Environmental Responsibility: Keeping Sterile Processing Departments Clean and Functional

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LEARNING OBJECTIVES

1. Discuss the importance of routine environmental cleaning and disinfection of a Sterile Processing department
2. Discuss the responsibilities of the environmental interdisciplinary team
3. List critical equipment and surfaces in Sterile Processing that require routine care and maintenance

Note: This lesson plan is based on standards and regulations as of 1/2/2020.

Often, a Sterile Processing department (SPD) is so busy processing medical devices that some of the environmental cleaning and routine maintenance tasks are left undone. The environment in which medical devices are processed is very important. For example, if the processing area has dust and lint contamination, those particles could be deposited onto the instrumentation. This lesson will address the importance of environmental cleaning and the guidelines and regulations that guide this process.

Objective 1: Discuss the importance of routine environmental cleaning and disinfection of a Sterile Processing department

Environmental cleaning is every Sterile Processing (SP) technician's responsibility. The SP environment is comprised not only of the air, walls and floors but also all work surfaces and equipment.

The decontamination area has a high risk of pathogen transmission due to multiple contacts between staff and contaminated medical devices. It is critical to thoroughly clean and disinfect this room, as it is a basic infection prevention principle used to reduce the likelihood that the exogenous sources in that room will contaminate other areas and surfaces of the SPD.

The clean areas of the department also must be cleaned and disinfected on a regularly scheduled basis to help keep the microbial and dust levels down. Dust and lint can enter an unpackaged tray and transfer onto/into a patient during a procedure. An uncleaned sterilization or storage area can contaminate a sterilized tray.

It is important that most areas of the SPD are properly cleaned at least daily. Work surfaces and sinks should be cleaned at least each shift and more frequently, as needed. Cleaning in the SPD is a shared responsibility with

departments such as Environmental Services (EVS), Facilities Maintenance and Biomedical Engineering (Biomed), to name a few. Developing an interdisciplinary team to develop and monitor environmental cleaning and equipment maintenance cleaning routines is an effective way to keep the department properly maintained.

Objective 2: Discuss the responsibilities of the environmental interdisciplinary team

The interdisciplinary team should determine the cleaning routines and schedules for each area of the department. For example, floors should be wet mopped and disinfected at least daily and vents and walls should be cleaned on a regular basis, based on the activity and dust levels of the department. The team should also monitor established procedures to ensure they are consistently followed. For example, environmental cleaning equipment and supplies used in the decontamination room should only be used in the decontamination room to prevent the spread of contamination.

The SPD should have policies and procedures developed that specify the cleaning, disinfection and routine maintenance procedures for each area of the department and for each piece of equipment. This is best accomplished using the interdisciplinary team that includes SP, EVS, perioperative nursing, and Infection Prevention to ensure cleaning procedures and frequencies are based on manufacturers' instructions for use (IFU), best practices, standards and regulations. Facilities Maintenance and Biomed professionals will help ensure the area and equipment are maintained properly.

Failure to perform routine maintenance tasks can result in equipment becoming contaminated or not functioning properly. Equipment manufacturers' IFU should specify the cleaning, disinfection and/or sterilization, inspection and routine maintenance requirements. The recommendations for cleaning and disinfection of surfaces should originate from either the manufacturer, government regulations, or standards and guidelines.

The interdisciplinary team should identify high-touch areas to be cleaned and disinfected. Evidence has shown that high-touch areas such as control panels, switches, knobs and handles can harbor contamination and should be cleaned and disinfected on a routine basis to prevent the cross-contamination. *Note: It is important to understand who is responsible for keeping surfaces clean. Typically, EVS maintains floors, walls, ceilings and vents. The rest of the area is typically the responsibility of SP technicians. While this is the typical line of responsibility, it is important to have a written plan to specify who is responsible for each surface and piece of equipment to prevent an item from being missed.*

The equipment and work surfaces used in medical device processing should be cleaned on a routine basis, as prescribed in the policies and procedures. To ensure all areas are cleaned, a checklist should be developed that specifies the equipment or surface to be cleaned, and the cleaning schedule. The same can be done for routine equipment maintenance. Checklists are a means of standardizing procedures, preventing missing surfaces or equipment and demonstrating compliance with policies and best practices. The checklist may be designed to each area of SP or different types of equipment.

There also should be a method of evaluating the effectiveness of the cleaning process. This measurement can be either using a qualitative method [such as visual inspection and/or fluorescent marking, or quantitative methods using cultures or adenosine triphosphate (ATP) monitoring]. The testing time intervals should be based on recommendations from the interdisciplinary team. Results from quantitative methods should be recorded and used to provide measurable objective data. This information can then be used to drive process improvement, promote compliance, educate personnel and verify personnel competency.

