then disposed off.

5.1.4 Other Things

- Slippers for toilet use and OR are kept separate.
- Slippers are washed daily with detergent and dried.
- Dress code is maintained.

- Stretchers used inside and outside the OR are separate.
- Doors of the OR is always kept closed.
- Garbage is segregated and disposed after each OR session.
- Storage is discouraged inside the OR.

5.2 DECONTAMINATION OF EQUIPMENTS AND ENVIRONMENT

Cleaning, with water and detergents is done for:
- OR
- Equipments
- Linen

Disinfection / Sterilization is required for:
- Environment
- Equipments
- Linen
- Personnel

In the OR, the floor, surfaces, sinks and drains must be cleaned regularly as per the following protocol.

5.2.1 OR and Corridor
- The OR floor is swept thoroughly daily, and the floors, walls and doors are mopped with 1% sodium hypochlorite.
- Block room, changing room, doctor's room are cleaned daily three times with 1% sodium hypochlorite.
- Scrub area is cleaned daily five times with 1% sodium hypochlorite.

5.2.2 Water Tank, Sink and Drain
- Liquid soap and scrub solution dispenser is cleaned and autoclaved weekly.
- Scrubbing sink to be cleaned daily with brush and powder, dried & mopped with 1% sodium hypochlorite.
- Water tank is cleaned with bleaching powder at least once a month and documented. The level of chlorination is checked regularly.
- Drain is cleansed with 1% sodium hypochlorite.

5.2.3 Cleaning of Equipments and Furniture should be done on a regular basis
- Microscopes are cleaned with 15% cetrimide and 3% chlorhexidine gluconate daily, except lens.
- Microscope head needs Bacilloid 25 spray daily.
- Lenses is cleaned once a week with lens cleaning solutions.
- Fans, lights, clocks inside the OR is wiped once a week, with 1% sodium hypochlorite solution.
- AC filter is cleaned once a week.

5.3 CLEANING / DISINFECTION / STERILIZATION OF ENVIRONMENT

The environment in the OR can be cleaned either chemically or mechanically.

The Chemical agents recommended for cleaning the OR are:
- Formaldehyde 2%
- Glutaraldehyde 2%
- Combination of formaldehyde, glutaraldehyde and benzalkonium chloride.
- Hydrogen peroxide with silver nitrate.

The recommended frequency of chemical cleaning is weekly, and the cleaning agent is changed everytime.

The mechanical methods recommended are:
- Laminar flow
- HEPA filter
- Split air conditioner
- Air purifier
- Air curtain

The OR, scrub area, corridors and sterilization room are fumigated once a week, and the OR is closed for 24 hours. For this purpose formalin is routinely used as it is effective and cheapest. Other agents mentioned here can be used as alternatives, and is changed once in two months.

5.4 DISINFECTION

Disinfection is an adequate method of rendering such instruments clean which do not penetrate the skin, and high level disinfection is effective against microorganisms like *M.tuberculosis* and Enterovirus. Instruments like tonometers, tongue

depressors, thermometers, Chittle's forceps etc. are sterilized by disinfections.

Disinfection can be achieved by thermal and chemical 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. For chemical disinfection, various chemical disinfectant agents are available. (Not recommended for sterilization of instruments for eye surgery).

- Glutaraldehyde 2% for 10 hrs (sporicidal: kills spores also)
- 6% hydrogen peroxide for 20 minutes
- Alcohol 60 – 70% for 1 to 10 minutes
- 1% hypochlorite for 30 minutes

5.5 STERILIZATION

Sterilization is advocated for instruments that penetrate the body cavity or the vascular system. The following methods of sterilization are available:

- Steam under pressure (Autoclave)
- Dry heat (Hot Air Oven)
- Ethylene oxide
- Hydrogen peroxide

Out of these, Steam sterilization under pressure (Autoclaving) is preferred, as it is dependable, nontoxic, in-expensive, and sporicidal and can penetrate fabrics well.

In a regular autoclave, articles are sterilized at 121^{0}C+ 15 Psi for 20 minutes, whereas in a high speed autoclave, at 134^{0}c + 30 Psi, 3-4 Minutes of exposure ensures sterilization.

5.5.1 Dry Heat Sterilization (Hot Air Oven)

It is done for articles which can be damaged by steam, e.g.:

- Sharp instruments
- Glass syringes
- Ointments
- Oil / powder

Sterilization occurs at 170^{0} C for two hours or at 180^{0} C for one hour.

- Ethylene Oxide gas provides low temperature sterilization for heat sensitive articles, and is commonly used in industrial establishments. It is toxic and potentially explosive. Due to its toxic nature, an aeration period of minimum 72 hours for the sterilized items is a must before they are put to use. A microbiological control is mandatory.

5.5.2 Cleaning Instruments before Sterilization

The used instruments are cleaned thoroughly before they are resterilized in order to remove any tissue debris or body fluid deposits. The steps in this process are:

- Separation: The instruments are separated from tubings, and the sharp instruments are separated from the blunt instruments.
- Ultrasonic Cleaner: It 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.
- Four Bowl Cleaning: This method is equally effective; 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, delicate instruments. After cleaning, the instruments are dried and tipped with individual plastic sleeves, and packed in individual perforated boxes/trays. The toothbrush is changed after every 15 days.

5.5.3 Sterilisation Method of Choice for Articles During Eye Surgery

ITEM AND METHOD OF CHOICE*

Δ Linen, Heat Resistant Metal Instruments, Cautery.

∗ Autoclaving
Δ Electrodes, Silicone, Sutures Glassware
∗ Hot Air Oven
Δ Heat Labile Metal Instruments, Sharp Instruments.
∗ ETO
Δ Plastic Items, IOLs
∗ ETO

***** Autoclaving is suitable for everything except disposable items.

***** Aeration time after ETO sterilisation is a minimum of 72 hours.

***** IOL is not resterilised by hospitals where ETO sterilisers are not available.

5.5.4 Shelf Life of Sterilised Items

METHOD OF STERILISATION AND SHELF LIFE

Autoclaving in drums or linen: 48 hours
Double Packing: 28 Days
Peel Pouch – Heat sealed: 1 year
ETO sterile: 1 Year

5.6 MONITORING PROCEDURES

Sterilization is dependent upon machines & 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 is monitored:

- Monitoring of cleaning
- Monitoring of sterilization
- Monitoring of procedures
- Monitoring of standards
- CME

5.6.1 Monitoring of Cleaning

OR Area & Personnel

- Microbiologically: An air sample is tested using open dish sedimentation method or bacterial counter on a weekly basis. 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.
- Checklists of scheduled tasks can be prepared on daily, weekly, monthly and quarterly basis.

5.6.2 Monitoring Sterilization Procedures

The sterilization procedures are monitored with the help of following:

- Mechanical indicators
- Chemical indicators
- Biological indicators

Mechanical indicators give a daily measurement of cycle time, temperature and pressure gauge in the form of a graphic record. Maintainence of log book is always helpful.

Chemical indicators undergo a change of colour on completion of the procedure. One is placed on the outside of each pack and three inside the pack – top, middle and bottom. A daily Bowie-Dick or similar test for steam penetration in high vacuum autoclaving is recommended.

Biological indicators contain:

- *Bacillus stearothermophilus* spores for monitoring steam & dry heat sterilization.
- *Bacillus subtilis* spores for monitoring ethylene oxide sterilization.

5.7 DECONTAMINATION OF HANDS

Three levels of decontamination of hands by hand washing to remove resident and transient microbial flora are recognized:

- Social
- Hygienic
- Surgical

Social hand washing is required for eating, feeding patient, visiting toilet, nursing a patient and when hands are soiled.

Hygienic hand washing is done before performing any invasive procedure with immunocompromised patient, before and after wound dressing or urinary catheterization and on contact with blood secretions. It is imperative to wash hands before and after wearing / removing gloves. Alcohol is an effective alternative.

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

Quality of Water:
Distilled water is best. Alternatively, boiled, purified or chlorinated tap water can be used.

Surgical Scrub:
Chlorhexidine 4%, Povidone Iodine 7.5% or Alcohol 3 ml are used. Importance of time taken for the scrubbing, use of scrubbing agent, parts of hands scrubbed, use of brush, size of nails, and any residual nail polish is recognized. All ornaments worn on the hands are removed at the time of scrubbing, and the hands are dried. Using liquid soap is recommended, and use of gloves is mandatory.

General measures include initial and regular health screening and immunization record of the staff. All skin lesions on hands 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.

5.8 OR ETIQUETTES
It is important to lay down and follow some etiquette in the operation theatre, depending on the role of a particular person.

When a person is scrubbed for Surgery:
- Follow correct gowning and gloving technique.
- Remember that the back of the gown and area below the waist are considered unsterile.
- When changing places with other scrubbed person, move back to back.
- Gloved hands are kept above the waist or on top of the sterile field or 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 For Surgery:
- The sterility of the sterile pack is checked before opening.
- Before giving any sterile items, staff rubs sterilium on hands and wait for 3 minutes to allow it to dry.
- Open the pack away from the body keeping fingers outside the wrapper.
- While pouring liquids, container is held 6 inches above the sterile field.
- Items are not passed above the sterile field.

When Observing the Surgery:
- Hands are kept behind the back.
- Sterile field is not touched or crossed.
- Leaning over the sterile field is avoided.
- Crossing between sterile fields is not done.
- One foot clearance from sterile area is strictly observed.
- Excessive coughing / sneezing inside the OR is avoided.
- Any casual observers/VIPs inside the OR are not allowed.
- Woollen wear of any kind is not allowed inside the OR as it attracts and harbours dust and micro organisms.

5.9 Parameters for Surgical Work
- Surgical work on a day is done for a maximum of 7 hours to allow adequate time for cleaning and resterilisation of the OR and instruments for the next day.
- Maximum surgeries per surgeon per day may not exceed a stipulated number of (eg. 30) surgeries

to maintain the quality of the surgery and well being and efficiency of surgeons and OR staff.

- Pre operative check up and post operative dressing is done by the operating surgeon.
- Visual outcome monitoring of the final follow up is mandatory.
- Automated anterior vitrectomy machine should be available to manage vitreous loss in all cases. It is suggested that the vitrectomy machine is kept on standby mode through out the surgical session.
- An IOL is not implanted forcefully in difficult situations where it may prove deleterious to the eye.

Chapter - 6

QUALITY MONITORING OF CATARACT SERVICES

Monitoring is a process which attempts to determine the relevance, effectiveness, efficiency and impact of activities in the light of specific objectives. Monitoring of cataract services helps in many ways. It helps us to learn from the experience in the past, improve the output/outcome of the present and plan realistic future activities.

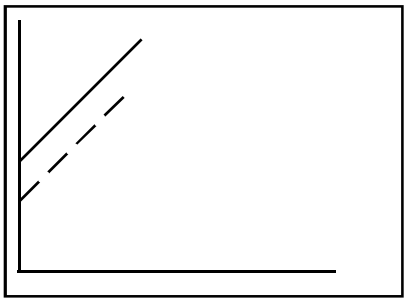
Any cataract intervention programme showing stagnant or lowered performance for 3 years continuously is a matter of concern, as it indicates a poor output on account of under-utilization of the available resources. Sometimes other factors play a role such as reaching a plateau, after which further increase is possible only if additional resources / infrastructure are provided, or an existing strategy is changed to a more efficient approach. Monitoring of cataract services provides guidance for further planning and decision making. It can be used by government or non- government organizations (NGOs) and the general public to provide more support where needed.

