SOP on the Use of Dry Heat Sterilizers

Ministry of Health and Wellness
MAURITIUS

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Approval Form

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STANDARD OPERATING PROCEDURE ON THE USE OF DRY HEAT STERILIZERS			
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Standard Operating Procedure on the Use of Dry Heat Sterilizers

Challenges faced

During multiple visits of surgical wards, orthopedic wards, neonatal ICUs, area health centers and Mediclinics since 2019, it was noted that healthcare workers do not follow proper instructions when operating dry heat sterilizers that are used to eliminate microbes on surgical instruments.

Interviewed staff were noted to be using inconsistent parameters. Sterilization drums are often rusty or have old paper stuck to them. In addition, items are not packed or wrapped, which render them non-sterile as soon as they are removed from the machine.

Purpose

This Standard Operating Procedure (SOP) is to be used by all healthcare workers (HCWs) who operate dry heat sterilizers in the public health sector.

Key points

1. To prevent the transmission of infections, reusable instruments that are needed for performing sterile procedures must be cleaned and sterilized before reuse.
2. Disposable or single-use items should not be reused and must be discarded after use.
3. Due to possible breaches in sterility, within the limits of practicality, it is preferable to make use of disposable items instead of reusable items.
4. Processing equipment for cleaning and sterilization should not be conducted in patient care areas, never washed in handwash basins and should preferably be conducted in a separate, dedicated room. Workflow for equipment processing should always be from dirty - to clean - to sterile.
5. The manufacturer's instructions should always be followed for the processing of equipment as well as for the decontamination requirements of the re-usable medical devices.
6. Wards in healthcare facilities in Mauritius usually have the static-air oven-type sterilizers.
7. Dry heat or hot air sterilization is only to be used for instruments which cannot be sterilized using steam under pressure; dry heat ovens can sterilize items that might be damaged by moist heat or that are impenetrable to moist heat. It is however more time-consuming than steam sterilization.
8. Note that high temperatures may degrade the material and therefore steam sterilization is generally preferred.
9. Dry heat sterilization is not meant for linen, cotton and gauze.
10. It can be used on metal instruments.
11. Within the limits of practicality, use dry heat sterilization only if the items are to be sterilized outside of working hours. Otherwise, to ensure better sterility, send the items to the Central Sterilization Supply Department (CSSD) for steam sterilization using autoclaves.
12. All items should be packed in appropriate packaging material such as laminated pouches or medical grade paper.[10] The selection of packing material depends on the manufacturer's guidelines as well as the recommendations of the type of dry heat sterilizer to ensure that the packing material can withstand high temperatures.
13. Non-perforated metal containers are an alternative packing solution, but can only be used in dry

heat sterilizers.[11] Instruments in these containers are also no longer sterile, once the container has been opened.

14. If possible, the sterilizer should have a print-out facility to record the parameters used such as temperature and time. Alternatively, there must be direct observation and recording of parameters into sterilization records, which must be dated and kept for 5 years for future reference. If this is not achievable due to a lack of staff or time, a class 5 chemical indicator (an integrator) or a class 6 chemical indicator (an emulator) should be used.[5]
15. Sterilization processes should be monitored. Biological indicators should be done weekly and each package should have a chemical indicator inside or alternatively a bag can be used with an integrated chemical indicator. [11]
16. *Bacillus atrophaeus* spores (biological indicator) should be used to monitor the sterilization process for dry heat because they are more resistant to dry heat than are *Geobacillus stearothermophilus* spores.[4] This monitoring should be done at least weekly and recorded.
17. No implantable devices should be sterilized in a dry heat sterilizer. Implantable devices should be sterilized in a steam autoclave and an internal chemical indicator must be included in the pack.[6,11]
18. All surgical instruments that are used in the minor theatre for invasive procedures should be wrapped with the appropriate material and at least a class 4 chemical indicator included in the pack.
19. Do not stack gallipots, bowls and kidney dishes one over the other since this practice reduces the penetration of hot air.
20. There must be at least one person present at the time the sterilizer is used who is adequately trained in the operation of the sterilizer.

Steps to be followed

1. Don the appropriate personal protective equipment (PPE) e.g. gloves, goggle/facial protection and gown.
2. The instrument must be dismantled or opened as necessary to ensure all of its parts are adequately cleaned.
3. All instruments must be cleaned with a medical grade enzymatic detergent and water prior to sterilization. Dirty instruments cannot be properly sterilized. No disinfectants or antiseptic solutions should be used to wash instruments. [10,11]
4. Good quality potable water must be used for cleaning. Water with a high mineral content is not suitable for rinsing as the instruments can become damaged by the mineral deposits.
5. Wash / scrub all surfaces of the instrument under the surface level of the water with a soft brush to prevent splashes and aerosol generation. If there are coagulated blood or body fluids present on the instruments, it can be soaked in a diluted enzymatic cleaner in lukewarm water according to the manufacturer's guidelines.
6. Use a recommended detergent, e.g. an enzymatic cleaner and water temperature that is in the range of 27 - 43°C or as recommended by the manufacturer, as hot water coagulate the protein which makes it harder to remove. [10,11]
7. Limit the generation of aerosols by washing instruments under the surface level of the water or in an automated washer/ disinfector, which is a much more validated process.[10,11]
8. Rinse in clean warm water once the instrument is clean and free from dirt and organic material.[10,11]

9. Wait for the instrument to be properly dried – residual moisture may compromise the sterilization process. Dry all items using a drying cabinet or with a lint free cloth.
10. Scissors and forceps should be wrapped in a semi-open position for better hot air penetration.
11. The instrument must be packed and labelled prior to placing in the dry heat sterilizer, in order to maintain sterility while removing the instrument once the process is completed in order to facilitate easy identification without compromising sterility. Place a chemical indicator inside the pack or use a bag with an integrated chemical indicator. Seal the package properly.
12. A chemical indicator such as a Class 4 indicator that monitors two of the critical sterilization variables such as time and temperature and are intended to indicate exposure to predetermined parameters should be placed inside each pack.[11] If the internal chemical indicator is not visible from the outside of the package, an external indicator should also be used. Chemical indicators help to differentiate between processed and unprocessed items, eliminating the possibility of using instruments that have not been sterilized.[6]
13. Exposed chemical indicators may change over time, therefore it is advisable to record the result in a register.
14. The following information should be recorded on the outside of the package: content, ward, sterilization date, person who packed the instruments.
15. Settings on the machine should be as follows:[4,7,8]

Temperature	Duration
180° C	30 minutes
170° C	60 minutes
160° C	120 minutes
150° C	150 minutes

16. Traditionally, four weeks was the recognized shelf life for sterile packs, after which the items should be re-packed and re-sterilized. Using the now more popular standard of event-related labelling, it is understood that the item remains sterile unless the package is opened, damaged or wet.[9] Note has to be taken that it depends on the packaging material and the storage conditions of the sterile packs. [10,11]
17. Transport on clean trolleys only – do not use the same trolley for the transportation of soiled linen or waste.
18. Store the items in a well-ventilated clean and dry area away from sunlight and moisture.

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