Objective 3: List critical equipment and surfaces in Sterile Processing that require routine care and maintenance

There are equipment and surfaces throughout an SPD that require routine cleaning and disinfection to maintain a clean environment for processing medical devices. The following areas should be considered for routine cleaning and/or disinfection:

- Ventilation ducts, including air vents and grilles, and the filter should be cleaned and changed on a routine basis. The manufacturers' IFU should provide this information.
- Walls, floors and ceilings should be routinely inspected for debris and staining. These areas should be routinely cleaned and should also be cleaned whenever debris is present/noted.
- High-touch areas/surfaces that cannot withstand disinfection should be protected with a barrier covering to prevent the surfaces from becoming a reservoir for microorganisms. An example is a computer keyboard. The protective covering should be removed or disinfected in accordance with the IFU.
- High-touch areas such as doorknobs, control panels, cart handles and switches should be routinely cleaned.
- All floors should be cleaned and disinfected each day with a damp mop.

- Sinks should be cleaned and disinfected at least daily and more frequently, as necessary.
- Emergency eye wash/shower stations should be cleaned and disinfected on a routine basis. This equipment requires weekly testing to ensure its safe operation, according to the Occupational Safety and Health Administration's (OSHA's) Eye and Face Protection Standard (29 CFR 1910.133). Both the shower (if available) and eye wash station should be activated for a period long enough to verify its operation and ensure that the flushing solution is available. The water temperature should be monitored to ensure it is a tepid temperature, (between 60° and 100°F). A record of this weekly test should be maintained.
- Countertops should be cleaned and disinfected at least daily.
- Workstations should be cleaned and disinfected at the end of each shift and whenever soiled.
- The service area behind the sterilizers should be routinely cleaned, with specific areas in need of cleaning clearly defined. The cleaning schedule should be based on recommendations from the interdisciplinary team.
- Employee changing areas should be cleaned daily and employees should be encouraged to clean their lockers on a routine basis.

Sterile Processing equipment

It is imperative to follow the IFU of the equipment used in the SPD. The IFU should be used to select the types of cleaning and disinfectant chemicals for use. The IFU should also provide information regarding routine maintenance requirements, replacement parts (including tubing and filters), inspection and other maintenance necessities. The requirements should be included in a checklist and verification testing should be recorded. While the IFU provides information regarding the types of cleaning solutions to use, they may not provide information regarding the frequency of use. What follows are some frequency of use recommendations, based on standards, guidelines and regulations:

- **Ultrasonic cleaners** This equipment should be cleaned at least daily whenever the equipment is in use, in accordance with the equipment manufacturer's IFU. The basin may require daily cleaning. In addition, the equipment should undergo daily performance verification and cavitation testing. If a manifold system with tubing is used for irrigating cannulated instrumentation, the tubing should be tested for fluid flow. The strainer should be cleaned each day.
- **Washer-decontaminator** Spray arms should be checked at least daily to ensure they are completely free-turning and that the spray nozzles are not clogged. The strainer should be cleaned at least daily and whenever visible debris is observed; the eternal surface should be cleaned at least daily and whenever visibly soiled. Cleaning verification testing should be performed and documented each day the equipment is used. Equipment settings should be checked to ensure they are correct, and the printout should be examined to ensure it is functioning properly. Equipment loading carts and trolleys should be inspected and cleaned on a routine basis, in accordance with recommendations from the interdisciplinary team.
- **Cart washer** The chamber should be cleaned according to the IFU. Cleaning verification testing should be performed and documented each day the cart washer is used. The settings should be checked to ensure they are correct, and the printout should be examined to ensure it is functioning properly. The strainer should be cleaned at least daily and whenever there is visible debris. Spray arms should be checked at least daily to ensure the arms are completely free-turning.
- **Leak tester** Each day, pressure verification should be performed for each type of leak tester; the results should be recorded.
- **Borescopes** These devices should be cleaned and disinfected after each use.
- **Automatic flushers** Check with the manufacturer for specific information on filter changes, cleaning and disinfecting tubing, and calibration.
- **Detergent doser** Clean and disinfect in accordance with the IFU, and routinely verify for correct dose. Ensure calibration is verified, per the IFU.
- **Pass-through window** The window should be checked periodically to ensure it completely closes and seals, thereby, creating an effective physical barrier.
- **Instrument preparation and packaging workstations** These areas should be cleaned and disinfected after each shift.
- **Heat sealer** This piece of equipment should be cleaned at least daily to remove packaging debris. Temperature calibration should be checked, per the IFU.
- **Biological incubators** Refer to the manufacturer's IFU for proper cleaning and other maintenance requirements.
- **Storage areas/storage equipment** Sterile storage area equipment such as the shelves or cabinets should be cleaned and documented on a routine basis.
- **Automatic endoscope reprocessor (AER)** The AER should undergo automated cleaning efficacy

verification testing, in accordance with the equipment manufacturer's IFU.