6.1 AIMS OF CATARACT SERVICES

- To improve the quality
- To increase the quantity
- At a cost which is sustainable

_____Quantity

_ _ _ _ _ _Quality



- Quality improving
- Quantity improving

Three factors which are monitored for assessing cataract services are:

- Quality outcome
- Quantity output
- Cost outlay

For monitoring quantity various indicators are used, like the number of cataract surgeries performed per year, the number of blind persons operated, the cataract surgical rate and the cataract surgical coverage.

6.2 QUALITY ASSESSMENT

Quality monitoring is usually done considering the following factors:

- **Psychological outcome**:- How much does the patient feel the benefit (i.e. patient satisfaction)?
- **Functional outcome**: - What can the patient do now which he /she could not do before?
- **Visual Outcome**: - Impact of surgery on the visual acuity of the patient.
- **Physiological**: - Vision in the operated eye. The psychological and functional outcomes, being subjective, are difficult to monitor. So the simple measures to monitor quality are:
- **Patient Outcome**: - Vision in better eye.
- **Physiological outcome**: - Vision in the operated eye.

The physiological outcome depends on various factors.

These include the:

Pre-operative status:

Pre-operative status of the eye, whether there was presence of any pre-existing eye disease other than cataract (pre-existing corneal disease, glaucoma, retinal disease will have an unfavorable impact on physiological outcome). Also, the quality of surgery, whether it was uncomplicated surgery, IOL implantation or small incision surgery. All these factors are associated with the physiological outcome. The quality of surgery can be improved by the use of good quality equipment, maintaining strict aseptic and antiseptic measures in the operation

theatre, and the training of ophthalmologists and paramedic personnel. Also, since uncorrected aphakia is one the main causes of blindness, correction of aphakia with proper glasses will lead to good physiological outcome.

***Follow-up*:**

This is necessary as it enables the doctor to check whether patients are using proper glasses, and to look out for the development of posterior capsule opacification in a pseudophakic patient. Quality monitoring of surgery using physiological outcome are standardized for:

- Time after surgery
- Type of surgery
- Type of cataract

6.3 INDICATORS USED IN QUALITY MONITORING

Two main indicators used in the quality monitoring of cataract surgery are:

- Sight Restoration Rate: The percentage of blind patients with restored sight after surgery.

a = number of cataract operation of blind persons
b = number of blind persons after surgery
c = number of persons with restored sight
(a-b) - Sight Restoration Rate = {(a-b) x 100}/ a

- Success Rate = Percentage of operated eyes with age-related cataract achieving 6/60 vision post - operatively.

Finally, indicators used for monitoring quality can be used to compare the same hospital / surgeon over a period of time, so that the trend in services can be monitored. They are not used to compare one hospital with another or one surgeon with another.

6.4 WHO GUIDELINES FOR CATARACT SURGERY VISUAL OUTCOME

	Post-op Visual acuity	Available correction	Best Correction
	>6/18	>80%	>90%
	< 6/18 - 6/60	<15%	<5%
	<6/60	<5%	<5%

6.5 QUALITATIVE ASSESSMENT

Proportion of eyes having poor outcome post operatively (Visual Acuity - corrected < = 6/60)

< 5% Satisfactory
5% to 10% Scope for improvement
> 10% Warrants urgent intervention

6.6 MAINTENANCE OF REGISTERS

6.6.1 WARDS

Essential:

- Register containing the surgeries done for the day mentioning patient details, operating surgeons and complications.

Desirable:

- A master register containing
  - Name of patient
  - Name of father/husband
  - Age
  - Address
  - Pre op visual acuity
  - Surgical procedure
  - Follow up dates
  - Final visual outcome (in case of unsatisfactory visual outcome, mention reason)
- Maintenance
  - Register same on master register for follow-up monitoring

Chapter - 7

CONSENSUS GUIDELINES FOR PREVENTION OF INFECTIONS IN THE OPERATION THEATRES

PREPARATION AND CONCENTRATION OF DISINFECTANTS

Formaldehyde and gulteraldehyde

- For surface cleaning : 200 ml in 10 litres (2%).
- For fogging: 2% Hydrogen peroxide and silver nitrate.
- For surface cleaning make 5% for the solution : add 250 ml in 5 litres of water.
- For fogging: make 20% concentration of solution (200 ml in 1000 ml) Sodium Hypochlorite.
- 75 ml in 12 litres of water (1%).

OUTBREAK POLICY

Definition:

An increase in the isolation rate of an organism or clustering of clinically infectious cases in the same time frame suggest an outbreak.

Factor suggesting an outbreak:

- A laboratory report of a bacteriology specimen grows an alerting organism.
- Two or more patients are found to have an infection attributed to a species not previously documented particularly if it has occurred after a surgical procedure.
- The clinician of the ward staff report multiple infections of a similar nature.

Investigation of an outbreak:

- An outbreak is an infection control emergency:, measures should be taken as soon as an outbreak is suspected.
- Begin preliminary evaluation and determine a background rate of infection.
- Confirm the existence of an outbreak.
- Confirm the diagnosis that may include laboratory and clinical data. Start with a broad case definition that can be redefined at a later data.
- Identifying those exposed. Describe the data in terms of time, place and person. Remember that cases may have been discharged from the health care facilities.
- Take immediate control measures. Determine who is at risk. Look at changes that may have affected the rate of infection e.g. new staff, new procedure, new laboratory tests, and health care worker: patient ratio, etc.
- Communicate to relevant personnel.
- Screen personnel and environment as indicated.
- Write a coherent report (preliminary and final).
- Summarize investigation and recommendation to the appropriate authorities.
- Implement long-term infection control measure for prevention of similar outbreaks.

Create a infection control / quality control team.

Team comprises of :

1. Operating Surgeon
2. Hospital Manager
3. OR Incharge
4. Laboratory Incharge

PERIODICAL TESTS DONE BY INFECTION CONTROL COMMITTEE

Test Done on	Tested for	Frequency
1. Potability of water	Biochemistry: level of chlorine	Every fortnight
2. Air Sampling of O.R	Bacteria and fungi	Every week
3. Food Handlers	Stool for salmonella or other parasites	Biannually

Reference: Infection Control Guidelines
Hinduja Hospital, Mumbai

UNIVERSAL PRECAUTIONS:

Body substance: Blood, Urine, Oral secretions, Faeces, Semen, Mucous, Pus, Wound or other

drainage.

WASH:
Before touching Blood and Body substance.

GOWN:
When soiling is likely to occur.

MASK:
Wear goggles when it is likely that eyes or mucous membranes will be splashed with blood or body fluids.

SHARPS:
Place needles in shapes container Do not recap.

WASTE:
Use Red plastic bag for disposal of infection waste.

LINEN:
If linen is heavily soiled with body substances, double wrap it before placing it into red laundry bag.

PHYSICAL PARAMETERS FOR OPERATING ROOM VENTILATION

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

MICROBIOLOGICAL PARAMETERS, PROPOSED FREQUENCY OF SAMPLING AND 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 do 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 108 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 should be absent
Evaluation of operation theatre staff for carriage of *S. Aureus and B haemolytic 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 disinfectin and cleaning measures should be instituted
Disinfectant in Use	Monthly	Should adhere to established microbiological standards

IMPORTANT CONSIDERATIONS OF ASPEPSIS AND STERILIZATION

Pathways leading to infection:

1. Surgeon Factors

- Surgical scrubbing is not just hand washing.
- Do not operate with bare hands.
- Gowns are not sterile below the waist, on the back and in the region of armpits and neck.
- Cap and mask are useless if they do not fully cover the scalp hair and nostrils.
- Do not let your mask hang loose around the neck and dont reuse the same.
- Do not wear same footwear from unrestricted to restricted area.
- Do not move around with hands folded (into armpit or in gown pocket).

2.General:

1. Preparing all trolleys beforehand.
2. Relying on unconventional method (Boiling).
3. Unsterile person completing a trolley using a chittle forceps.
4. Throwing around soiled linen and cover etc.
5. Discarding swabs used for skin preparation onto the floor.
6. Sterile persons leaning over an unsterile area.
7. Nonsterile persons reaching over a sterile area.
8. Sterility is doubtful, but decide to use the same.
9. Linen is soaked with moisture, still using it.

3. Patient preparation:

1. Exclude adnexal (eg. Dacryocystistis) and ocular surface infections.
2. Detect presence of active septic foci.
3. Repeated contact procedures (e.g. Applanation Tonometry, biometry) are avoided just prior to surgery.
4. Address unclean patient attire and exposed scalp hair.
5. Reensure correct method of surgical painting.
6. Cover nostrils and eyelashes (drape plus opsite).
7. Wash away meibomean secreations.
8. Wash conjunctival sac with providone iodine.

4. Surgeon factors:

1. Exposed scalp hair and nostrils.
2. Operating inspite of an open wound.
3. Improperly scrubbed hands.
4. Ungloved hands.
5. Getting irrigation fluid all over: trolley surface, gown, drape etc.
6. Not checking indicator tapes (autoclave, ETO etc.).
7. Not checking irrigating fluid for particulate matter / presence and concentration of antibiotic.
8. Inadvertently touching an unsterile area but not changing gloves.
9. Same irrigation line used for several surgeries. (ideally RL bottle and drip set should be changed after every surgery)
10. Reusing instruments from trolley of another patient directly.
11. Reusing dropped instruments without adequate resterilisation.
12. Inserting dropped IOLs after wash!
13. Leaving eye predisposed:
    - Improper valve
    - Wound gape
    - Exposed suture knots
    - Vitreous wick

5. Instruments Factors:

Pay special attention to:

Tubular instruments (eg. Cannula)

Devices with anti peristaltic pumps and reflux mechanism (eg. Phaco / vitrectomy machines): Ensure suction bottle is empty and sterile.

Reference: Government of India Guidelines, NPCB

STERILIZATION PROTOCOL AT A GLANCE

Area	Procedures	Accepted practice
No. of standard surgical sets	One surgeon with one OR table : 4 sets One surgeon with two OR table: 7 sets one junior surgeon with one OR table 2 sets	
Cleaning Procedures	Manual Cleaning	Use four bowls. First wash is the disinfectant and cleaned with a soft toothbrush. Than followed by three washes with distilled water
Blunt Instruments	Prior to Surgery	Steam sterilization
	Between Cases	Flash Autoclave
Sharp Instruments	Prior to Surgery	Steam sterilization, ethyene oxide sterilization
	Between Cases	Flash Autoclave
	Cryoprobe	Formalin chamber / ethylene oxide
Heat Labile Instruments	Vitrectomy cutter & Cautery	Formalin chamber / ethylene oxide
Linen	Surgeons Dress	Steam Sterilization
	Aprons	Steam Sterilization
	Drape Sheets	Disposable
Hand Washing	Prior to Surgery	Hand scrubbing with povidone iodine scrub or chlorhexidine for five minutes
	Between Cases	Change of gloves and sterilium
Surgical Supplies	Irrigation Solution	Steam sterilization before opening the seal
Theater Sterilization / Disinfections	Floor	Chlorhexidine, Lysol
	Fumigation of OR	Formaldehyde
	Air Conditioners	Filters to be removed and washed with soap and water weekly
	Walls	Washed with water and disinfectant weekly
	Theatre Trolleys	Disinfectant
Patient	Dress for OR	Sterile dress if provided by the hospital, shoe covers and cap

Reference: Sterillisation Manual Arvind Eye Care System Madurai

CONSENSUS GUIDELINES FOR PREVENTION OF INFECTIONS IN THE OPERATION THEATERS

These are general surgical principles not meant for cataract surgery directly but can be used as a reference.

