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Review Article

A clinical review on importance of sanitizing the operating room

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ABSTRACT

Modern day surgery is a highly sophisticated procedure incorporating both invasive and non-invasive techniques that are performed in the operation theatres. But we cannot ignore the fact that the infections are often acquired in hospital are surgical sites. The infection may transfer from patient to staff, staff to patients or patient to patient. Hence the aim of infection control practice is reducing the risk of infection from the surgical site. These practices include surgical scrubbing, disinfection of operating rooms, equipment and sterilization of instruments. Hand washing is done before and after dealing the patients, before surgical procedure with anti-septic solution or alcohol based sanitizer. The sanitizing techniques play an important role in avoiding infections and their spread in operating room. The knowledge of various techniques of disinfection and sterilization are more essential for staff members. These include but not limited to preparation of disinfectants and their concentration. For surgical instruments we use steam sterilizer (auto-clave) and ethylene oxide for endoscopic instruments. There is a need of training the surgical staff members to carry out these practices.

Keywords: Sterilization, Sanitization, Operation theatre, Infection control

INTRODUCTION

According to studies, 20% of all infections acquired in hospitals are surgical site infections (SSIs).[1] An infection that develops in the body portion where surgery was performed. It could be only superficial, or it could affect organs or tissues. Typically, as SSI arises 30 days following surgery. Therefore, it is crucial to prevent and control infection in operating rooms to ensure the patient's safety.[2]

INFECTIOUS SOURCES IN SURGICAL SUITES

The majority of SSIs develop during surgical procedures while the patient's wounds are still open. The infection origins may include the following.

The operations team members, what they are wearing and conditions in the operation room, including the air quality. The equipment and instruments, which are used during the procedure. These protocols should be understood by the operating staff members.[3]

The central component of each surgical institution is the operation theatre (OT) complex. The results of surgical interventions are dependent on several aspects, including: proficient surgical abilities; the scientific design of the operating room; appropriate methods for sanitation and disinfection; and infection control protocols.[4] Cleaning the operation room and its surrounding area reduces the risk of potentially contagious micro-organisms coming into contact with patients and medical personnel.[3] Cleaning takes place at different time.

The planning phase is a new operation theatre. Each day, just before the procedure, among the patients, following the final daily operation, known as terminal cleaning. Once a week and/ or once a month, further cleanings are done.

Unrestricted, semi-restricted, and restricted spaces must all be cleaned. Prior to going on to the scrub regions, anaesthesia and recovery rooms, and finally the sterilizing area, begin in the operation room. Cleaning the bathroom should come last.

EQUIPMENT

There must be an abundance of cleaning supplies available. There should be a set of these for the operation room, the restroom, and any other rooms. Sets ought to be kept apart in storage. The following should be included in each set: buckets and mops, hard scrubbing brush, rubber pusher to push back extra water, and vacuum cleaner.

Wipe every smooth surface (starting in the centre to outward and top to bottom).[3]

The patient's bed and its add-ons, as well as positioning tools and patient transfer appliances.

DISINFECTANT

Choose a disinfectant with broad-spectrum microbicidal action that is appropriate for each type of surface that need to be cleaned. Find out what is available in the pharmacy department and use the highest-quality products for a price that's affordable.[1]

Dry and wet cleaning clothes that is absorbent.

The cleaner should change into a fresh gown, cap, mask and pair of clean work gloves.

CLEANING ADVICE

Have a separate mop for the unclean regions and one mop for the clean rooms and operating room. Between each section, the water is changed.

Placing a cautionary "wet floor" sign at the entrance to the room as a cleaning begins is a smart idea.

Daily sanitizing and imperfection.

PRIOR TO THE DAY'S SURGICAL PROCEDURE

Every morning, regardless of whether it will be utilized or not, we clean and disinfect the operating room. Cleaning is the process of physically removing dirt or organic material form an object, it is necessary before sterilization or disinfection. Water is typically used, either with or without detergents.

Generally speaking, cleaning is done to get rid of micro-organisms rather than kill them.[5] To eliminate any soap (or detergent) residue, rinse the area with warm, soapy water before wiping it off with a towel dipped in fresh water. Wipe with the disinfecting solution to finish.[3]

Bio-cleaning

In order to accept the next patient in safety, bio-cleaning processes must guarantee that all these contaminants are removed completely after each patient passes while adhering to all regulatory measures. Three processes come together to create successful bio-cleaning: cleaning, dirt and filth removal and disinfection. The final stage ensures that any potentially harmful micro-organisms are destroyed.[13]

The following should be cleaned and sterile

Wipe all flat surfaces (starting at top to bottom and centre to outwards). The patient's bed and its related accessories, patient transfer equipment (wheel-chair and patient's trolley), positioning tools, antiseptic bottles, trays, and containers for sterile instruments are all included. Clean the walls, tabs, and basins. We should ensure there are no leaks in operation room complex. Check to see that the bottles of soap and antiseptic solution at the scrub basin are full and replenish them as necessary.

