American Journal of Infection Control 43 (2015) 308-11

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Letters to the Editor

Health care workers use disposable microfiber cloths for cleaning clinical equipment

To the Editor:

Standard precautions require all clinical equipment to be cleaned between patient use.[1] Cleaning equipment of patients colonized with vancomycin-resistant *Enterococcus* (VRE) had previously involved a 2-step cleaning process with detergent and water followed by disinfection with hypochlorite solution 1,000 ppm using a disposable detergent wipe or paper towel. Environmental services have been using a chemical-free system since 2011.[1]

In January 2014, disposable microfiber cloths (D-MFCs) (Rubbermaid HYGEN, Rubbermaid, Winchester, VA) were introduced at Monash Health, a large metropolitan health service with 2,150 beds and 14,000 staff. The D-MFCs are used by dampening with water and provided a system for cleaning sensitive equipment that could not be disinfected with hypochlorite solution. The D-MFCs consist of 2 blended materials (nylon and polyester) that are mechanically split to provide ultrafine 3-5 micron filaments. Prior to use, health care workers were trained and educated with presentations and flyers by infection control staff.

Over the next 9 months, the D-MFCs were implemented across all clinical areas of the health service.

Prior to implementation, fluorescent assessment[2] was undertaken comparing the cleaning capability of the standard detergent wipes and the D-MFCs. Fluorescent markings 5 × 5 cm were placed on a laminate surface and allowed to dry. The same person cleaned each surface using a paper towel with detergent and water, a

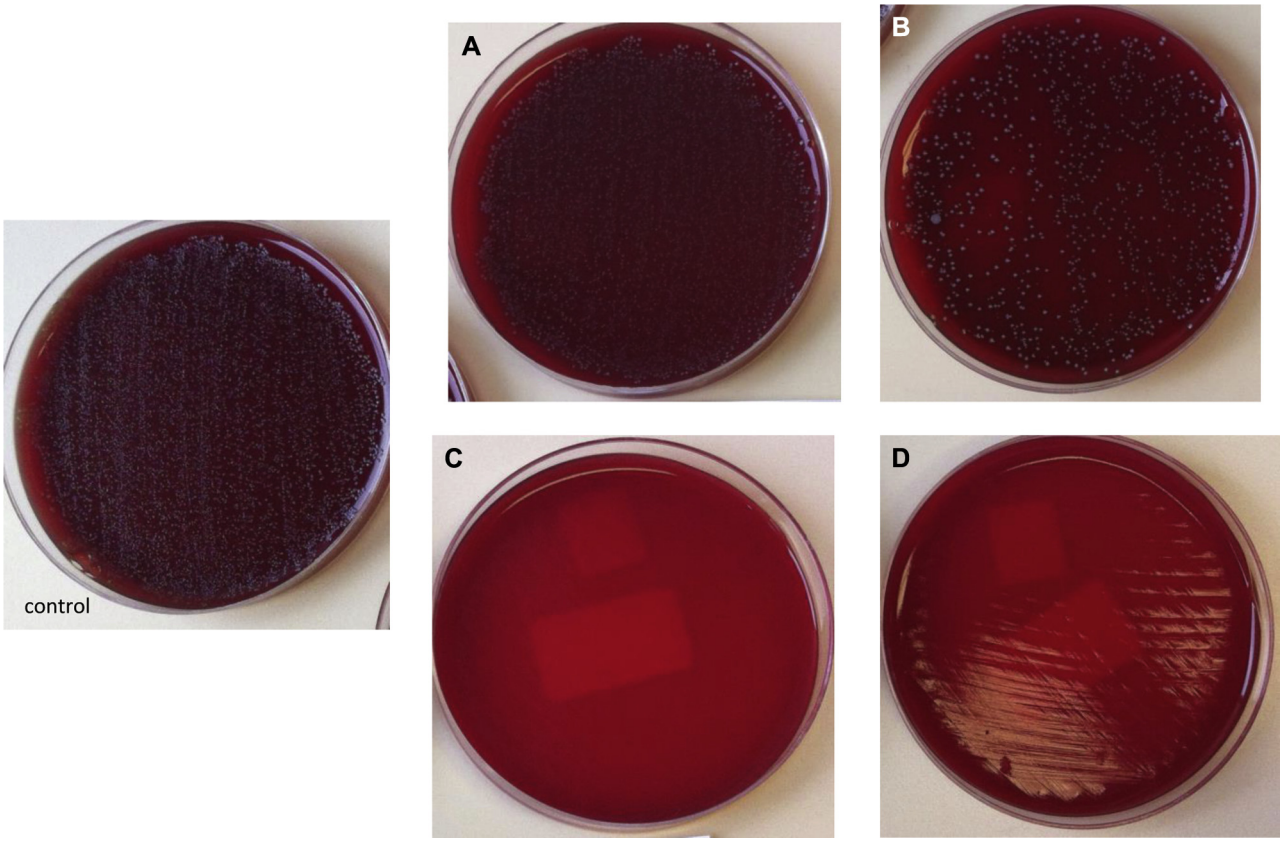

Fig 1. Growth of viable bacteria after attempted removal with different wipes. The control plate is an inoculated plate after 24 hours (10^8 colony forming unit concentration): (A) paper towel; (B) detergent wipe; (C) reusable microfiber cloth; (D) disposable microfiber cloth.