Background:

The need for these guidelines stems from the fact that there are extreme situations in operating room facilities in our country, ranging from rooms with fans, window air conditioners to the more sophisticated laminar airflow systems. International standards are rigid and in a developing country like India, it is often difficult to adhere to such rigid guidelines.

Thus, although the goal set is to reach the International standards, there is a definite need to guide smaller institutions to be able to achieve the best possible with limited resources.

Introduction:

Prevention of infection in the operating room (OR) consists of the following:

1. Practice of aseptic techniques
2. Surgical attire
3. Sterilization of instruments and equipment
4. Staff and patient skin preparation
5. Creation and maintenance of a sterile field
6. Control of the environment

Who is responsible?

The basic requirement is a surgical conscience that consists of commitment to aseptic practice at all times.

GENESIS OF SURGICAL SITE INFECTIONS (SSI)

It is misconception that SSI orginates in "environment". Microbial contamination of the surgical site is a necessary precursor of SSI. The risk of SSI can be determined by the following: SSI risk=Dose of bacterial contamination x virulence / Resistance of the patient. It has been shown that SSI risk is markedly increased if the microbial contamination is $>10^5$ per gram of tissue. This dose is lower if foreign material is present at the site.

Sources of pathogens include:

1. The endogenous flora of the patients skin, mucous membrane or hollow viscera.
2. Seeding of the operative site from the distant focus.
3. Exogenous sources like the surgical personnel, OR environment, instruments and other material brought into the sterile field during an operation.

Risk and Prevention of Surgical Sight Infections

A risk factor for SSI is a variable that has significant, independent association with the development of SSI after a specific operation eg. Shaving 24 hours before the operation.

SSI prevention is an action intentionally taken to reduce the risk of SSI eg. Antimicrobial prophylaxis.

I. Patient characteristic that may influence the risk of SSI.

1. Age
2. Nutritional status
3. Diabetes
4. Smoking
5. Obesity
6. Coexistent infections
7. Colonization with microorganisms
8. Altered immune status
9. Length of preoperative stay

Certain studies have shown the above factors to be significant risk factors. In a recent study, preoperative colonization of the nares with *staphylococcus aureus* has been shown to be one of most powerful independent risk factors for SSI.

following cardiothoracic operations.

I. Characteristics related to the operation:

A. Preoperative, patient related:

1. Preoperative antiseptic bath:

Preoperative antiseptic bath / shower reduces the microbial load of the skin. Chlorhexidine gluconate achieves nine fold reduction when compared with Povidone iodine products which achieve a 1-2 fold reduction in microbial count.

In our country, where poor hygienic standards prevail, this practice of antiseptic baths preoperatively needs to be encouraged.

2. Preoperative shaving:

Shaving the surgical site the night before an operation is a significant risk factor for SSI. Microscopic skin cuts serve as foci for bacterial multiplication.

The recommended practices are shaving immediately before an operation, clipping or depilation before an operation.

3. Patient skin preparation:

The recommended agents are:

- Chlorhexidine gluconate 4%
- Povidone iodine 10%
- Alcohol containing products

Chlorhexidine glucomate is advantageous because of its residual activity after a single application and the fact that it is not inactivated by blood or serum proteins.

Lodophors on the contrary lack both these properties.

4. Antimicrobial Prophylaxis

It is a necessary adjunct for surgical procedures to reduce to microbial burden of intraoperative contamination at the surgical site.

Principles for surgical prophylaxis;

- Use a safe, inexpensive and bactericidal agent that covers the most likely intraoperative contaminants.
- Time of initial dose, so such that a bactericidal concentration is achieved in the serum and tissues by the time the skin is incised.
- Simple protocols will ensure proper implementation.
- A single dose with induction of anaesthesia is recommended except in surgeries lasting >3 hours, wherein a second dose is given. Exceptions to the rule are immuno-compromised patients.

Two well recognized exceptions of clean surgeries requring prophylactic antimicrobials are:

- Insertion of intravascular prosthesis / joint prothesis.
- Any operation in which an incisional or organ / space SSI would pose a catastrophic risk.

The choice of antimicrobials depends on the endogenous flora likely to contaminate the site. Cephalosporins are the most thoroughly investigated agents for surgical prophylaxis. Cefazolin provides adequate covrage for most clean – contaminated operations.

Anaerobic cover, if required, is achieved with Clindamycin or Metronidazole. Aminoglycosides are seldom recommended either alone or in combination. Likewise, the routine use of Vancomycin is not recommended, the exception being, a cluster of MRSA incisional SSI.

B. Preoperative related to the surgical team:

1. Hand / forearm antisepsis:

Surgical team members who come into direct contact with the sterile operating filed, sterile instruments or supplies used in the field must scrub. The surgical scrub is carried out with a broad-spectrum antiseptic agent. This may be 4 % Chlorhexidine gluconate or 7.5% Povidone Iodine.

at least three minutes. Besides the choices of the agent there are other important factors that influence the effectiveness of the scrub, like the technique, the condition of the hands and the techniques used for drying.

First scrub of the day includes thorough cleaning underneath the finger nails.

Sterile towels are used for drying.

2. Colonized or Infected Surgical Personnel

Personnel operating with active infection have been linked with outbreaks of SSI. 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 personel may be encouraged to report their illnesses rather than shy away from the reality.

Infected Health Care Workers in the operating rooms.

HIV

There have been at least two reported instances of HIV transmission from health care worker to patients, one involving a dentist and the second an orthopedic surgeon. Retrospective investigational data from the CDC and other studies have drawn the conclusion that the risk of HIV transmission from health care worker to patients is very low.

HBV

Transmission to patients has been reported during invasive procedure. Many of these have occurred prior to the 'wide spread use of barrier precautions and have involved obvious deficiencies in infections control practices.

HCV

Specific factors that might promote the transmission of HCV from health care worker to patients are yet to be identified.

Thus, although the documented risk of transmission of blood borne pathogens from health care workers to patients is low, in a busy set up, due to economic constraints or ignorance the possibility of lapses in infection control practices are high.

Strict adherence to standard precautions including hand washing, protective barriers and disposal of all sharps is essential. Infected health care workers are restricted from exposure prone procedures i.e. procedures including digital palpation of a needle tip in a body cavity or the simultaneous presence of the health care workers fingers and a needle or other sharp instrument or object in a poorly visualized or highly confirmed anatomic site. In such cases, the routine use of gloves does not eliminates the potential for exposure of a patient to the health care worker.

Hepatitis B 'e' antigen positive health care workers are more likely to transmit HBV.

Health care workers carrying out such procedures should notify prospective patients about their sero positive status.

Operation Related Issues.
A. Operating Room Environment:
Source of microorganism in the OR environment are:

- Dust
- Lint
- Skin squames (epithelial cells)
- Aerosol
- Respiratory droplets

The microbial level in the OR is directly proportional

to the number of the people moving about in the room.

Therefore it is recommended that the traffic should be minimized during surgery.

Movements of "swinging" doors also creates turbulence and adds to the microbial burden. Sliding doors are thus preferred.

1. *Ventilation / Heating Ventilation Air Conditioning (HVAC)*

HVAC systems maintain indoor air temperature and humidity, control odours, remove contaminated air and minimize the risk of transmission of air borne microorganisms.

They consist of air inlets, filter beds, humidity modifications mechanisms, heating and cooling equipment, fans, ducts and air exhausts. Decreased performance of HVAC systems can contribute to the transmission of air borne infection in the OR.

Critical Parameters for Operating rooms:

1. Filtered air through two filter beds in series, with the efficiency of the first filter bed at $\geq$30% and is recommended the second filter bed being $\geq$90%.
2. The filters depend on the kind of facility. The use of high efficiency particular air (HEPA) filters which remove particles $\geq$ 0.3µm with an efficiency of 99.97% may be reserved for high risk surgeries.
3. OR is under positive pressure to prevent less clean air from mixing with the clean air.
4. A 15 air change per hour with a minimum of three air changed of fresh air (20%) is recommended. Air should flow from the ceiling and the exhausted near the floor (3 feet above the ground level).
5. Temperature 20-22^{0}C, comfortable and inhibits bacterial growth (Heating Systems to raise the temperature whenever required need to be provided).
6. Relative humidity 30-60% to slow down bacterial growth.

Laminar airflow (ultra-clean air) and ultra-violet(uv) radiation have been suggested as additional measures in certain situations. Laminar airflow is designed to sweep away particles in its path over the aseptic operating field at a uniform velocity. Ultra-violet radiation may be used for duct irradiation or upper room air irradiation. It is not a substitute for HEPA fillers.

Infection Control Impact of HVAC system Maintenance and Repair.

HVAC systems should not be shut down.

Air-flow can be reduced and pressure relationships maintained with the help of special drives on air handling units (variable ventilation systems).
When the unit is started following shut down, bursts of organisms tend to be released and may increase the risk of airborne infection. Presence of moisture in the system can result in aerosols of fungal spores.

Air handling systems provide ideal environments for microbial growth due to the presence of air, dust and water.

This highlights the need for proper engineering and maintenance.
Performance monitoring thus includes:

- 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.
- Intake air is kept clean and free from bird droppings.
- Duct cleaning has benefits in terms of system performance. There is no evidence that duct cleaning beyond what is recommended for optimal performance reduces the risk of infection.

In hospitals that lack HVAC systems the quality of air in the OR cannot be guaranteed.

When a window air-conditioner is used proper maintenance is required. In a developing country, other innovative methods of providing clean air may be investigated, particularly with reference to their influence on SSI rates.

The use of fans in operating rooms is not recommended, since this adds to turbulence and lifts dust particles.

2. Environmental sampling:

Air sampling is used to detect aerosols or particles of microorganisms. These may be respirable particles (<5um) or larger particles. This requires particle counters and is a practical method for evaluating the efficiency of filters.

Particulate sampling does not require the service of a microbiology laboratory.

Microbiologic sampling:

Settle plates : Rely on gravity

This selects large particles and lack sensitivity for respirable particles. They are commonly used for sampling air for bacteria and fungi.

Settle plates may be useful to detect aerosols of fungi. Though commonly used in our country this method lacks sensitivity and correlation with clinical isolates.

The detection of pathogenic microorganisms or fungi from the operating room environment should thus be an indicator of inadequacy of cleaning / air quality.

Slit air samplers are also in vogue. These are capable of collecting larger volumes of air in short periods. This method helps to verify efficiency and is performed in undisturbed conditions.

Control air for sampling, remains controversial since there are no standards for comparision.

Both the methods should therefore be interpreted in the right context.

Concentrating all efforts on microorganisms detected during sampling can often be misleading. The true factors responsible for SSI may thereby be neglected. Environmental "swabs" is an issue of the past and should be abandoned.

