

Keywords

- packaging
- sterilisation wrap
- container

Sterilisation Wrap – The Alternative to Metal Containers?

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A routine check of the metal instrument containers in the general surgical department of Essen University College Hospital revealed that the lids of the majority of the 16-year-old containers were deformed and did not close properly anymore. Optimal sterility of the instruments accommodated in such containers was thus no longer assured. It was necessary to replace 101 of the 123 instrument containers in use. As part of an in-depth and modern solution, all problems associated with the use of metal containers were also analysed:

- The containers used are often old and outdated
- Containers do not assure sterility as soon as they are no longer airtight
- Regular maintenance of containers is not possible, even in the case of new containers, because of a lack of capacity
- The heavy weight and unfavourable storage of the containers as well as the weight of the supply and disposal trolleys are a major source of stress for surgical staff
- Hygiene is compromised due to the fact that the supply and disposal trolleys are pushed along the hospital corridors, and then through the corridors of the sterilisation and surgical departments
- Packing the containers with instruments is an onerous task because the following have to be used:
 - Sterilisation paper
 - Sterile filters
 - Lead seals
 - Metallic inscriptions
- Instrument and disposal containers are often not washed in the washing machine because they do not fit
- A special detergent is needed to clean the disposal containers (Eloxal)

To solve the problems outlined above, we considered changing over to sterilisation wrap (Kimguard One-Step, Fa. Kimberly-Clark). Practical tests were conducted in the Central Sterile Supply Department (CSSD) between September 2002 and March 2003 to gauge the feasibility of this planned measure. The primary goal defined was to achieve optimal sterility with markedly reduced costs. The secondary goals included: to render working practices easier for staff, reduce the weight of the instrument trays (back protection) as well as assure better utilisation of instrument washer-disinfectors as a result of being able to dispense with supply and disposal trolleys.

For the practical tests the three most commonly used trays were selected: retractor tray, soft tissue tray and liver tray. The tests were divided into three sub-projects relating to infection control, practical application and costs.

Infection Control Subproject

As part of the infection control subproject the pros and cons of instrument containers, disposal containers and sterilisation wrap were analysed. Both container systems proved to be particularly suitable for protecting against penetration of sharp objects. This minimised the risk of staff sustaining injuries from sharp instruments and becoming contaminated by pathogens.

However, the lead seals of instrument containers, which are difficult to open, proved to pose a risk of injury in routine operations. Such staff injuries could contaminate the sterile surgical instruments if the seal is opened. Similar risks of injury are faced when loading the transportation trolleys with heavy metal containers or by bent containers or sharp edges.

Mechanical deformations of containers detract from sterility (no longer possible to assure sterile closure). The external protective layer of the containers becomes detached as a result of frequent handling (opening, closing, transportation,...) This means that aluminium splinters come into contact with the instruments, thus further compromising their sterility. The risk of contamination is further increased by the internal cloth, which is too small. Cleaning the containers also calls for manpower that could be deployed for cleaning and sterilisation of instruments were one to use sterilisation wrap instead.

Contamination of surgical areas results from the fact that the supply containers are pushed along the hospital corridors (public thoroughfare, incoming goods, contaminated beds, ...) into the sterile area (corridors of CSSD). Using sterilisation wrap, there is no need to push the transportation trolley into the CSSD corridor, thus preventing the formation of a contamination link.

Deformations mean that utilisation of disposal containers is also restricted. Gas-kets are porous or non-existent, thus posing a greater risk of contamination for staff. Often, the containers are contaminated by blood residues or other materials, thus calling for additional cleaning. This must be carried out manually since disposal containers do not fit into washing machines.

The main disadvantage associated with the use of sterilisation wrap is the risk of sustaining an injury from sharp instru-

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ments (mosquito clamps, Redon skewers). While conducting the practical tests, this danger was minimised by providing for extra cushioning of sharp instruments and placing them in kidney dishes. Other protective measures are also possible.

The risk of contamination is greatly reduced by using sterilisation wrap. The use of supply and disposal containers is completely dispensed with since the used instruments on trays are wrapped in the same wrap that was used to bring them into the surgical department in a sterile condition. This wrap is then discarded. Since the used instruments are separated from their environment by means of the wrap, there is no need to clean the trays used for transportation in the washing machine. The risk of injuries to staff is markedly reduced thanks to the reduced weight of the sterile-packed OR trays. Sterile opening of the instrument packages can be effected easily and safely. Contamination is thus virtually ruled out.

