



Livewire

ISSUE 4

INFECTION CONTROL

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NEWS LETTER

FROM THE DESK OF EDITORIAL BOARD

EDITORIAL BOARD



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Dear Friends,

We believe you have taken a good look at the first three issues of Livewire – infection control series. You would have been introduced to the subject, where stalwarts in the field have shared with you what they feel about the quality of cataract surgical services in our country. This must have triggered some thinking at your end and we would like to hear from you.

With this issue, we are entering into the details of infection control measures. Here, we are talking about the most important cause leading to endophthalmitis – whether cluster or sporadic. Hope this will help you understand the basics of infection control activities, reflect on the most important cause and think about how to prevent it. The science of infection control has also made rapid advances in the recent past. Once we understand it properly, it is not very difficult to practice the same. The important thing is to know the same in details. We are trying our best to give you the scientific details of infection control activities and we request experts in the field of infection control to write articles for the series.

We have heard very encouraging feedback about the livewire infection control series. Hope this series will fill the gap left during academic days. Your feedback is very valuable and is most welcome.



Dr. Mehul Shah,
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Dr Mehul has done his graduation and post-graduation from Ahmedabad, did retina fellowship from Retina foundation and Sankara Nethralaya. He is working at Drashti Netralaya, developed special interest in Ocular trauma, Published 185 articles in peer reviewed journals, 4 chapters in books and reviewed 47 articles in international peer reviewed journals. He has experience of construction of state-of-the-art operation theatre approved by NABH and provided guidelines to number of hospitals to construct operation theatres.

WHICH ARE THE MOST IMPORTANT REASONS LEADING TO SPORADIC AND CLUSTER INFECTIONS?

• THEATRE LAYOUT:

Size – number of tables – floor – walls – paint – arrangement of rooms – autoclave room – false ceiling

• STERILIZATION:

In the hospital and pre-sterile items: Methods – Present practices – Causes of failure – how to monitor – who will monitor & when – who is responsible in the end – shelf life – expiry date

CHAIN OF INFECTION:

- **Causative Agent-** Microorganism capable of causing disease
- **Reservoir-** Agent can survive, may/may not multiply
- **Portal of exit-** Respiratory, GI, GU tracts, skin & mucous membranes
- **Transmission-** Direct & indirect contact, airborne, common vehicle
- **Portal of Entry-** Open wound, skin & mucous membranes
- **Host-** Person lacking effective resistance
- **Adequate Dose-** # of organisms needed for infection

MODE OF TRANSMISSION:

- ENVIRONMENT
- SUPPLIES- CONSUMABLES, INSTRUMENTS, FLUID-BOTTLES AND VISCOELASTICS
- PATIENTS
- PERSONNELS

Post-operative surgical site infections remains a major source of illness and a less frequent cause of death in the surgical patient

- These infections number approximately 500,000 per year, among an estimated 27 million surgical procedures
- Accounts for approximately one quarter of the estimated 2 million nosocomial infections in the United States each year
- Infections result in longer hospitalization and higher costs



Following are some major factors which play an important role in prevention of infection.

INFRASTRUCTURE:

- Old or new premises
- Special design or converted- no special design
- Air control- conventional or HVAC

If old and converted premises, kindly renovate in such a way that it should be according to scientific principles.

PERSONNEL:

- Dressings- Hair care, nail care
- Attitude- Operation room etiquettes
- Patient flow
- Operation room interior arrangement

Attitude of people is very important for sterile and unsterile personnel, as organisms flying in the air will contaminate surgical site, movement of people, patients, air currents, dropping of instruments on the floor will cause organisms on the floor to fly up in the air.

OPERATION ROOM MAINTENANCE:

- Daily cleaning
- Weekly cleaning
- Filter care
- OR Traffic control

Maintaining dry floor is very important.

Cleaning floor, sinks, equipments, furniture, air conditioner filters is also important.

STERILIZATION:

- Irrigating solutions, viscoelastics
- Other disposables
- Blades
- Sutures
- Dropped surgical instruments

In an effort to be more cost effective, one is compromising on quality aspect, particularly for community services.

There has to be a specific policy for activities to be performed in between cases – repeat scrubbing, patient transfer, and sterile trolley transfer.

Appropriate technology has to be adopted for the same. One has to find out or learn proper methods to recycle. Training to staff who is recycling is also important. Direct recycling can contaminate from one case to other case.

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In a country like ours, there are cost constraints and non-availability of items needed for cataract surgery. Some of the critical areas for which no universal/uniform method exist are handling of irrigating fluids before the surgery, viscoelastic, consumables used in either phacoemulsification or other intraocular surgeries.

The following describes some of the common reasons that lead to post-operative infections and the practices that are for prevention of post-operative infections. These practices are ever evolving and changing depending on the changing requirements or nature of existing facilities. So, the policies and procedures should be reviewed periodically and updated to meet the changing needs and trends.

There are many reasons for developing infection after a cataract surgery. The type of infection and the organisms causing these infections may indicate the possible causes and source of infection.

For example, if it is an early postoperative infection developing within a week to 10 days of surgery and caused by *Staphylococcus* species, this is most likely to be from the patient's own conjunctiva flora.