The unresolved issues of microbiologic sampling are:

- Lack of standards linking fungal spore levels with infection rate.
- Lack of standards protocols for testing.
- Lack of details in the literature describing sampling circumstances For example, concentrations during ongoing activities and in unoccupied rooms.
- Sensitivity of the sample used.
- Such sampling should largely be reserved for epidemiological investigations during outbreaks.

3. Environmental surfaces: OR Sanitation

Environmental surfaces in operating rooms are rarely implicated as the source of pathogens. However, it is important to perform cleaning of these surfaces to restablish a clean environment after each surgery. The choice of disinfectant is important, for example, routine use of quaternary ammonium compounds can lead to the selective Gram negative organism in the environment. The ideal disinfectant should be broad spectrum, safe and economical.

There is a wide choice available. Commonly used agents include sodium hypochlorite, environment iodophores, hydrogen peroxide (stabilized with silver), chlohexidine gluconate combinations etc. The disinfectant are approved / selected by the Hospital Infection Control Committee, taking into consideration all the above factors.

Rotation of disinfectants remains a controversial issue.

Schedule for the cleaning of operating room:

- Beginning of the day i.e. before the first surgery
- During a procedure
- Between a procedure
- End of the day
- Weekly / monthly

Prior to the first cases:
The furniture, equipment, light are damp dusted with a detergent germicide. Particular attention to be paid to horizontal surface because dust and lint transport microorganisms settled on them.

During the procedure:
Spills / blood splashed in the vicinity of the sterile field is absorbed with a cloth and cleaned with a germicide.

All instruments opened for a procedure whether used or not are treated as contaminated.

In between cases:
Furniture, operating lights, suction canisters and other equipment used are wiped with a detergent germicide. Mattress is wiped and bed is remade. Patient transport vehicles are wiped 3-4 feet area of the floor around the table should be cleaned. Wet mop, fresh for every patient is preferred or wet vacuum cleaner. Walls, doors, push plates and other areas that have come in contact with the patient's blood and body fluid are cleaned.

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

Fumigation / Fogging:
This ancient routine is still widely practiced. However, there is no substitute for vigorous washing of surfaces that come in contact with patients.

Fumigation traditionally consisted of a mixture of formalin and potassium permanganate being placed in a bowl. The room would then be sealed and opened after 12-24 hours. Later on this changed to formalin being sprayed with humidification by a spraying devices or automist.

The origin of fogging can be traced to lister who aerosolized carbolic acid to improve antisepsis in operative practice.

Essentially fogging hastens the process of setting of airborne microorganisms. Mist, generated by a disinfectant of water would achieve the same process.

This procedure is no longer recommended in the Western literature. Fogging, however, continues to be a primary method of decontamination in our country.

It is prudent to mention that this gives a false sense of security.

Formalin has now been identified as a carcinogen.

If this procedure is continued the following points need to be considered:

- Replace formalin with a safer agent like hydrogen peroxide stabilized with a silver salt or any other disinfectant of proven efficacy and safety.
- This is not an alternative to mechanical cleaning of surface.
- It has no role in operating rooms with modern day HVACs.

- Laundered linen is to be autoclaved before being supplied to the ORs.

Pest Control:

It is essential to keep the OR free of pests like flies, which can sometimes gain entry through open doors.

There has to be a regular schedule for pest control. Besides the pesticides used must be safe in case the AHU gets contaminated with these or else the procedure should only be carried out when the AHU is shut down.

This is an important reservoir of microorganisms like Pseudomonas species. Some water sources may also be responsible for outbreaks of Legionellosis.

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.

There are several commercial gadgets available for this purpose.

Water has been implicated as an important reservoir in outbreaks of post operative infections.

4. Sterilization of instruments:

This is one of the most critical procedures requiring stringent monitoring. Surgical instruments are soaked in a germicidal detergent and thoroughly washed prior to steam sterilization or the use of other approved methods.

Microbial monitoring of steam sterilizers is necessary and can be accomplished by the use of a biological indicator.

Detailed discussion on sterilization is beyond the scope of this guideline.

Shortcut methods like boiling and chemical decontamination of surgical instruments are avoided.

Appropriate packing of surgical instruments also needs to be addressed. Insufficient number of surgical instrument set during "camp" may lead to inadequate sterilization of instruments resulting in grave consequences.

A. Operation related issue, 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 ordinary clothes. Operating room clothes are not be worn outside this area.

- ***Scrub suits:***

Surgical attire are designed for maximum skin coverage since skin squamers are a potential source of microbial contamination.

- ***Caps:***

Head and facial hair are be covered. (a potential source of microbial infection).

- ***Masks:***

Disposable deflector masks which are well fitting are worn. Cloth masks, are ineffective barriers for microorganisms, particularly once they get moistened during breathing.

Some studies have raised doubt about the efficacy of masks in preventing SSI risk. Nevertheless, masks are beneficial in protecting the wearer from inadvertent exposure to blood and body fluids. If splashes are anticipated during surgery additional protective eyewear / face shields are recommended

- ***Shoes/ Shoecovers***

Dedicated footwear is recommended for the use in the OR. The footwear should be designed to protect the wearer from spills of blood and body fluids.

- ***Sterile Gloves:***

Sterile gloves are worn by all scrubbed members of the surgical team. They help to minimize the transmission of microorganisms from the hands of the surgical team to the patient. They also protect the surgical team members from contamination with the patient's blood and body fluids.

Double gloving is recommended for protection during operations on patients infected with blood borne pathogens viz HBV, HCV and HIV. In fact this can be recommended for all surgeries. (Reuse of surgical gloves is not recommended)

- **Gowns and drapes:**

Sterile surgical gowns and drapes are used to create a barrier between the surgical operative field and potential sources of microorganisms. (All surgical team members wear gowns and drapes are placed over the patient).

The gowns and drapes are ideally made of material that is impermaeable to liquids. However, such gowns are uncomfortable and require careful selection.Gowns and drapes may be disposable or reusable. It is common practice to use cotton gowns and drapes. A plastic apron should be worn under the gown. The cotton gowns and drapes are laundered following use and steam sterilized for reuse.

B. Asepsis and surgical technique:

All scrubbed personnel adhere to aseptic practice at all times.

Members who work in close proximity of the sterile field such as anesthesia personnel also follow the same standards of asepsis.

Invasive procedures like endotracheal intubation, intravascular devices have all been associated with out breaks of post operative infections including SSI.

Good surgical technique reduces the risk of SSI. This includes:

- Effective hemostasis.
- Prevention of hypothermia (Temperature<36^{o}C during a procedure has been shown to be associated with an increased risk of post operative SSI).
- Gentle handling of tissues during surgery.
- Removal of devitalized tissue and avoiding inadvertent entries into a hollow viscous.
- Appropriate use of drains. In general closed suction drains are more effective in evacuation, but timing of the drain removal is important. The longer the drain remains, more is the chance of bacterial colonization. Drains that are placed through an operative incision may increase the SSI risk.
- Appropriate use of suture material. In general monofilament sutures have lowest infection promoting effects.

Post Operative Issue:

Care of the incision:

In extraocular surgeries on lid. surgical incision that is closed primarily is usually covered with a sterile dressing for 48 hours. Incase of delayed primary closure of healing by second intention, the incision is packed with a sterile dressing.

Additional Issues:

Managing clinical wastes from the OR:

The waste emerging from the operating room would consist of the follwing:

- Patient contaminated wastes viz disposable plastics, linen and gauze contaminated with blood and body fluids.
- Sharps
- Gloves
- Anatomical body parts and tissues
- Wrapping paper and other wrappers

All sharps including needles, IV cannulae, scalpel blades etc, could be segregated into puncture proof containers at source.

Infectious wastes requiring disposal like gloves, plastics, cotton, gauze etc. could be segregated into color codes bags for transportation to the site of treatment.

Non-infectious "wraps" could be collected in color codes bags for disposal/recycling.

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

Specimens fixed in formalin are to be stored in closed containers. These are no longer considered as "infectious"..

Laundry:

- Contaminated linen may be a source of infection and are placed in impervious bags for transportation.
- Disinfection in a sluice area is achieved using mechanical washers / sluicing machines or hot water and or bleach.
- Laundered linen is autoclaved before being supplied to the ORs.

SSI surveillance:

Principles and practice:

Surveillance of SSI with appropriate feedback to the surgeon has been shown to be one of the important strategies to reduce the risk of SSI.

In Indian hospitals where little or no surveillance data exists, concentration on SSI assumes importance.

In designing a surveillance protocol, both clinical and micro biological data are essential. The method of data collection should be made easy.
Essential clinical data should consists of the following:

- Severity of infection.
- Type of operation of extent of bacteriological contamination of the wound (wound classification).
- Time period between the procedure and the appearance of infection. Microbiology laboratory data should be reliable and include the complete identification of organisms isolated and their antimicrobial susceptibility. Thus the recommended practice is Targeted surveillance.

This may be:

- Site oriented (SSI)
- Unit oriented
- Priority oriented

Surveillance methods:

The choice of what to monitor may be jointly made by surgeons and infection control personnel.

Inpatient SSI surveillance:

1. Direct observation of surgical site by surgeon / Infection Control Nurse. Case finding varies from daily to 3 times per week.
2. Indirect observation through review of laboratory reports or patient records.

Post discharge SSI surveillance:

Most SSI become evident within 21 days after the operation.

Methods:

1. Direct examination of wounds during followup.

2. Review of clinical records.
3. Mail based surveys.
4. Pharmacy records for the use of antimicrobials.

Epilogue:

As is evident from these guidelines, the problems of a developing country are unique. This fact is further complicated by resource crunches, poor hygienic standards, non availability of items and irregularity of supplies. Simple solution, tailor-made to suit the problem are far easier to implement than reading international standards and being idealistic rather than realistic.

These guidelines are just a beginning of this process.

Reference: Consensus guidelines for the prevention of infection in the operating room - hospital infection society, Mumbai Forum

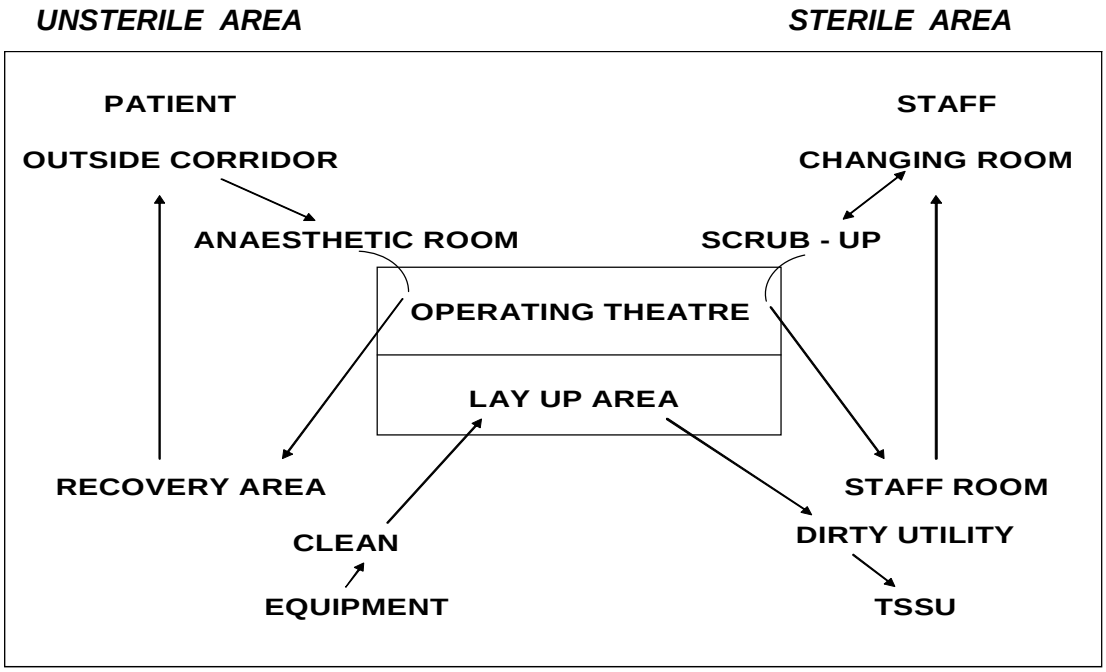
Note:- This article had been originally conceived for general surgeries, but has been adapted (with permission) for our manual, & should be read keeping in mind the issues relevant to eye surgery.

