Sterilization in Ophthalmic Practice

Dr. Lalitha Prajna, Ms. Charu Priya. R, Ms. Sharmila Noor, Aravind Eye Hospital, Madurai

Introduction

Decontamination, disinfection and sterilisation are basic components of any infection control programme. The basic of the technology-chemicals for disinfection-heat for sterlisation go well back to the 19th century, with Koch, Pasteur, and Lister. Lack of knowledge or negligence in infection or standard practices would result in hazardous effects, as sterile instruments and environment are essential for successful eyecare service.

In ophthalmic practice major hospital associated infectious (HAI) diseases are preventable. It is minimal since, hospital stay of a patient rarely exceeds 48 hours.

Definition

Sterilization is defined as the complete absence of any viable microorganisms including spores.

The objective of sterilization is to remove or destroy microorganisms, since they cause contamination, infection and decay. The purpose for sterilization, the material to be sterilized and the nature of the microorganisms that are to be removed or destroyed decides on the methods of sterilization employed. Any sterilization process must be monitored by chemical and biological method. It includes pressure, temperature and other methods depending on the sterlisation method. The sterlisation procedure choosen should be appropriate for the item to be sterlised.

Sterlization of Ophthalmic Tools

Methods:

The methods of sterilization most commonly used are

1. Dry heat
2. Wet heat
3. Formaldehyde and gas

Disinfection is reducing the number of viable microorganisms but not inactivating all viruses and bacterial spores.

The most important factor in using disinfectant is its concentration, time of contact with the disinfectant and precautions advised by the manufacturer. Several methods of disinfection are available, but standardisation and uniformity throughout a hospital is essential. Disinfection is not a substitute for sterilization.

The common disinfectant used in ophthalmology are:

1. Glutaraldehyde 2%
2. Chlorhexidine
3. Iodine
4. Alcohol

Preventive Methods:

Sources of infection to the outpatient are mainly due to the contamination on the surgeon's and paramedics'hands, tonometer, slit lamp, opened old medication bottles etc.

Hand-washing:

This is the most important procedure for preventing infections

1. Hands should be washed incase of the following:
   a. When hands are soiled obviously
   b. After direct patient contact, more intense than a brief handshake, like taking a blood pressure or drawing blood from a general care patient
   c. During personal hygiene (use of toilet, blowing nose)
   d. Before handling sterile products
   e. Before eating

Hand Washing

2. In high-risk areas, an antiseptic liquid hand-washing agent (such as an iodophor or chlorhexidine gluconate) should be used, both before and after direct patient contact. High-risk areas include cornea clinic and minor operation theatre.
3. General patient care areas, outpatient clinics and clinical laboratories require only a general liquid hand-washing agent
4. Bar soap and towels should not be used for multi-patient use.

Needle Stick/Splash Policy

Splash policy is to be strictly adhered, to avoid transmission of infection through accidental splash of a needle stick with blood contamination, body fluids, mucous membranes or non-intact skin. The needle stick injuries should be thoroughly cleaned, and the affected area rinsed with soap and water.

Precautions to prevent spread of infection

Patients in contact with contaminated ophthalmic diagnostic instruments like the tonometer and slit lamp, are at high risk of getting ocular infections due to bacteria and viruses.

Methods to disinfect tonometers are as below[1]:

1. Dry heat
2. Mechanical cleaning with disposable wipe / sterile gauze
3. Wipe with gauze soaked in alcohol or chemicals like hydrogen peroxide and merthiolate
4. Soaking in chemicals like 70% isopropyl alcohol, 1:1000 merthiolate, 3% hydrogen peroxide and 1: 10 diluted house hold bleach (sodium hypochlorite)

Methods to disinfect slit lamp are as below:

1. Mechanical cleaning with disposable wipe / sterile gauze
2. Wipe with gauze soaked in alcohol or chemicals like hydrogen peroxide and merthiolate

Preventive Methods in the Operation Theatre:

Sterilization in the Operation Theatre begins right from its construction, as an ideal theatre should be located away from the roadside, avoiding dust, noise and other contaminants. The most sterile section of the field is in the center. Exogenous infection can occur by transfer of bacteria or fungi, which are airborne or transferred into the surgical field from improperly sterilized instruments or balanced salt solution, or from infected members of the operative room staff.

Rules for Operating Room

Proper design and maintenance of operating room is important to prevent transportation of micro organisms. Personnel who enter the operating rooms suite, contains large quantities of bacteria, in the nose and mouth, on the skin and on the attire, which may contribute to serious infections. Measures should be taken in order to follow the regulations in maintaining in the operation room. Its is also essential to maintain the theatre discipline and to avoid unnecessary talking or movement in the theatre.