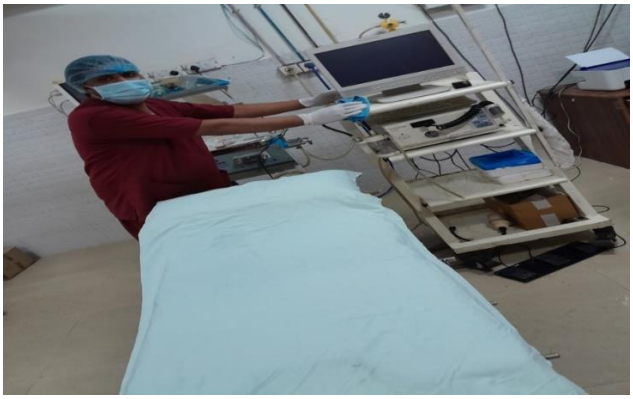

Figure 1: Technique of sanitization prior to the day's surgical procedure.

Prepare waste bins (including placing colour-coded waste collecting bags)

Clean and sanitize the floor last. Use a mop or a hospital-grade wet vacuum to remove extra filth and dust; then, mop with clean water to remove soapy residue; and last, disinfection. Be careful not to stir up the dust, because doing so spreads it. Keep the door closed and the ventilation equipment running for 10-15 min. after the operating room has been cleaned and disinfected (Figure 2).[3]

Following each patient

Clean and disinfect any contaminated portions of the floor as previously stated after each procedure. The operating table, surgical light, blood pressure cuffs, tourniquets, cautery plate, multipara monitor (leads and probe), image intensifier, and any other items that come into contact with the patient or could have become soiled or damp should all

be cleaned and disinfected. The area up to 1.5 meters away from the operation table, clean and sanitize the floor. We will replace all of the bin liners (waste collecting begs) after collecting and eliminating all of the waste even in the kick. Suction machines, for example, should have their waste removed before being cleaned, disinfected, or sterilised.

Figure 2: Preparing waste bins.

After surgery, at the end of the day

We should clean all surfaces, including the tops of operating tables and any stools, using a cloth and hot, soapy water. To disinfect electrical wires, carefully turn off all equipment at the mains and dab a towel with a little alcohol or other disinfectant before wiping them off (to use as little liquid as possible). The operation tables, trolley legs and wheels should be cleaned properly. Damp dust is may be present on the ceiling's hanging lights and other fixtures. We should clean the operating microscopes and operating lenses after each theatrical performance. Avoid cleaning microscopes or lenses with soapy water, since the soap residue could damage the lens, we wipe the lens and microscopes, including the handles, with a soft, non-abrasive cloth dipped in 70% alcohol or another disinfectant or as per as direction by the manufacturer. IV stands, anaesthesia work-stations, and patient's monitors should all be clean every day. In the theatre and restrooms, they replace the hand towels, patient sheets, blankets and sweep the floor.[3]

Depending on the kind of equipment, a different cleaning method will be used. For instance, some surgical equipment can be washed and dried in a machine. Some instruments need to be cleaned in an ultrasonic unit first, followed by a different washing and drying process before being sterilized and read for storage.[3]

Disinfection and sterilization

Disinfection is the process of completely cleaning an instrument or object to eliminate any microbes that could cause an infection, either entirely or partially. A perfect disinfectant should eradicate all micro-organism while also posing no risk to human health.[7] Sterilization entails eliminating all microbes, including spores, from the surface of the apparatus. Sterilization is meant to communicate an absolute procedure. The most modern techniques include hydrogen peroxide (H_2O_2) gas plasma, low-temperature sterilization technologies, and liquid chemicals. Common methods include dry heat, ethylene oxide (ETO) gas, and steam under the pressure.[8] Instruments must typically be wrapped or packaged before sterilization. As a quality control measure, every packet of sterilized material has chemical and biological indicators.[9]

Fumigation

Formaldehyde 40% solution is effective for sanitation of operating room. Fumigation is effective at 20^0C, with a relative humidity of 65% and requires a minimum exposure length of 12 hours. It acts as an alkylating agent.[11] Today, we can use Hydrogen per oxide 8% and 30 mg/l silver ions, which is more effective in the comparison of formaldehyde. The exposure time is very short. The solution is non-irritating for eyes and non-carcinogenic, and starts the procedure in operating room within 1 hour.[11] Following the appropriate closing of the operating theatres and a contact period of about 12 hours in the event of a significant contamination during the septic case operation-the fumigation technique is conducted.[11] The operating room can be opened after fumigation (12-24 hours) for surgical procedure.[12]

Radiation (UV lamp)

The easiest technique for sanitizing an operating room is with an ultraviolet lamp. Effective, simple to use, and low cost are the advantage of this approach. The operation room's surface and air bacterial contaminations were reduced by the UV light's efficient sterilizing action.[12]