ANNEXURES

1. **Schematic drawing of the lay out of the operation theatre**
2. **Recommended scrubbing technique**
3. **Checklists**
4. **Phacoemulsification**
5. **Autoclave logbook sample**
6. **Patient file sample**
7. **Emergency Kit & Emergency Drug**
8. **Method of Scrubbing**
9. **Manual Tally Sheet**
10. **Abbreviations**
11. **Intravitreal Injections**
12. **Peribulbar Block**
13. **Preparation of Intraocular Drugs**
14. **Vertical Autoclave**
15. **IOL Power Calculation Guideline**
16. **Bio Medical Waste Management**
17. **References**

Annexure - 1

SCHEMATIC DRAWING OF THE LAYOUT OF THE OPERATION THEATRE



Kindly see Page 77 for another possible OR design

Annexure - 2

Scrubbing time of under 1 minute with povidone iodine scrub and then applying an appropriate recommended handrub is suggested as an effective measure. The guidelines* also suggest that it is not necessary to rescrub everytime between surgeries, and that an appropriate recommended handrub would provide adequate aspesis in between cases. (photographs with details on page no. 27)

**Guidelines for hand hygiene in health-care settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSEA- Hand Hygiene Task Force. Recommendations Oct 2002/vol 51/no RR-16*

Annexure - 2

RECOMMENDED SCRUBBING TECHNIQUE

1. Palm to Palm

2. Rotational rubbing of the left and right wrist

3. Left Dorsum over Right Palm

4. Palm to palm with fingers interfaced

5. Right Dorsum over Left Palm

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

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

8. Rotational rubbing of thumb with the opposite hand

Annexure - 3

INDEX OF CHECKLISTS

Note: These checklists are just examples. Organisations may design their own checklists as per their specific requirements.

(1) OR Next Day (Tomorrow) Planning Report

Date : …….....

(1) No. of Eye Operations : _____

(2) OR staff in attendance : Note if anybody is on leave / or posted elsewhere :

No. of nursing staff : _____

No. of OR Boy : _____

No. of PCA : _____

(3) How many paramedics will be available ? _____

_____

_____

(4) In case of OR Boy and PCA either on leave or break, who will be available from outside against such vacancies?

_____

_____

(5) Arrangements in Eye OR : At what time will it start ? _____

Table 1 _____

Table 2 _____

Table 3 _____

(6) Note : _____

_____

(7) Incharge Sister _____ HOD _____

(2) Pre Operative Check List – Eye OR (Per Patient)

Name of Patient _____Indoor No. _____

1. Investigation

Hb (if GA to be given) _____Urine Sugar _____

Other _____

2. Eye examination

Vision _____ Sac _____Xylocaine Sensitivity

_____Tension _____A-Scan _____

3. Obtained written informed consent in local language ? ☐ Y ☐ N Attached GVP consent form ? ☐ Y ☐ N

4. Does the patient suffer from diabetes, BP ? ☐ Y ☐ N Medicine given ? ☐ Y ☐ N

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

6. Eyebrows & Eyelashes painted with Povidone Iodine 10%? ☐ Y ☐ N

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

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

9. Did medical officer examine ? ☐ Y ☐

10.Written clearance from physician / cardiologist ☐ Y ☐ N

11.Examination by Anaesthetist : Weight of patient : _____

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

_____

Suggestion of Doctor _____

_____

Date : _____

Signature of ward Nurse: _____

Signature of OT Nurse: _____

(3) Cleaning Check List for Eye O.R. (to be filled in Daily)

Date -

Particulars Checked -

1. Who checked Pre operative check list?

2. Who put povidone iodine 5% eye drop before giving block?

3. Who checked autoclave strip register?

4. Who filled drum of gowns - gloves? Who checked it ?

5. Who checked clarity of Inj. RL?

6. Who did preparation before arrival of surgeon? (Coutery & Microscope in order?)

7. Who did Fumigation ? With what ? (Formaline, Ecoshield, Bacillocid)

8. Who did cleaning before leaving in evening? (doors should be cleaned every day)

9. Who checked operation & emergency medicines stock?

10. Who put on the U.V. light at night ? Who put it off in the morning ?

11. Was the chlorination of water tank done yesterday ? Who did it ?

12. Who checked anaethesia trolley?

13. Who replaced bed sheet of OR table in the evening ?

14. Who cleaned equipments / Instruments (Cautery, Suction machine & OR Table) with Na – hypochlorite ?

15. Special Note :

Signature of OR – Incharge: _____

Signature of HOD: _____

(4) Weekly Cleaning Check List Eye OR

Date - Week -

Particulars Checked- ☐ Y ☐ N

1. List of medicines checked ? ☐ Y ☐ N Who did it ? (Daily use + Emergency medicines)

_____

2. Eye OR Check list checked ? ☐ Y ☐ N (List except medicines) Who did it ?

_____

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

4. Who submitted Auto Clave report ? Who checked it ?

_____

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

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

7. Cleaning of sink with 1% Sodium Hypochlorite done ? ☐ Y ☐ N Who did it ?

_____

8. Walls and floor of OR 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.R. – Incharge: _____

Signature of HOD: _____

(5) Monthly Cleaning Check List Eye OR

Date - Month -

Particulars Checked - ☐ Y ☐ N

No Particulars Month / Date

1. Overbook of change of OR boy posting checked ? ☐ Y ☐ N

2. Swab sample culture done on every second Saturday ? ☐ Y ☐ N

3. OR A/C cleaned by air blower cleaner on last Saturday ? ☐ Y ☐ N

4. Did in-charge check the washing of Or on last Saturday ? ☐ Y ☐ N

5. IOL Report completed or not ? ☐ Y ☐ N

6. Lecture delivered and exam conducted for OR staff ? ☐ Y ☐ N

7. Who cleaned the water tank ? On which day ?

_____

8. Drum cleaned ? Who did ? Holes checked ?

_____

9. Windows cleaned or not ? ☐ Y ☐ N

10. Special Note : _____

_____

Signature of O.R. Incharge:_____

Signature of HOD : _____

(6) 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.R. Incharge:_____

Signature of HOD : _____

(7) Weekly Nail Check List

Date / Day -

No. of Persons_____

Name of Persons_____

_____

_____

_____

_____

Nail Cut ? ☐ Y ☐ N

Clean ? ☐ Y ☐ N

Prepared by:_____

Signature of I / C _____

(8) Daily posting of OR staff / Preparation of OR check list.

Date -

Particulars	Eye OR
No. of operations done	
Time of start of operation	
Time of end of operation	
How many Doctors attended OR	
No. of nurses + Field Staff	
No. of OR Tables – Assistants	1.
	2.
	3.
No. of OR Boy	
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. Viscomet	7 Nos.		Inj.Viscomet	13 Nos.

Report Prepared By: _____

Signature of OR I/C: _____

Signature of HOD: _____

Note:_____

_____

(9) Medicine + Others Weekly Check List (Eye OR)

1	Intravitreal Ing.											
2	Gentamycin 80 mg.											
3	Dexamethasone 2mg.											
4	Xylocaine 2%											
5	Bupivacaine 0.5%											
6	Ampicillin 500mg											
7	Hyaluronidase											
8	Pilocarpaine											
9	Adrenalin											
10	50% Dextrose											
11	Sodabycarb											
12	Dopamine											
13	Alprax											
14	Mefentine											
15	Hydrocortisone											
16	Aminophylline											
17	Deriphylline											
18	Atropine											
19	Pentazoscine											
20	Phenargen											
21	Distilled water											
22	Pentothal 0.5mg											
23	Calcium Gluconate											
24	Chlorphenaramine											
25	Inj. Furosemide											
26	Viscoolastic											
27	Suction Machine (Big)											
28	Torch-3											
29	Anaesthesia Trolly with 02N20 Cylinder											
30	Scissors (Big)											
31	IV Set											
32	Scalpvein											
33	Pulse oxymeter											
34	Mannitol (100 ml)											
35	Mannitol (350 ml)											
36	Ringer Lactate											
37	5% Dextrose											
38	5 Glucose saline											
39	Oxygen cylinder pressure guage with flow meter											
40	Nasal prongs											
41	Ambubag with mask											
42	Laryngoscope with all blades											
43	Endotracheal Tube No. 3,5 to 9											

Filler Sign. _____ O.R.- Incharge Sign. _____

Verifying Doctors Sign. _____

(10) Daily OR Report

Date - Day OR Start Time - OR 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 ☐
35 to 50 ☐
50 to 60 ☐
Above 60 ☐

Female : 15 to 35 ☐
35 to 50 ☐
50 to 60 ☐
Above 60 ☐

Children Age Group

Infant : < 1yrs: ☐
Boys : 1 to 15 ☐
Girls : 1 to 15 ☐

Details about type of operation done:

A)

B)

C)

Total No. of Operations:

1 Total Cataract ☐
2 Phaco with IOL ☐
3 Non-Phaco with IOL (SICS / ECCE) ☐
4 IOL ☐
5 Non-IOL ☐
6 Combined Cataract with AGS ☐

1 Squint ☐
2 Lid Surgeries ☐
3 DCR ☐
4 Glaucoma ☐
5 Pterygium ☐
6 Vitrectomy ☐
7 Retinal Detachment ☐
8 Corneo / Scleral Tear Repair ☐
9 Minor ☐
10 Corneal Surgeries (Keratoplasties) ☐

Complications: _____

(11) Daily OR Particulars Report

SL. No.	Particulars	Date
1	Cleaning of anesthesia trolley in presence of Anesthetist	
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. / Filled Inj. (G.A) Ampoule — Atopine / Adrenaline / Mephentine	
	No. 0-4 oral airways connected cylinders filled with Nitrous & Oxygen Small-Large size spanner Both circuit — Upper (Bains) / Lower (Clesed) / Children (Pediatrics)	
	Lower tray Adult & paediatric ambubag with valve & mask	
3	Things needed by Anesthetist except trolley	
	Instruments Cardiac monitor pulse oxymeter B.P. Instruments Stethoscope suction machine	
	Medicines	
	Spinal and G.A. Injection Emergency drugs Intra Veinous fluids	
	Filler sign OR In Charge Sign	

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

(12) Weekly Autoclave Report

Autoclave Repot from_____ to _____ Report prepared on _____

Autoclave by		Eye OR	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	Operations done		Autoclave No.				Total drum+tray	•When needed •Started in morning	Note
	EYE OR	Day	EYE OR	1	2	3	4			
Sun.		Sun.								
Mon.		Mon.								
Tue.		Tue.								
Wed.		Wed.								
Thur.		Thur.								
Fri.		Fri.								
Sat.		Sat.								