Operation Theatre Environment

Attire:

The attire worn in the restricted surgical areas should be made of proper materials that meet with the standards. The apparel should be made of closely woven fabric and should cover as much as skin as possible to prevent dispersal of bacteria. The attire should not be worn outside the operating room department.

Caps and Mask:

Caps should be worn, as hair would harbor bacteria and if left uncovered, it would be a major source of infection. Hence care should be taken to cover hair completely. Persons in the operating room should wear disposable masks with high filtration efficiency, as masking is vital for prevention of infection. It should cover the mouth and nose entirely and should be tied securely to avoid venting.

Hand Washing:

Ornaments should be removed before the surgical scrub. Scrubbing with disinfectant and sterlised water is very important. The person should maintain Hand scrubbing. Generally three steps-procedures are followed for hand-scrubbing. The first step, is that the person should wash his hands from elbow to his fingers with soap and water for one minute. The next step is to scrub from elbow to fingers with brush and the last would be to scrub from elbow to wrist with brush.

Cleaning procedure

The environment of the operating room, like the walls, floors and other surfaces are rarely associated with transmission of infections. The operation theatre floors should be mobbed thrice a day with disinfectant. The other floors, including the patient preparation room, recovery room, waiting room, bathrooms and corridors should be cleaned once a day and the person, for protection, should wear a heavy-duty vinyl alcohol gloves. The walls, overhead fans, air conditioner filter, and vents should be wiped once a week.

Hospital-borne infections

Postoperative endophthalmitis, external ocular infections such as conjunctivitis, infections transmissible through corneal transplantation, hepatitis and HIV major hospital-borne infection, and preventive measures should be taken in order to avoid them.

Hepatitis

The term viral hepatitis refers to a variety of illness, but primarily to Hepatitis A, Hepatitis B and Hepatitis non-A, non-B. Hepatitis A primarily spreads non-parentally and Hepatitis B spreads parenterally and is characterized by the presence of Hepatitis B surface antigen (HbsAg) in serum. Hepatitis non-A non-B (NANB) also spreads parenterally and is currently the most common cause of transfusion-associated hepatitis.

High risk areas/staff

The high-risk of infection among staff is for anesthetists, surgeons, laboratory personnel, operating-room staff and places that are exposed to contaminated blood and body fluids.

Preventive Methods:

Hepatitis is a hospital-acquired-infections in health care workers and hence prevention against it is quite essential, the major source of infection being needle sticks and blood spills.

Personnel working in high risk areas should be given information about Hepatitis B and the risk of developing the disease.The decision to have Hepatitis B vaccine administered shall be left to the employee. Priorities for the administration of Hepatitis B vaccine to employees shall be developed by the infection control committee

AIDS Fact Sheet

- Direct contact of skin and mucous membranes

with blood, blood products, secretions, wastes and tissues of patients should be avoided.
- Regardless of the use of gloves, hands should be washed routinely.
- Gloves should be worn for contact with moist body substances.
- If soiling of cloths with moist body substances is anticipated, gowns or aprons should be used.
- Masks or goggles should be worn.
- If infection requiring a private room is mandated, then it should be arranged.
- Care should be taken to avoid needle splash, while handling needle sticks on patients.
- Revisable items to be reprocessed should be kept in the soiled utility room.

Infective waste disposal

Infective waste should be incinerated or should be autoclaved prior to disposal. Sharp items like needles, scalpel blades that could cause injury, should be placed intact into puncture-resistant containers. Needles should not be recapped, bent, broken or manipulated by hand, inorder to avoid needle-stick injuries. The government has laid down strict rules for waste disposal in a hospital. The paramedics should be aware of the specific colour codes of bags used for disposal of infective waste.

Conclusion

Health and safety measures should be well informed to the personnel in the operation theatre, staff in direct contact with patients or those involved with disposal of infective waste materials, inorder that they prevent themselves and others from infection. Since there are substantial epidemiological evidences to prove of diseases caused by hospital borne infection, there should be regular monitoring of disinfectant and sterility procedures by having an ICC (Infection Control Committee) with an Infection Control nurse and adequate surveillance. Since patient care is our priority we should not be the cause for them getting infected due to our negligence. It is highly essential to take preventive measures to maintain hygienic and sterile environment for eyecare service.

Suggested Readings

1. Patrict R. Murray, Ellen Jo Baron, et al. *Manual of Clinical Microbiology, Ed.7.*
2. *Hospital Infection Control Manual, Ed. 3, Christian Medical College, Vellore.*
4. *Centre for disease control and prevention 1985, Guidelines for handwashing and hospital environment control-CDC Atlanta.*