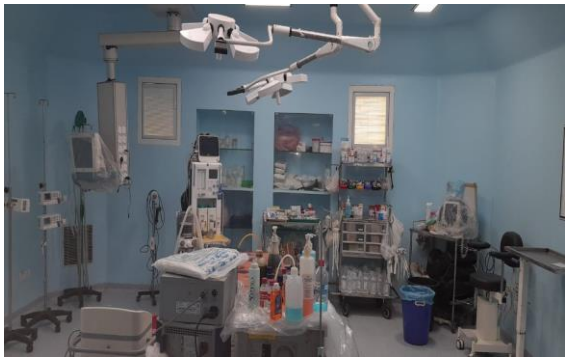

Figure 3: Cleaning of operating rooms.

REGIONS OUTSIDE

Throughout the day, the restrooms and changing rooms must be inspected and cleaned, and specific cleaning supplies must be utilized for the restrooms. To prevent insects from being drawn to the location, tea rooms,

kitchens, and the recuperation area (if food is provided) must be thoroughly cleaned.

Figure 4: Cleaning of sterilizing drums.

Cleaning every week (weekly cleaning)

The operating room equipment needs to be inspected at least once every week.[2] Remove all objects and thoroughly clean the area with hot, soapy water and clean the floor then disinfect it.[3] The instrument certs should be cleaned, dried, especially the wheels and rungs, oiling of wheels must be done after a regular period.[7] Dish washing bowls and gallipots clean every day.[3] Both inside and outside windows those are clean.[3] Use a moist cloth to wipe down all high surfaces, including windowsills and the tops of cabinets. Hence, dust accumulation is prevented.[3]

Avoid getting sterile things wet because doing so will cause the packaging to become permeable and the items to lose their sterility.

Cleaning every month

The cleaning spaces behind and beneath furniture, such as cabinets or shelves, requires moving the items away from the walls. Clean the tops and inside of lockers, drawers, and cabinets. When doing so, remove all items to avoid harm. Inspect on the date of expiration and move stock such that products with impending expiration dates are on the front. If necessary, clean the trolleys, IV stands, stools, microscopes, etc. The curtains should be washed at least once every three months in recovering zones.

ADDITIONAL FACTORS

Pest control

Co-ordinate together with the administrator and the maintenance crew to plan recurring pest inspections and/ preventative actions. Any necessary control procedures must be carried out whenever the operating room is not in use. For instance, plan for this to happen the day before a festival or the weekend. This gives the operating room a chance to settle and for any problems to be fixed before it needs to be used again.[3]

Filters and air conditioners

Verify that items are examined and cleaned. As needed, replace the filters.

Figure 5: Cleaning of O.T lights.

Cleaning advice

Aerosol cans shouldn't be used or kept in operating rooms since they can catch fir and spew dangerous gas into the air.

The 'three- bucket' system

Firstly, use a solution of water and detergent (first bucket) to mop the floor (or wipe the surface) to get rid of any dirt or grime. Secondly, clean the floor (or wipe the area) with plain water (second bucket) to eliminate soap residue. Thirdly, use disinfectant solution (third bucket) to clean the floor when it has dried, such as 1% sodium hypochlorite solution.[3]

DISCUSSION

Infection prevention and control are essential to improving care and ensuring the security of both patients and health care providers.[14] Micro-organisms invading a sterile environment cause surgery site infection. The foundation for preventing infections in an operation environment includes good operation theatre design, suitable micro-biological monitoring, careful sterilization, and rigorous adherence to barrier procedures.[15]

To reduce the risk of occupational (operating room) infections, it is crucial to use personal protective equipment (PPE), which includes gloves, gowns, face masks, respirators, and full-facial visors.[16] The issues with hospital-acquired infections can be resolved with some creativity and knowledge of infection control techniques.[17] Sanitation should be periodic and proper interval of time. Properly clean and disinfectant the table mattes.[18] Today, we can use H_2O_2 8% and 30 mg/l silver ions in place of formaldehyde because it is more effective, non-irritating and non-carcinogenic. We start the procedure in operating room within 1 hour.[19]

CONCLUSION

The operation theatre is "heart" of the surgical hospital, where surgeons are performed various types of surgical procedure. The success of surgical procedure is totally depending on the sterilization level of OT complex. Infection prevention and control are essential to improving care and ensuring the security of both patient and health care providers. The various key factors are play important role sanitizing of OT complex like operation theatre design, cleaning, careful sterilization and disinfection, suitable micro-biological monitoring and use of PPE. The good knowledge infection control techniques and applying these techniques like as surgical scrubbing, surgical painting and draping, proper sterilization of instruments, proper disinfection of medical equipment, etc. in OT complex a proper way, we reduce the infection. The sanitization of operating room plays a important role to increase the success rate of surgical procedure and also reduce the surgical site infection rate.

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