Report Prepared By:_____

Signature of OR I/C:_____

Signature of HOD:_____

Note: _____

_____

(13) Weekly OR staff posting Report

Period from:_____ To _____

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

Remarks: _____

_____

_____

(2) OT Boy

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

(3) OT PCA

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

Remarks:_____Prepared by: _____

Signature of OR I/C :_____Sign. of HOD:_____

(14) Oxygen - Nitrous Cylinder weekly report

Total: Total No. of Oxygen (Small)
Total No. of Oxygen (Big)
Total No. of Nitrous (Small)

SL.No.	Item	Filled	Used	Pending	Empty	Total
1	Oxygen (Small)					
2	Oxygen (Big)					
3	Nitrous					

Remarks: _____

Prepared by: _____ Signature of OR I/C :_____

Sign. of HOD: _____

(15) Check list of work to be done by OR boy on Sunday

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

Report Prepared By: _____

Signature of OR I/C : _____

Signature of HOD : _____

(16) IOL Report (IOL Stock Report)

IOL No.	Biotech		Appa		C-thro		Total	IOL No.	Biotech		Appa		C-thro		Total
	AC	F) PC	AC	F) PC	AC	F) PC			AC	F) PC	AC	F) PC	AC	F) PC	
6								19.5							
6.5								20							
7								20.5							
7.5								21							
8								21.5							
8.5								22							
9								22.5							
9.5								23							
10								23.5							
10.5								24							
11								24.5							
11.5								25							
12								25.5							
12.5								26							
13								26.5							
13.5								27							
16								27.5							
16.5								28							
17								28.5							
17.5								29							
18								29.5							
18.5								30							
19								30.5							

Report Prepared By : _____

Signature of OR I/C : _____

Signature of HOD : _____

(17.A) IOL Monthly Report

Stock position of IOL for the month of _____											
Sr.No	Opening Balance	Receipt				Total Stock	Use				Closing Stock

Report Prepared By : _____

Signature of OR I/C : _____

Signature of HOD : _____

(17.B) Power Distribution of IOL as Balance Above

No.	Diopter	Opening balance	Stock received till end	Stock need till end	Balance till end	Demand	Remarks
1	<18						
2	18						
3	18.5						
4	19						
5	19.5						
6	20						
7	20.5						
8	21						
9	21.5						
10	22						
11	22.5						
12	23						
13	23.5						
14	24						
15	24.5						
16	25						
17	25.5						
18	26						
19	26.5						
20	27						
21	>27						
	Total						

Filler Sign : _____

O.R. - Incharge Sign : _____

Verifying Doctors Sign : _____

(18) Monthly over of O.R. Boy

EYE OR

S.No.	Particular		Month / D. O. C
1	Are coils of all autoclave Machine in order ?	Y / N	
2	Are coil, Ping, Ring, of all autoclave Machine in Position ?	Y / N	
3	Are E.T.O. machine & High speed Machine fuctional ?	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 ?	Y / N	
	Note:		

	Name	Designation	Signature
Signature of person handing over			
Signature of person taking over			
Signature of O.R. Incharge			
Signature of Verifier			

Filler Sign : _____

O.R. - Incharge Sign : _____

Verifying Doctors Sign : _____

Annexure - 4

STANDARD SURGICAL STEPS FOR PHACOEMULSIFICATION

- Full dilatation of pupil of the eye to be operated is ensured.
- Peribulbar anesthesia by the Anesthetist.
- Surgical area is cleaned with Povidone Iodine Microbicidal solution and draped with Disposable drape (with fluid collection bag).
- Self retaining wire eye speculum is applied after cutting a window in the disposable drape, taking adequate care to properly isolate the lid margins & eyelashes from the surgical field.
- Side Port entry wound to be fashioned on the non-dominant hand side with the help of MVR blade or 15 degree blade.
- In case of mature and hyper mature cataract air is injected into the Anterior Chamber (AC) through the side port, using a a 27 or 30G cannula.
- Anterior Capsule is stained with Trypan Blue {dye especially where indicated (BLUREX)}.
- Air and Blurex is replaced with Visco elastic through side port.
- Main Phaco wound is fashioned on dominant hand side, preferably limbal or clear corneal.
- Partial thickness corneal gutter incision, 5.5 mm in length, to be made with Razor blade fragment/ appropriate surgical blade.
- Lamellar pocket is made using Crescent tunnel blade.
- AC is entered using 2.8 mm or 3.0mm sharp tipped keratome blade, taking care that the entire tunnel incision is of appropriate length.
- After re-injecting visco elastic into AC, Continuous Curvilinear Anterior Capsulorrhexis is performed with 26G needle Capsulotome and / or Uttrata's Capsulorrhexis forceps.
- *Hydro dissection* is done using a 30G or 27G cannula, taking care to avoid damage to the capsulorrhexis edge and posterior capsule; the nucleus is intermittently depressed with the tip of the cannula to express unwanted fluid from the lens substance and also to take care of any nucleus prolapse into the AC.
- *Hydro delineation* to separate harder part of nucleus from softer epinucleus to follow using the same cannula till a Golden ring appears within the lens substance; the nucleus to be intermittently depressed with the tip of the cannula to express unwanted fluid from the lens substance and also to take care of any nucleus prolapse into the AC.
- After ensuring proper tuning of the Phaco machine, Phaco probe is introduced bevel facing down into AC through main surgical port with irrigation running, and epinucleus and cortex in the area of the capsulorrhexis is aspirated to expose the anterior surface of the sclerosed nucleus.
- Make sure that the nucleus rotates freely inside the bag for its efficient removal subsequently.
- Ensure complete aseptic precaution by covering the phaco machine panel with a sterile plastic drape.
- A ¾ depth linear diametric trench is fashioned in the nucleus using linear Phaco mode. Nucleus is rotated through 180 degrees with help of Sinsky's hook to complete the trench on the opposite side.
- Nucleus is rotated through 90 degrees and another diametric ¾ depth trench is fashioned perpendicular to the previous trench.
- Second instrument is always removed first before removing the phaco probe and aspirating probe before removing the irrigating probe.
- After completion of both trenches, nucleus is cracked and divided into four parts using Blunt Chopper and Sinsky's hook.
- After splitting, the four fragments of the nucleus are is removed one by one by emulsification in pulse mode.
- Low power and high vacuum is used during fragment removal.
- Irrigation is always be ON when the Phaco probe is inside the eye.
- Avoid corneal distortion during Phaco.
- As the surgeon becomes more proficient in the surgery, he/she may practice stop and chop technique after bisecting the nucleus into two fragments.

- Epinucleus is removed by Irrigation-aspiration sing epinucleus aspirator hand piece; Cortex is aspirated by fine port aspirator.
- Once all cortex is removed, the wound is enlarged to 5.2 mm using the appropriate round tip keratome blade.
- Anterior chamber and capsular bag is filled up with visco elastic and IOL to be implanted in the bag with help of McPherson's forceps; second haptic is inserted in the bag by dialing with Lester's Dumb-bell IOL manipulator.
- After ensuring that the IOL is well placed in the capsular bag and is stable, the visco elastic is removed by irrigation-aspiration using the fine port aspirator. Make sure to remove all the visco elastic by IA.
- Once all visco elastic has been removed, the main Phaco wound and side port is sealed by hydration of the corneal lip and wound edges using the Hydro procedure cannula.
- In case of slightest doubt about the integrity and water-tight property of the Phaco section, the section is closed with a 10 / 0 Nylon suture (Interrupted / Figure of 8 / infinity suture).
- Technique and instruments can differ with different surgeons.
- Mixture of Injection Cefazoline/Gentamicin and Injection Dexamethasone (Total volume approximately 0.3 to 0.5 ml) to be injected sub-conjunctivally in Inferior fornix at the end of surgery, and the eye to be patched after removing the surgical drapes.
- Some people use intracameral antibiotic / antibiotic in infusion solutio also, though not considered essential.
- Plastic protective eye shield is to be applied.
- Post-operatively, patient is provided with Non-narcotic analgesics (e.g. Ibuprofen-paracetamol combination or Nimuselide) and Acetazolamide systemically as and when required.
- Surgeon to ensure that operative notes are correctly entered in the patient's indoor case record. Any significant fact related to the surgical procedure is duly recorded.
- Patient is examined by surgeon next day on slit lamp and advised appropriate topical and systemic treatment.

Annexure - 5

Autoclave Logbook										
Date	Particular	Pre Vaccum	Steam Pressure	Steriliz-ation	Steam Release	Dry Time	Total Time	In Sig.	Out Sig.	Remarks

Annexure - 6

OPD No._____ IPD No. _____Date _____

Name _____Age _____ Sex____

Address _____

_____Phone No._____

Ref. by_____ Doctor

Name_____

Diagnosis_____

_____

COMPLAINTS:

GENERAL MEDICAL HISTORY:

OCULAR EXAMINATION OD OS

I. VISUAL ACUITY	Without Glasses	With Glasses	PH	Without Glasses	With Glasses	PH
DISTANCE						
NEAR						

II. REFRACTION

PREVIOUS GLASSES

SUBJECTIVE TEST

RETINOSCOPY UNDILATED

DILATED

FINAL PRESCRIPTION

III. SLIT LAMP EXAMINATION

LIDS

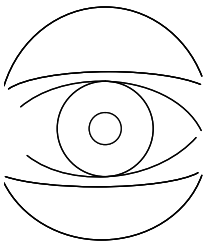
LACRIMAL SYSTEM

CONJUNCTIVA

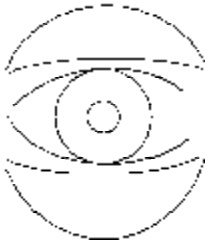
SCLERA

CORNEA

RT. EYE



LT. EYE



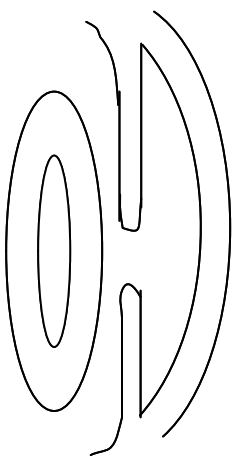
ANT. CHAMBER

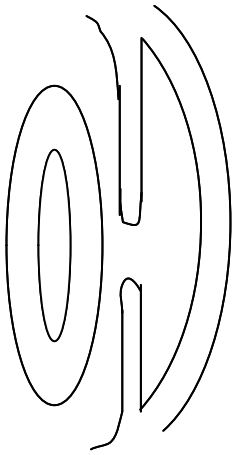
IRIS

PUPIL SIZE

PUPIL REACTION

LENS





IOP

IV. FUNDUS EXAMINATION

MEDIA

OPTIC DISC

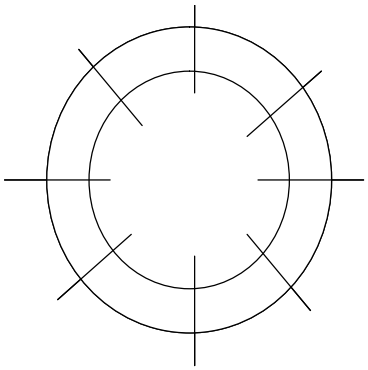
CUP - DISC RATIO

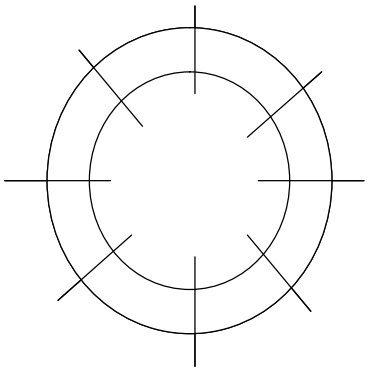
COLOUR
MARGIN

BLD. VSSLS

AV RATIO
AV CROSSING

MACULA & FOVEA





PROVISIONAL DIAGNOSIS.....

