Microbiological Screening of Re-usable Pressure Relieving, Low-Airloss Therapeutic Beds to Determine the Efficacy of the Decontamination Process

M.G.Holliday[1], J.D. Perry[1], M. Ford[1], K.E.Orr[1] and S.Morgan[1].
[1]Microbiology Department, Freeman Hospital, Newcastle upon Tyne, NE7 7DN. UNITED KINGDOM

INTRODUCTION

Pressure relieving therapeutic beds play an important role in the care of seriously ill patients, however nosocomial infection with pathogenic organisms associated with re-usable pressure relieving therapeutic beds has been described[1,2].

In the UK, low-airloss beds (fig 1) are usually hired and, after use on a patient, are returned to the supplier for decontamination before being sent out, for re-use on another patient.

It has been shown that therapeutic beds were the route by which Vancomycin Resistant Enterococci were introduced into our hospital[2].

Figure 1. Low-airloss therapeutic bed

It is essential that cleaning, decontamination and handling of these beds is effective enough to ensure that they are free of potential pathogens and it has been proposed that beds should be microbiologically screened before they are released for use in the hospital[2], and that surveillance sampling should be carried out to demonstrate the effectiveness of decontamination regimens [3].

Following a change in the decontamination protocol employed by the bed supplier, a screening programme was instituted which tested all low-airloss bed mattresses entering this hospital, and a percentage of the total number of beds undergoing the suppliers decontamination process between January 1999 and December 2000.

METHODS

The total surface of the mattress was sampled using an environmental sampling sponge (Polywipes) [4] (Fig 2).

In the laboratory this was aseptically removed from it's container and placed in a sterile square petri dish containing 25 ml Brain Heart Infusion Broth[5]. (Fig 3)

This was incubated at 37°C overnight followed by subculture to Columbia Blood agar[5], CLED[5] agar and CAA agar[6]. These were incubated at 37°C overnight before being examined for the presence of Enterococci, *Staph aureus*, *Pseudomonas aeruginosa* and Coliform organisms.

Figure 2 Sampling using the Polywipe sponge

Figure 3 Broth Enrichment of the Sponge

The presence of any of these organisms was taken as evidence of inadequate decontamination.

Enterococci were particularly sought as they have been shown to be relatively resistant to heat and the disinfectants used in the decontamination process[7].

Between 1.01.1999 and 31.12.2000, 1687 low-airloss bed mattresses were tested in this manner.

Figure 3 *E. faecium* (top) and *E. faecalis* (bottom) on CAA medium

RESULTS

Of the 1687 mattresses samples, there were 4 (0.23%) which grew one of the indicator organisms.
These were as follows:

19.02.1999	E.faecium	28.10.1999	E.faecium
11.01.2000	E.faecalis	28.09.2000	E faecalis

None of these isolates appeared related, and all had different antibiotic susceptibility patterns. None were VRE.

1683 mattresses grew environmental or skin organisms only (Bacillus spp, Coagulase negative staphylococci etc) or were no growth.

CONCLUSION

It had been shown that the original decontamination protocols used by the bed supplier were not effective enough to remove all potentially pathogenic organisms[2].

This study was undertaken to demonstrate that the new decontamination protocol (laundering and manual cleaning using sodium hypochlorite) was effective.

The results of this study proved that the mattress decontamination process used was effective in removing potential pathogens

The Microbiological screening methodology was designed to be as sensitive as possible in order to detect even small numbers of potential pathogens.

The use of environmental sample sponges allowed the entire surface of the mattresses to be sampled, thus removing any possibility of unrepresentative sampling. The sponge is moist and contains no inhibitory substances, allowing maximum collection and recovery of micro-organisms.

Broth enrichment of the entire sponge produced an extremely sensitive culture method which allowed optimum detection of even low levels of pathogens.

It is suggested that this method would be a sensitive method for environmental surveillance for other pathogens such as MRSA

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