Common causes/sources of infection leading to post-operative infection

- Bacteria from the patient's conjunctiva (most common cause)
- Contaminated instruments by improper or faulty sterilization (second common cause)
- Irrigating solution, viscoelastics, Trypan blue (common in our country)
- Air conditioning system, operating room personnel (very rare)
- IOLs especially hydrophilic IOLs immersed in solution

Post-operative infections can occur as sporadic infection (cases spread apart in time and across different theaters). Many cases can occur together that constitute a cluster. Cluster infection constitutes post-operative endophthalmitis cases occurring in relatively short succession in a single facility or a particular operating room. Many clusters reported in the literature tend to originate from a distinct infective source and occur over a relatively short time period of days to weeks. But majority of instances of cluster infection that were reported were operated on a single day and some common consumable items that have been used had been linked to these cases. The causes and the microorganisms associated with either scenario are different.

Reasons for cluster infection:

- Break in sterility of pre-sterilized items (IOLs, trypan blue, viscoelastic).
- Failure to properly sterilize reusable items like instruments.
- Irrigating solutions.
- Inadequate sterilization of phaco-tubing.

The causative organism in a cluster outbreak is invariably *Pseudomonas aeruginosa* which is a common contaminant of water and air. Most often this organism can be cultured both from the vitreous and the suspected source of infections.

Majority of cases occur as sporadic infection where it is very difficult to point out a source of infection. *Staphylococcus* and *Pneumococcus* species are from the patient's own conjunctiva and gram negative organisms may be external contaminants.

Use of Ringer lactate vs. balanced salt solution & autoclaving of irrigating fluid

Ringer lactate is commonly used for irrigation. Currently, because of inconsistencies in the supply and quality of the ringer lactate in glass bottles, ringer lactate packed in plastic bags are commonly used. These bags need not and cannot be autoclaved. But if bottles are used then they should be autoclaved prior to use. Balanced salt solution, because of the cost factor is not commonly used for cataract surgeries.

Autoclaving Viscoelastic before use

Autoclaving of viscoelastic is not preferable. Viscoelastic that are remaining after surgery should be discarded or can be used for wet lab training purposes.

Handling of the various parts of the Phaco machine

The needle tips are cleaned and autoclaved by high speed autoclave after every surgery & in-between surgeries. At the end of the day they are cleaned and sterilized as per routine procedure. The needle tip is discarded after a certain period of time.

The sleeve is also changed and autoclaved by high speed autoclave in-between surgeries. Sleeves are used till the color changes or holes form and usually they last for a week or less.

At present, most of the cassettes along with the tubing are disposable and can't be reused. For reusable cassette-tubing, they should be sterilized by autoclaving every day. One should never gas sterilize these tubings as the degree of sterilization is questionable if there are fluid pockets in the tubing.

Phacoemulsifier hand piece, irrigator/aspirator, irrigator/aspirator tips

Phacoemulsifier hand piece is flushed with balanced saline solution prior to removing from the operative field. Each item is cleaned and flushed in accordance with the manufacturer's direction for use and it has to be verified that all debris inclusive of viscoelastic devices are removed. Irrigator/aspirator tips must be inspected preferably under magnification, before sterilization.

Phaco internal tubing

Internal tubing is cleaned by the technicians once in 6 months.

Pre-operative preparation of the patient

- **ROPLAS test versus syringing of lacrimal passages**-syringing of the lacrimal passages are done for all patients and in addition, pressure is applied over the sac for any regurgitation to rule out atonic sac. If the passages are completely blocked then a DCR is done and cataract surgery is done after a few weeks. If the passages are partially blocked, then a conjunctiva culture is taken and if negative then surgery is performed. The staff doing this must be well trained. Literature and many ophthalmologists do not recommend this practice. However, given the high incidence of blocked naso-lacrimal duct in the Indian patients and associated organisms harbored by the lacrimal sac, it is still a good practice to check the patency of the duct.

- **Clipping of lashes required or not:** Clipping of eye lashes is not done as a routine before cataract surgery. Studies have proven that this does not have any influence on the post-operative infections. Sterile disposable plastic drapes should be used to drape the surgical field. The eye lashes must be fully separated from the surgical field. This drape comes in different sizes and is very economical. This saves on man power of washing linen drapes.

Intraoperative issues:

- a. Oral or any form of systemic antibiotics are not given before surgery
- b. Antibiotics in the irrigating fluid are also not used
- c. Subconjunctival antibiotic injection at the end of surgery: The use of subconjunctival injection at the end of surgery is a matter of personal preference for the surgeons. As a general rule, it is not used. Situations where this is given are if the surgery was prolonged due to complications or post-operative inflammation is anticipated. Topical antibiotics like Ciprofloxacin / Ofloxacin is applied before bandaging the eyes as a routine, a drop of Povidone iodine is also given at the end of the surgery.

Prevention of post operative infection needs the involvement of all the members of the surgical team. To achieve this, we need not only a sound sterilization procedures, but also a motivated team that will practice the aseptic protocols honestly with dedication, keeping the patient's welfare in mind. All this is possible only with good leadership among the doctors as well as among the nursing team and other support staff.