.....

REFFERAL INVESTIGATION TREATMENT

CORNEA CLINIC

V R CLINIC

PAEDIATRIC CLINIC

SQUINT CLINIC

NEURO OPHTHALMOLOGY

LVA CLINIC

OCULOPLASTY CLINIC

CL CLINIC

GLAUCOMA CLINIC

CATARACT CLINIC

Annexure - 7

EMERGENCY KIT & DRUGS

1. Airway - All Size
2. Endotracheal tube - All Size
3. Mask for oxygen - All Size
4. Suction machine & catheter
5. B P apparatus and stethoscope
6. Laryngoscope
7. Ambu bag
8. Self inflating bag
9. Defibrillator machine
10. Monitor (Multiparameter)
11. Floe's catheter and Uro Bag
12. Inhalar: - Asthalin, Beclate
13. Tablets sorbitrate 5 mg
14. Capsule depin 5mg
15. I/V fluids:- dextrose 5%, 10%, D.N.S., R.L. Manitol, N S
16. I/V set & I/V cannula & Paediatric I/V canula 22G, 20G, 24G
17. Dis. Syringes (1,2,5,10,20 cc.)
18. D/Needle (23G, 26G)
19. Ryles tube 12, 14, (8, 10F Paediatric)
20. Neubulizer Asthalin, Beclate
21. Nitroglycerine Patch
22. Glaucometer

DRUGS

1.Injection Adrenaline

2.Injection Avil

3.Injection Diazepam

4. Injection Hydrocortisone (efcorline)
5. Injection Decadron
6. Injection Deriphyline
7. Injection Aminophyllin
8. Injection Perinorm
9. Injection Pentazocine (Inj. fortwin)
10. Injection Atropine
11. Injection Sodium bicarbonate
12. Injection Phenargan
13. Injection Lasix/Fucimide
14. Injection Emeset
15. Injection Fulsed (midazolam)
16. Injection Xylocard
17. Injection Calcium Gluconate
18. Injection Pot klor (potassium chloride)
19. Injection Nor-adrenaline
20. Injection Distilled water amp.
21. Injection Dextrose 50%, 25%
22. Injection Insuline soluble 40 unit / ml (human act rapid)
23. Injection Dopamine
24. Injection Mephentine
25. Injection Glyco pyrolate
26. Injection Paracetamol
27. Injection T.T
28. Injection Vita K
29. Injection Vita C
30. Injection Rantac
31. Injection Heparine
32. Injection Afsoline
33. Injection Trimadole

Annexure - 8

METHOD OF SCRUBBING

- Wash hands and arms to two inches above the elbow and clean fingernails under running water.
- Wash hands with antiseptic soap upto elbow for 2 minutes
- Betadine (povidone, iodine liquid scrub) to be used twice for 4 minutes each
- Begin scrubbing palm outer and inner aspect of each finger, finger nails, the dorsum of the hand and circumferentially work up to the elbow. Rinse the hadn and arm, keeping the arm above the elbow level.
- To use sterillium twice for 30 second's each time.
- Disposable surgical gloves to be worn and cleaned with sterile, normal saline to remove glove powder.
- I fone touches anything in the process of scrubbing, the procedure should be repeated a fresh.

Annexure - 9

The Manual Tally Sheet > 4 Weeks Post Operatively

Village:

> 4 Weeks Post Operatively														
Sr.No.	Patient Name	Place of Surgery	Surgeon	Eye	Surgical Compl.	No. of wks post op.	Good 6/6 - 6/18	Border-line 6/24 - 6/60	Poor <6/60	Cause of poor outcome (<6/60)			Refraction	BCVA
										Selection	Surgery	Spec-tacles		

Abbreviations :

Surgery

CR	Capsule Rupture
VL	Vitreous Loss
BL	Blood In AC (>1/3 hyphaema)
CE	Corneal Edema

Selection

CO	Corneal Opacity	UV	Uveitis
OI	Old Iritis	RD	Retinal Detachament
RDS	Retinal Disease	CME	Cystoid Macular Edema
GL	Glaucoma	PCO	Posterior Capsule Opacification

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ABBREVIATIONS

1. AC – Air Conditioner
2. AGS – Anti Glaucoma Surgery
3. AHU – Air Handling Unit
4. BCP – Bacterial Carrying Load
5. BP – Blood Pressure
6. CCC – Continuous Curvilinear Capsulorrhexis
7. CCTV – Close Circuit Television
8. CDC – Control Communicable Disease
9. COPD - Chronic Progressive Pulmonary Disease
10. DCR – Dacryo Cysto Rhinostomy
11. DM – Diabetes Mellitus
12. DOP – Dioctly Phthalate
13. ECCE – Extra Capsular Cataract Extraction
14. ETO – Ethylene Oxide
15. FBS – Fasting Blood Sugar
16. GA – General Anesthesia
17. HB – Hemoglobin
18. HBV – Hepatitis B Virus
19. HCV – Hepatitis C Virus
20. HEPA – High Efficiency Particulate Air
21. HIV – Human Immuno deficiency virus
22. HOD – Head of Department
23. HT – Hypertension
24. HVAC – Heating Ventilation Air Conditioning
25. I/C – In-charge
26. IABP – International Agency for prevention of Blindness
27. ICO – International Council of Ophthalmology
28. IHD – Ischemic Heart Disease
29. IOL – Intraocular Lens
30. IOP – Intraocular Pressure
31. IPD – In Patient Department
32. MRSA – Methicilin Resistant Infection Staphylococus
33. MVR – Micro Vitreo Retinal
34. NIBP – Non Invasive Blood Pressure
35. NPCB – National Programme for Control of Blindness
36. NSAIDS – Non Steroidal Anti-intlummatory Drugs
37. OPD – Out Patient Department
38. OR – Operating Room
39. PC- Posterior Chamber
40. PCA – Patient Care Attendant
41. PCIOL – Posterior Chamber Intraocular Lens
42. PSC – Posterior Subcapsular Cataract
43. RBS – Random Blood Sugar
44. RL – Ringer Lactate
45. ROPLAS – Regurgitation on pressure over lacrimal sac area
46. SICS – Small Incision Cataract Surgery
47. SSI – Surgical Sight
48. USG – Ultrasound Sonography
49. UV Light – Ultraviolet Light
50. VA – Visual Acuity
51. VIP – Very Important Person

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INTRAVITREAL INJECTIONS

MATERIALS REQUIRED:

- Tuberculin Syringes
- 26G needles
- Lid Speculum
- Cotton tipped Applicator
- Caliper
- Fixation Forceps
- 4 % Xylocaine or 0.5% Proparacaine eye drops.

SITE OF INJECTION:

- Phakics-4 mm from limbus
- Pseudophakics/Aphakics-3.5 mm from Limbus
- In aphakia (without intact posterior capsule), injection can be given through the limbus into the vitreous cavity.

TYPE OF ANESTHESIA:

- Topical
- Topical with Facial
- Peribulbar in un-cooperative patient

TECHNIQUE:

1. An Intravitreal injection should be given in O.T. with all aseptic and antiseptic precautions
2. Paint and drape the eye
3. Mark required distance from the limbus
4. Fix the globe with fixation forceps
5. Insert 26 G needle, bevel facing upwards and direction towards into the mid-vitreous.
6. With the tip of the needle visualized, take a vitreous tap before injecting the drug in case of endophthalmitis.
7. Change the syringe to the one with the drug without withdrawing the needle from the vitreous cavity and inject the medicine slowly.
8. Withdraw the needle after administering the intravitreal injection and press the sclera on the injection site with the cotton bud.
9. Take an AC tape after giving the Intravitreal injection.
10. Check IOP (Digitally) after the injection and patch the eye.

CHOICE OF DRUG:

- Differs case to case
- Choice of Antibiotic according to EVS Study-

o 1st choice- Vancomycin 1 mg/0.1ml
and
Ceftazidime 2.25mg/0.1ml

o 2nd Choice- Vancomycin 1 mg/0.1ml and Amikacin 400mgm/0.1ml

- Steroids-Dexamethasone 400mgm/ 0.1ml
- Antifungal-Amphotericin B 5mgm/ 0.1ml

REMEMBER:-

1. Do not mix different drugs in the same syringe.
2. Do not withdraw the needle each time from the vitreous cavity for injecting multiple drugs (in the same sitting)
3. Fix the syringe loosely on the needle and change only syringes for different drugs, keeping the needles stabilized in the vitreous cavity.

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PREPARATION OF INTRAOCULAR DRUGS

The lists provided here are recommended procedures for preparing antibiotics, antifungals and steroids for intraocular injection.

CEFTAZIDIME, 2.25 mg /0.1 ml

1. One vial of ceftazime powder, 500mg, is diluted with 10 ml normal saline for injection (preservative).
2. A second empty, sterile vial is filled with 1.0 ml of solution withdrawn from the fist vial.
3. To the second vial 1.2 ml normal saline for injection (preservative free) is added.
4. The concentration of ceftazidime in the second vial is now 2.25 mg/0.1 ml.

VANCOMYCIN, 1 mg /0.1 ml

1. One vial of vancamycin powder, 500 mg, is diluted with 10 ml of 0.9% normal saline for injection USP (preservative).
2. A second empty, sterile vial is filled with 2.0 ml of solution withdrawn from the fist vial.
3. To the second vial, 8.0 ml of 9% normal saline for injection USP is added.
4. The concentration of vancamycin in the second vial is now 1.0 mg /0.1 ml.

AMIKACIN, 0.4mg /0.1 ml

1. One vial filled with amikacin, 500mg /2 ml.
2. A second empty, sterile vial is filled with 0.15 ml of solution (40mg), withdrawn from the fist vial.
3. To the second vial is added 9.84 ml of 0.9% normal saline for injection USP.
4. The concentration of amikacin in the second vial is now 0.4mg /0.1 ml.

AMPHOTERICN - B, 0.005 mg /0.1 ml

1. One vial amphotericin –B, 50 mg, is diluted with 10 ml sterile water for injection UPS (preservative free).
2. A second empty, sterile vial is filled with 0.1 ml of solution with drawn from the fist vial.
3. The second vial is added 9.9 ml of sterile water of injection UPS.
4. The concentration of amphotericin-B in the second vial now 0.005 mg / 0.1 ml.