- **Sterilizers** Routine inspection and cleaning of sterilizers reduces the risk of accidental contamination of sterile items. Sterilizers should be inspected and cleaned according to the manufacturer's written IFU. Daily sterilizer evaluation requires assessment of recording charts; printers; printer ribbons; marking pens and ink; door gaskets (look for nicks and stains); inspection and cleaning the chamber drain screen to remove lint tape and other small objects from entering the exhaust line; and external surfaces. The sterilizer chamber should be cleaned weekly.

Routine sterilizer efficacy monitoring

Steam sterilizers should be tested at least daily using biological indicator process challenge devices (BIPCDs) validated for the sterilization cycle being tested. Some steam sterilizers have more than one cycle (such as gravity displacement and dynamic air removal); if both cycles are used, both cycles must be tested. This testing demonstrates that all sensors, controls, indicators and charts are functioning properly.

SP technicians can assemble their own BIPCD for steam sterilization. Information for the assembly of this test can be found in ANSI/AAMI ST79, *Comprehensive guide to steam sterilization and sterility assurance in health care facilities*. If a steam sterilizer is used for extended cycles, only the shortest cycle needs to be tested. The shorter cycle can be considered representative of the other longer cycles.

Dynamic-air-removal sterilizers require daily testing with a Bowie-Dick test. This test should be conducted every day the sterilizer is used, before the first processed load or at the same time each day. It is a sensitive and rapid means of detecting air leaks, inadequate air removal, inadequate steam penetration, and noncondensable gases. Insufficient air removal in a dynamic-air-removal sterilizer, particularly a prevacuum cycle, can result in a failed sterilization cycle. An improperly heated sterilizer could cause false Bowie-Dick test failures.

This steam sterilization cycle utilizes preconditioning techniques to remove air from both the sterilizer chamber and the load before pressurization with steam to a sterilization exposure temperature. Effective air removal is critical for predictable steam penetration and subsequent sterilization. A shortened cycle (i.e., a cycle omitting the drying phase) should be run first to heat the sterilizer. If the sterilizer is used continuously, the test may be performed at any time; however, it should be performed at the same time every day. For steam-flush pressure-pulse cycles, the manufacturer's recommendations for Bowie-Dick testing should be followed.

Biological indicators (BIs) should be run in every cycle for ethylene oxide sterilization and at least daily (preferably, every load) for all other low-temperature modalities.

What follows are cleaning recommendations for low-temperature sterilizers, sterilizer carts/trolleys, and endoscope drying/storage cabinets:

- **Low-temperature sterilizers** Some low-temperature sterilizers require routine filter changes. As always, it is important to review the IFU and include these important maintenance functions on a checklist. Chambers should be cleaned in accordance with the IFU.
- **Sterilizer carts and trolleys** These should be routinely cleaned, and the routine cleaning schedule should be based the recommendations from the interdisciplinary team. If sterilizer carts and trolleys are not routinely cleaned, dust and lint may accumulate.
- **Endocope drying/storage cabinets** A routine cleaning schedule for endoscope drying/storage cabinets should be developed by the interdisciplinary team. A cleaning log should be maintained for the cleaning of the endoscope storage cabinet. Cabinets with filtered air require filter changes on a routine basis; be sure to consult the IFU for specifications. If the cabinet has tubing and adaptors, the IFU should be consulted for specific maintenance.

Conclusion

It is essential that the environment in which medical devices are processed is routinely cleaned and properly maintained to prevent dust, lint and microbial contamination. Environmental cleaning is a shared responsibility between the SPD, EVS and, perhaps, even other departments such as Facilities Maintenance and Biomedical Engineering. Developing an interdisciplinary team to develop and monitor environmental cleaning and equipment maintenance cleaning routines is an effective way to keep the department properly maintained.

RESOURCES

Association for the Advancement of Medical Instrumentation. ANSI/AAMI ST79:2017, *Comprehensive guide to steam sterilization and sterility assurance in health care facilities.*

Association for the Advancement of Medical Instrumentation. ANSI/AAMI ST91:2015, *Flexible and semi-rigid endoscope processing in health care facilities.*

Association of periOperative Registered Nurses. AORN 2020 *Guideline for Environmental Cleaning.*