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NYU LANGONE HEALTH SURFACE DISINFECTION STUDY BRIEF

The Evaluation of Electrolyzed Water, Sodium Dichloroisocyanurate and Peracetic Acid with Hydrogen Peroxide for the Disinfection of Patient Room Surfaces

Published: *American Journal of Infection Control (AJIC)*; June 28, 2022

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SURFACE DISINFECTION CHALLENGES

Surface-persistent pathogens such as *Clostridioides difficile* and *Candida auris* present an increasing threat to patient safety and prompt the routine use of sporicidal disinfectants in patient care areas.

Though the CDC recommends that healthcare systems implement environmental surveillance to identify gaps in surface disinfection within patient care areas, particularly for high touch surfaces, no specific protocols have been released. Moreover, very little research exists on standardized protocol for assessing the efficacy of patient room surface disinfection.

Additionally, new sporicidal disinfectants with minimal toxicity and surface damage profiles are needed to combat the rise of surface-persistent pathogens. Although electrolyzed water (EW), sodium dichloroisocyanurate (NaDCC) and peracetic acid/hydrogen peroxide (PAA/H_2O_2) are less toxic and corrosive than bleach-based products, efficacy data on routine use in the healthcare setting is limited.

Novel application methods such as electrostatic sprayers warrant further evaluation in the healthcare setting as the devices produce positively charged disinfectant particles of equal size, which distribute uniformly over surfaces.

Prior to the study, NYU Langone Health protocol for daily and post-discharge disinfection incorporated PAA/H_2O_2 as the standard

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disinfectant applied with microfiber wipes for high touch surfaces and cloth mops for floor surfaces.

STUDY OVERVIEW AND DESIGN

The NYU Langone Health study was designed around three primary objectives:

1. Implement an environmental surveillance protocol to measure microbial contamination of surfaces
2. Apply this protocol to determine the efficacy of three different chemical disinfectants in reducing surface contamination
3. Assess the efficacy of a novel application method using electrostatic sprayer compared to traditional microfiber cloth application method

The NYU Langone Health environmental services and infection prevention team created a simple but effective protocol for sampling surfaces to assess disinfection. The protocol was designed to be feasible for routine surveillance with readily available materials and attainable sample sizes from both flat and non-flat surfaces. The protocol was used to evaluate the efficacy of three chemical disinfectants and two application methods—Microfiber cloths/mops and electrostatic sprayers.

The study was conducted in two phases over an 18-month period at two NYU Langone Health locations in New York City—A 700-bed academic medical center in Manhattan and a 380-bed major teaching hospital in Brooklyn.

DISINFECTANTS AND APPLICATION METHODS

Phase I compared NaDCC (EvaClean PurTabs) to PAA/H_2O_2 (Ecolab Oxycide), both applied in one step by microfiber cloths to high touch surfaces and compared EW (Viking Pure Solutions) applied in two-steps using diluted sodium hydroxide with microfiber cloths followed by diluted hypochlorous acid with electrostatic sprayer or pump spray.

After an interim analysis on disinfectant effectiveness, EW was discontinued and Phase I was completed with NaDCC and PAA/H_2O_2. Final analysis of the data revealed NaDCC to be the most effective, prompting further assessment in Phase 2 of the study.

Phase 2 compared application of NaDCC with microfiber cloths alone to a two-step process of microfiber cloths followed by an electrostatic sprayer on all patient room surfaces.

NADCC DISINFECTANT AND APPLICATION EFFICACY

After discharge cleaning of patient rooms, 774 surface samples were analyzed. EW had a significantly higher mean colony count compared to NaDCC and PAA/H_2O_2 had a higher percentage of samples with growth compared to NaDCC.

NaDCC applied with a microfiber cloth alone produced significantly lower colony counts compared to PAA/H_2O_2 and EW. In addition, NaDCC application with a microfiber cloth plus an electrostatic sprayer further reduced colony counts compared to microfiber cloth alone.

In the context of the regular hospital disinfection workflow, NYU Langone Health determined that NaDCC applied with the standard microfiber cloth and mop method plus an electrostatic sprayer is the most effective chemical disinfectant method.

CONCLUSIONS

A standardized environmental surveillance protocol is a key component when evaluating room disinfection processes and may identify surfaces presenting greater risk for cross contamination. NaDCC proved to be the best sporicidal disinfectant in the NYU Langone study. The incorporation of an electrostatic sprayer in the disinfection process resulted in the lowest number of colonized samples. Electrostatic sprayers allow for touchless disinfection and could be more effective at targeting sites that are difficult to reach or to disinfect with the standard mop plus wipe method.