

Economic Benefits of using Low Temperature Sterilization instead of Steam, are there any?

There has been tremendous growth in the volume of surgical procedures performed using MIS (minimal invasive) surgical techniques. It is estimated that more than 60% of the surgical procedures performed in the USA are performed using MIS. This has resulted in an increase in the number of complex and heat sensitive surgical instruments that need to be reprocessed. There has also been an increased focus on sterilization of heat sensitive devices instead of using high level disinfection, because of the risk of possible transmission of disease via contaminated surgical instruments and devices (Mc Creanor & Graves, 2017).

These combined factors have increased the need for low temperature sterilization systems.

A variety of low temperature sterilization methods are available for use. This article focuses on hydrogen peroxide gas sterilization.

Hydrogen peroxide gas sterilization

There are advantages and disadvantages of hydrogen peroxide gas sterilization methods.

Advantages include

- Relatively short cycle times
- Compatibility with heat and moisture sensitive device
- No cool down after sterilization
- Environmentally safe sterilant that decomposes into oxygen and water
- Easy to install and operate

The disadvantages include limited penetration which influences the diameter and length of lumens that can be sterilized in a load, as well as the need to use specialised packaging.

McCreanor et al (2017) logically states that “It is important for health care facilities to understand fully the costs and effects associated with different sterilization techniques”. An economic evaluation that compared the sterilization of heat sensitive equipment using low temperature hydrogen peroxide gas systems instead of steam was published in the American Journal of Infection Control. In this study ethylene oxide and other low temperature sterilization methods were not considered. It was

assumed that the types of instruments to be sterilized will be those that can be steam autoclaved but are heat sensitive, costly to purchase and repair.

In the economic comparison it was also assumed that instrument repairs were only covered by warranty in 30% of the cases (based on previous research cited in the paper). This is the first paper of this nature that has analysed the economic benefits of low temperature sterilization system. The model used for the calculations examined the changes to costs and the frequency of repairs that could be expected over 10 years (as a result of sterilizing instruments in a low temperature sterilizer instead of steam). The calculation in the model reported a savings of over \$738 000 dollars over 10 years. The results of the study did not even consider the possible effects that steam could have on the image quality of the instruments, another factor that could lead one to prefer low temperature sterilization for relevant devices. Although sterilizing surgical instruments using low temperature sterilization is more expensive than steam, “once repair costs are taken into account, savings are realized” (Mc Creanor & Graves, 2017).

Total Cost of Ownership

When the time comes to purchase or replace a low temperature sterilizer, a decision must be made as to which one to purchase. That is when total cost of ownership should be considered. Total cost of ownership is a cost benefit analysis performed by procurement to compare medical devices before purchasing them. This process takes into account direct costs, indirect costs, recurring costs and value-added services. Direct costs in this regard include the cost of the actual machine, installation costs, utilities (electricity), and possible training costs. Recurring costs that need to be considered are consumables (sterilant, biological indicator and chemical indicators), cycle costs (how many devices can be processed in a load to make it productive), aborted cycles and service requirements.

All things considered it would seem wise to invest in low temperature sterilization for the right reasons. (Full references available on request).

