Silver Knight anaesthesia breathing system sets the gold standard

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The use of an antimicrobial anaesthesia breathing system can help to reduce microbiological contamination in operating theatres as well as the fears of patients worried about contracting a hospital-acquired infection

HIGHLIGHTS

- In order to spread, bacteria have developed protective systems to avoid oxidation, as oxygen is highly toxic to bacteria
- The addition of the silver ion antimicrobial additive to the tubing greatly reduces the viable microbial count level
- There has been a cost and time saving, which justifies the change to the new system

When no conclusive data are available, and patients are concerned about contracting a hospital-acquired infection (HAI), how do you ensure that they are unlikely to be exposed to microbiological contamination in your operating theatre? According to Dr Joe Mellor, Consultant Anaesthetist at Leeds Teaching Hospitals NHS Trust, UK, the use of an antimicrobial impregnated breathing system goes a long way to reducing both the threat of infecting your equipment and the concerns of patients.

Dr Mellor has no means of calculating the extent of the problem of HAIs in his hospital – there is no data for comparison – but he has no reason to suspect the incidence is outside the normal range of the UK. Worryingly, one large NHS trust estimated that the effect of HAIs costs it approximately €5.5m. At Leeds NHS Trust, Dr Mellor says that all staff are "vigorously encouraged" to employ safe procedures, including handwashing before and after each patient contact, observing barrier nursing precautions alongside surveillance from the microbiology department.

Silver lining

Previously, Dr Mellor and his colleagues had been using the standard breathing system from Intersurgical, which suited their clinical needs. However, on being introduced to the Silver Knight range – an anaesthetic breathing system with silver antimicrobial additives included – they decided to change. Principally, this was because "we felt secure in the knowledge that patients were unlikely to be exposed to microbiological contamination," said Dr Mellor.

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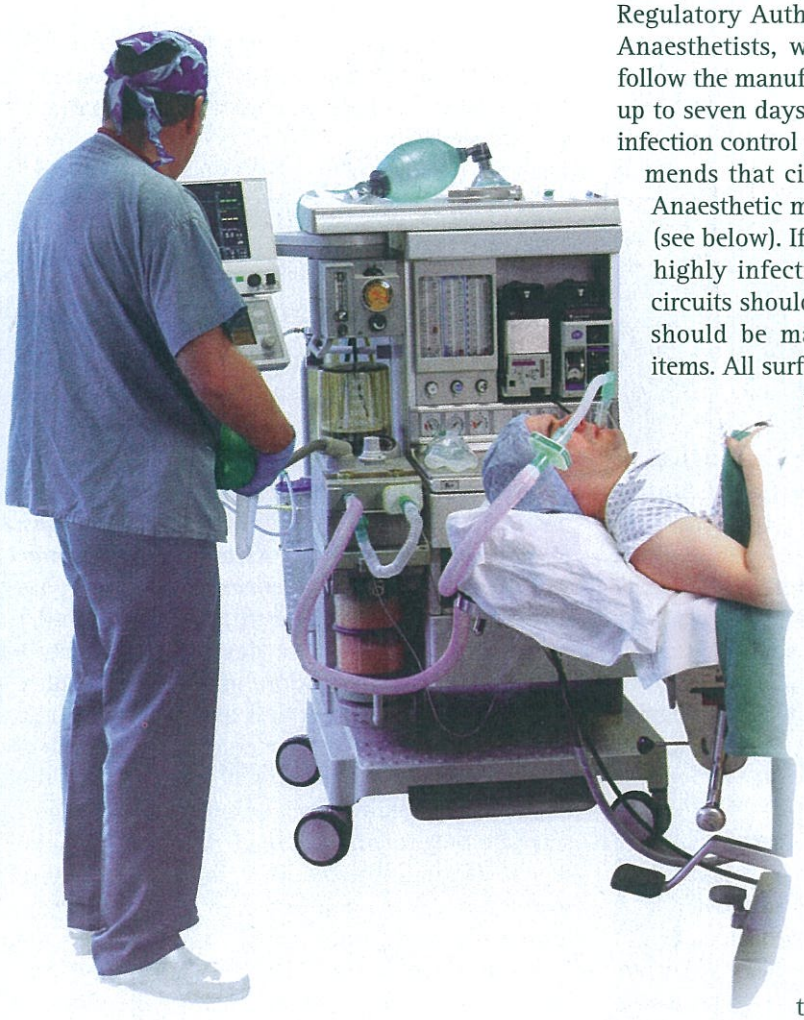
The addition of the silver ion antimicrobial additive to the tubing greatly reduces the viable microbial count level over time of the following microorganisms: MRSA, *Staphylococcus epidermis*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Acinetobacter calcoaceticus*. Silver Knight has a 99.9% effectiveness against these five. In order to spread, bacteria have developed protective systems to avoid oxidation, as oxygen is highly toxic to bacteria. Silver acts as a catalyst in the presence of oxygen and bacteria, causing catalytic oxidation, which effectively inactivates the bacterium. In addition, silver ions can bind themselves to the proteins and the DNA of the bacteria, which also interferes with the bacterium's ability to spread. It is a combination of all these factors that results in the antimicrobial effect.

Within the Silver Knight breathing system, silver ions stabilised within a matrix are added to

the tubing during production. The tubing (known as Flextube™) is coloured mauve to facilitate its identification. The technology allows these ions to be released in small quantities over time to reduce microbial growth and minimise colonisation, thereby reducing the risk of cross-contamination in the operating room. The breathing systems are in no way affected by the addition of the silver, there is just an added benefit.

Multiple advantages

As a result, Silver Knight has been adopted as the standard anaesthetic breathing system in the hospital's operating theatres. The old, standard tubing is still sometimes used if there is just one patient to be cared for, but when multiple patients are scheduled, Dr Mellor will invariably use Silver Knight. "By using Silver Knight for several patients," he added, "we were able to see a saving over our previous single use of the standard system."



While the manufacturer has validated the use of the Silver Knight systems for up to seven days, Dr Mellor and his team change them daily. With the old system, the circuit would have to be changed after each patient, which took longer.

> The main benefit of the new system is the ability to use it on multiple patients, feeling confident that it will not harbour microorganisms on the inside and outside

The main benefit of the new system, believes Dr Mellor, is the ability to use it on multiple patients, feeling confident that it is not going to harbour microorganisms on the inside and outside, which may lead to a HAI. In addition, Silver Knight complies with guidelines administered by the UK's regulatory body, the Medicines Healthcare Regulatory Authority, and by the Association of Anaesthetists, which states: "Departments may follow the manufacturer's recommendations of use up to seven days but to ensure consistency in the infection control process the Working Party recommends that circuits are disposed of when the Anaesthetic machine and monitors are cleaned (see below). If visibly contaminated or used for highly infectious cases (eg, tuberculosis) the circuits should be safely discarded. No attempt should be made to actively reprocess these items. All surfaces of Anaesthetic machines and monitors should be cleaned on a daily basis with an appropriate disinfectant or immediately if visibly contaminated."

Furthermore, silver is perfectly safe, is effective in low concentrations and acts quickly compared with other antimicrobial and antibiotic additives.

Conclusion

Dr Mellor cannot estimate the impact of Silver Knight on HAI rates, but he does know that there has been a cost and time saving, and while he admits these are not his primary concerns compared with patient care, they do nevertheless justify the change to Silver Knight. ■