

Improved eradication of *Clostridium difficile* spores from toilets of hospitalized patients using an accelerated hydrogen peroxide as the cleaning agent.

Abstract

Background

C. difficile spores in the environment of patients with *C. difficile* associated disease (CDAD) are difficult to eliminate. Bleach (5000 ppm) has been advocated as an effective disinfectant for the environmental surfaces of patients with CDAD. Few alternatives to bleach for non-outbreak conditions have been evaluated in controlled healthcare studies.

Methods

This study was a prospective clinical comparison during non-outbreak conditions of the efficacy of an accelerated hydrogen peroxide cleaner (0.5% AHP) to the currently used stabilized hydrogen peroxide cleaner (0.05% SHP at manufacturer recommended use-dilution) with respect to spore removal from toilets in a tertiary care facility. The toilets used by patients who had diarrhea with and without *C. difficile* associated disease (CDAD) were cultured for *C. difficile* and were monitored using an ultraviolet mark (UVM) to assess cleaning compliance on a daily basis 5 days per week. A total of 243 patients and 714 samples were analyzed. The culture results were included in the analysis only if the UVM audit from the same day confirmed that the toilet had been cleaned.

Results

Our data demonstrated that the efficacy of spore killing is formulation specific and cannot be generalized. The OxivirTB® AHP formulation resulted in statistically significantly ($p = 0.0023$) lower levels of toxigenic *C. difficile* spores in toilets of patients with CDAD compared to the SHP formulation that was routinely being used (28% vs 45% culture positive). The background level of toxigenic *C. difficile* spores was 10% in toilets of patients with diarrhea not due to CDAD. The UVM audit indicated that despite the enhanced twice-daily cleaning protocol for CDAD patients cleaning was not achieved on approximately 30 - 40% of the days tested.

Conclusion

Our data indicate that the AHP formulation evaluated that has some sporicidal activity was significantly better than the currently used SHP formulation. This accelerated hydrogen peroxide formulation provides a one-step process that significantly lowers the *C. difficile* spore level in toilets during non-outbreak conditions without the workplace safety concerns associated with 5000 ppm bleach.

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