DEXONA - 0.4 mg / 0.1 ml

1. 0.1 ml is directly taken from the Ampoule.

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PERIBULBAR BLOCK

- **PREPARATION:**
  - 10 ml syringe
  - 5 ml of bupivacaine 0.75 %,
  - 5 ml lignocaine 2% with or without (1:200,000) adrenaline &
  - 75 unit of hyaluronidase mixed

- **TECHNIQUE:**
  - A 25 guage 2.5 cm disposable needle is attached to the Syringe
  - Topical anesthesia is instilled in conj sac
  - pt. Placed in supine position & asked to look steadily straight ahead
  - Gentle aspiration of the syringe is performed to Alleviate possible entry of the needle in to blood vessel
  - 5 ml of mixture is injected in to lateral adipose tissue of the orbit
  - Second 5ml of injection given just inferomedial to supraorbital notch
  - Pressure is applied to the site for a couple of minute
  - Anesthesia and analgesia begin in about 5 to 15 minutes

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VERTICAL AUTOCLAVE

Vertical Autoclave

INSTRUCTIONS FOR OPERATING & MAINTENANCE

1. Unscrew locking nuts and lift the lid.
2. Fill water between the water level marks.
3. Put articles to be sterillzed into the Dressing Drum or Tray Packs with integrator and close the lid.
4. Ensure autoclave indicator tape with date of autoclaving is affixed to inner & outer side of drum container.
5. The vent holes of dressing drum and kept open.
6. Place the drum packs into the inner chamber.
7. Place the lid on the container and tighten by locking the opposite nuts.
8. Close the Air Exhaust valve and vacuum release knobs
9. The two electric elements are switched on.
10. As soon as the gauge shows 0.5 kg pressure, open a air exhaust valve till the pressure valve comes back to zero.
11. Bucket is placed below the valve.
12. Heating is continued till the pressure gauge reaches 1.5 kg.
13. One element is switch off.
14. After twenty minutes the second elements is switched off.
15. The steam release valve is opened and the air exhaust valve is opened till the pressure gauge comes down to zero.
16. After ten minutes, the lid is unlocked an opened and the contents are removed.
17. Water is change every day.

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IOL POWER CALCULATION GUIDELINE

1. KERATOMETRY:

- To be calibrated for each observer.
- To be calibrated 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 A-Scan & Tonometry.

2. RE – MEASURE 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.

3. A – SCAN BIOMETRY

- Calibration before day's use.
- Test block provided by company.
- Default settings to be used unless indicated.
- 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).
- A scan using an immersion technique is best but if an applanation technique to be used corneal compression to be monitored by Anterior Chamber Depth (ACD).
- If AL 22 – 24 mm SRK II or SRK – T
- AL < 22 mm Hoffer Q
- AL > 24 mm Holladay I
- If above formulas not available SRK – T in all cases.

4. RE – MEASURE BOTH EYES IF :

- AL 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.

N.B.: When re-measurement – is indicated it should be done by a second ophthalmic Assistant without prior knowledge of the first measurement – if still re-measurement is indicated it should be done by an ophthalmologist.

5. CHARACTERISTICS OF QUALITY A – SCAN TECHNIQUE:

- **Five principal Echo spikes are present :**
  - Corneal
  - Anterior lens
  - Posterior lens
  - Retina
  - Sclera and orbital fat
- **Echo heights are adequate :**
  - Anterior lens echo is 90% or more of maximum height.
  - Posterior lens echo is between 50% and 75% of maximum.
  - Retinal echo is 75% or more of maximum.
- **Each rise angle must be clear :**
  - The take off of the retinal spike must be clean and form a 90° angle from the baseline.

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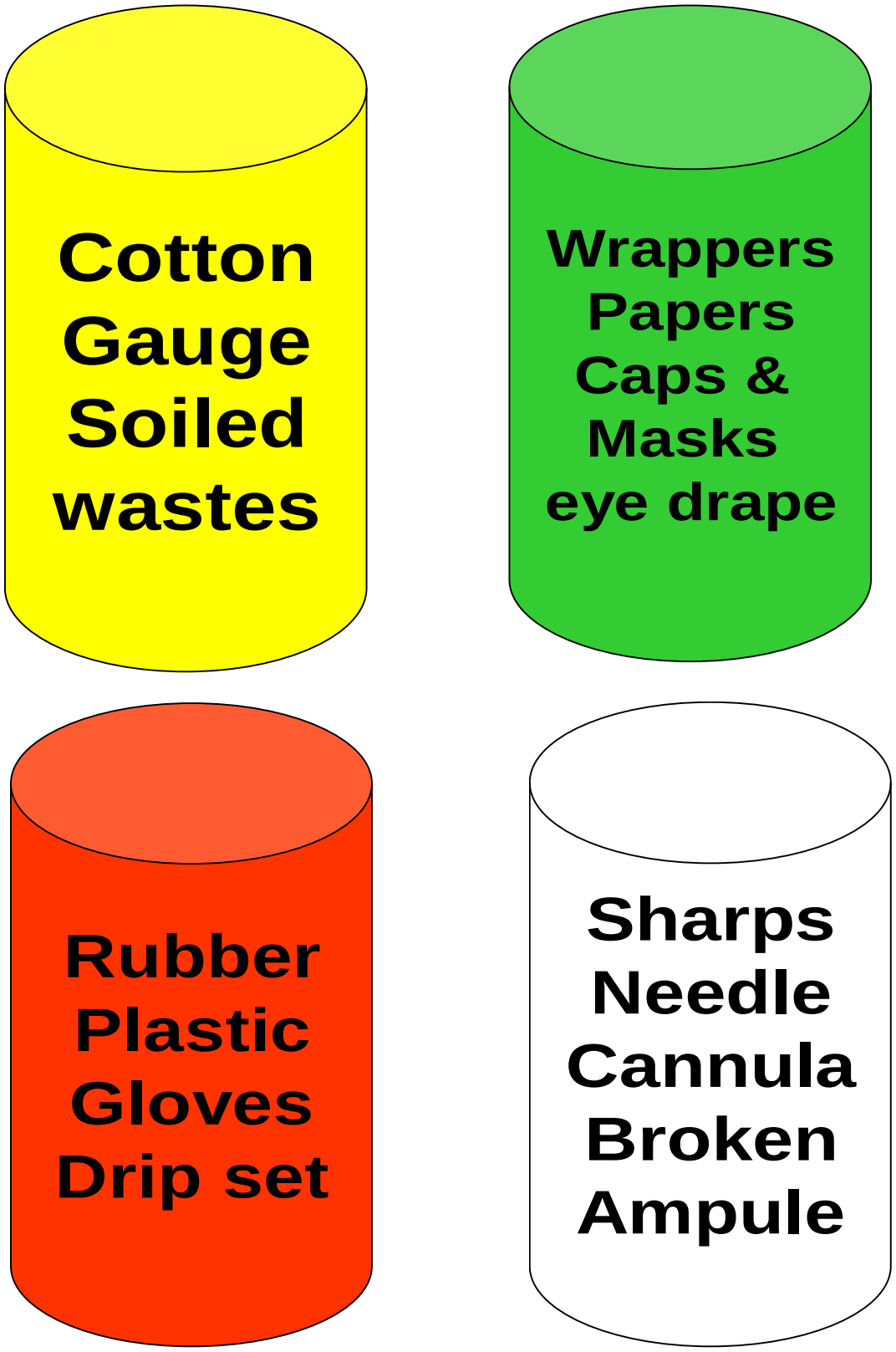
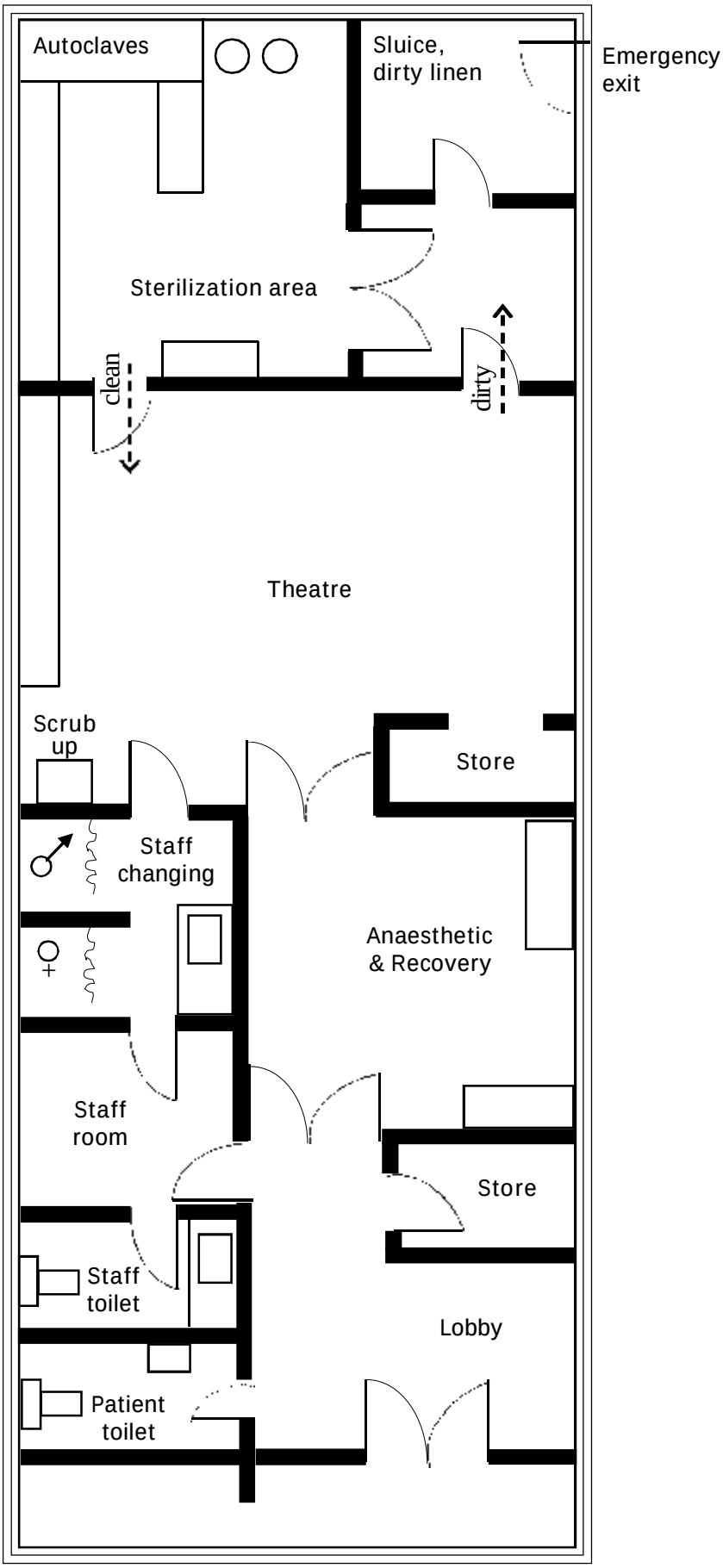
BIO MEDICAL WASTE MANAGEMENT



ONE POSSIBLE OR DESIGN



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