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Successful control of two simultaneous outbreaks of OXA-48-carbapenemase producing Enterobacteriaceae and multi-resistant *Acinetobacter* baumannii in an intensive care unit

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Background: Enterobacteriaceae producing OXA-48-carbapenemase and multi-resistant *Acinetobacter* baumannii (MRAB) have a high capacity for colonization in individuals and on surfaces. Moreover, they are difficult to eradicate from the environment. This report describes a double outbreak of OXA-48–producing Enterobacteriaceae (OXA-48-PE) and MRAB in an intensive care unit (ICU) and the effectiveness of measures implemented, including decontamination with vaporized hydrogen peroxide (VHP).

Methods: Affected patients were isolated in a confined area and cared for by dedicated personnel. Four percent chlorhexidine soap was used for patient daily hygiene. All patients are subjected to contact precautions. Training on hand hygiene and random samples of hands were taken to evaluate staff hand hygiene. An in-depth cleaning of the ICU was performed with a chlorine solution, followed by decontamination with VHP. Environmental samples were taken before and after the decontamination.

Results: From July-October 2015, 13 patients were colonized or infected by OXA-48-PE and 18 by MRAB in the ICU. The cumulative incidence of OXA-48-PE and MRAB was 3.48% and 4.81%, respectively. In the period after the intervention, they were 0.8% and 0%, respectively (P<.001). The compliance of hand hygiene was 62.2%. Before the VHP bio-decontamination, 4.5% of environmental samples were positive for OXA-48-PE and none for MRAB. After bio-decontamination, 1.4% of samples were positive for OXA-48-PE.

Conclusions: This study emphasizes the importance of environmental hygiene in the control of outbreaks caused by microorganisms of high environmental impact. When an outbreak is sustained after the implementation of the usual control measures and a high level of adherence to hand hygiene, there may be environmental reservoirs that need to be eliminated. The rapid effect after the VHP treatment suggests an influence of this measure in eradication.

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