Conclusions from the Infection Control Subproject

Medical devices contaminated by nosocomial pathogens can act as a source of infections among patients and staff. The risks posed by instruments are attributable to undesirable effects that can be caused by their preceding use (blood residues, blood components and secretions), the processing method used (residues of detergents and disinfectants) or as a result of transportation and storage (alteration of material composition, accelerated wear). These infection sources are greatly reduced on introducing sterilisation wrap.

Practical Application Subproject

The practical application subproject was supported by participating in a 5-day event organised from 13-17 January 2003 in the Central Sterile Supply Department at Düsseldorf University College Hospital. The sterilisation wrap was been successfully used there for the past 10 years.

It took some time initially in the surgical department to get used to handling the trays packed in wrap. But the benefits were soon clear:

While hitherto the tray was placed on a cleared table after withdrawal from the container (from a separate, non-cleared table) and from there the Mayo stand was

prepared, using the now unfolded wrap (121 cm x 121 cm) it was possible to prepare items directly from the tray. The previous use of a covering cloth from the Uni Set as a tablecloth was no longer needed for preparatory surgical tasks.

It was possible to save a lot of time on preparations since there was no need to put away empty containers or to carry disposal containers into the surgical department (as many as five or more, depending on the type of surgical procedure). Thanks to the fact that less space is needed, one table less has to be cleared. Furthermore, there are fewer packing materials to put away. Overall, markedly shorter waiting times have been achieved in the surgical department thanks to optimal storage.

A further time saving comes from the fact that there is now no need for the onerous tasks of cleaning and inspecting supply and disposal containers. This time saved can be used for example for instrument maintenance.

The risk of injuries to staff (back injuries, cuts, jammed fingers and hands) is greatly reduced thanks to the lower weights and greater handling ease. The supply containers weigh 4.1 kg and the disposal containers 5.9 kg when empty. Using wrap, there is no need to lift these weights anymore.

Conclusions from the Practical Application Subproject

Compared with the use of metal containers, the use of sterilisation wrap helps to expedite surgical preparations. Furthermore, sterilisation and storage capacities are optimally utilised. The risk of injury to staff because of heavy, unwieldy metal containers and their transportation trolleys is minimised. OR trays packed in wrap are much lighter and need much less time and space to handle than those instruments packed in metal containers.

Costs Subproject

While costs are regularly incurred for purchasing the sterilisation wrap, they are more than offset by savings made in respect of the costs incurred for cleaning the containers. Cleaning costs to the tune of 8.007.84 euros are incurred for the three test instrument containers, while the purchase of wraps costs 5.210.28 euros per year. Here alone, a saving of 2.797.56 euros can be made.

Moreover, when using wrap in the OR the costs for sterile covering cloths amounting to 2.233.14 euros can be saved. The wrap assumes the function of the cloths as a sterile base.

If one compares the costs incurred to purchase 24 containers amounting to 11.826.88 euros with the costs for accessories used in addition to the wrap (wall rails for storage, trays, tray trolleys, retractor trolleys) amounting to 4.249 euros, further savings of 7.577.88 euros can be made.

Further savings made on water and energy consumption arising from environmentally friendly disposal of the used wrap (manual and automated cleaning processes are dispensed with) were not calculated. Likewise, the time saved on cleaning and sterilisation as well as for surgical preparations could only be partially calculated. However, it is assumed to be much more than 280 hours per year.

Conclusions from the Costs Subproject

Despite the fact that sterilisation wrap is a consumable item that has to be continually purchased, replacing only 24 containers would result in savings of at least 12.608.58 euros and of 280 working hours.

Added to this is the one-off saving of 6.469.84 euros made by not having to purchase two new transport trolleys. Using wrap, these are no longer needed.

Study Findings

By introducing sterilisation wrap as a replacement for metal supply and disposal containers, sterility can be significantly enhanced with markedly reduced costs. This benefits the patient and creates an environmentally friendly and healthier workplace for staff in the surgical and sterilisation departments. The time needed to prepare for operations or emergencies is greatly reduced, and the resultant reduction in waiting times it also beneficial for the patient. The time saving of 280 hours helps to offset staff shortages and thus improve the working environment and patient care. Experiences gleaned from using sterilisation wrap over a 10-year period at Düsseldorf University College Hospital serve to corroborate the findings of this present project. In all respects sterilisation wrap is a suitable substitute for metal instrument containers. *