disposable detergent wipe impregnated with HC90, a reusable microfiber cloth (R-MFC), or the D-MFCs. Each area was examined using an ultraviolet light. Results showed that all surfaces cleaned with either the R-MFC or D-MFC were free of fluorescent marks, but streaking remained after cleaning with the paper towel or detergent wipe.

Surfaces (5 × 5 cm) were also microbiologically tested after inoculating with 10^8 and 10^7 colony forming units of the VRE vanB strain that was causing an outbreak in the neonatal unit. This was left untouched for 24 hours. The operator cleaned each surface using a standardized wiping method with each of the 4 cleaning cloths. The area was then swabbed and inoculated onto a horse blood agar plate to detect any remaining viable VRE. Results showed that all VRE were removed when using either the R-MFC or D-MFC, but heavy growth was still detected after detergent wipes and paper towels had been used (Fig 1).

Prior to the introduction of this new product, cleaning of clinical equipment in our neonatal unit was undertaken using paper towel and detergent. When VRE was detected in November 2013, some neonates were not able to undergo routine developmental testing and assessment because the sensitive equipment could not be disinfected with hypochlorite solution.

The D-MFCs were shown to remove VRE, eliminating the need to disinfect with hypochlorite solution. Advantages of this chemical-free system include time efficiency, occupational health and safety benefits, reduced water use, cost opportunities, and capacity to provide superior cleaning, regardless of the patient's perceived risk.[3]

In summary, these D-MFCs enabled our health service to complete the transition to a superior cleaning system. Capacity is now available for cleaning of instrumentation or sensitive equipment that could not be used if patients were infected or colonized with multidrug-resistant organisms.

References

1. Gillespie E, Wilson J, Lovegrove A, Scott C, Abernethy M, Kotsanas D, et al. Environment cleaning without chemicals in clinical settings. Am J Infect Control 2013;41:461-3.
2. Carling P, Bartley J. Evaluating hygienic cleaning in health care settings: what you do not know can harm your patients. Am J Infect Control 2010;38(5 Suppl): S41-50.
3. Abernethy M, Gillespie E, Snook K, Stuart R. Microfiber and steam for environmental cleaning during an outbreak. Am J Infect Control 2013;41:1134-5.

Conflicts of interest: None to report.

Elizabeth Gillespie, BN, MPubHlth(Melb)*
Anita Lovegrove, BN, MNursing
Infection Control and Epidemiology
Monash Health
Clayton, VIC, Australia

Despina Kotsanas, BSc, MClinEpi
Infectious Diseases
Monash Health
Clayton, VIC, Australia

*Address correspondence to Elizabeth Gillespie, BN, MPubHlth(Melb), Infection Control and Epidemiology, Monash Health, 246 Clayton Rd, Clayton, VIC 3168, Australia.
E-mail address: Elizabeth.gillespie@monashhealth.org (E. Gillespie).

http://dx.doi.org/10.1016/j.ajic.2014.12.003

Effectiveness of a chlorine dioxide-based coating on environmental contamination in long-term-care facilities

To the Editor:

The increasing prevalence of multidrug resistant organisms (MDROs) in acute care hospitals has heightened concerns about the role of long-term-care facilities in amplifying the burden.[1] The role of environmental contamination in MDROs transmission is evident. New technology, such as hydrogen peroxide vapor fumigation, is promising[2]; however, the method does not prevent subsequent microbial recontamination. Chlorine dioxide is an Environmental Protection Agency-registered gaseous sterilant that oxidizes the cytoplasmic membrane and denatures proteins of microorganisms.[3] Through sustained release of gaseous chlorine dioxide from a polymer-microencapsulated liquid coating, long-term disinfection of surfaces up to 28 days could be demonstrated.[4] To evaluate the efficacy of this coating in reducing surface microbial loads and vancomycin-resistant enterococci (VRE) contamination in the environment, a controlled before-and-after study was undertaken in the room environment of 3 VRE carriers in 3 long-term-care facilities between October 2012 and March 2013.

The room environment of another 3 residents with matched functional status in the same facility was chosen as the control. The environmental surfaces were cleaned twice daily with chorine-based solution (500 ppm) in the 7-week pre- and postintervention periods. During the 10-week study period, weekly application of chlorine dioxide coating (7,960 ppm) (Greenland Biotech Ltd, Hong Kong, China) was performed in the room environment of the VRE carriers by wiping, in addition to standard environmental cleaning regimens that varied among the facilities and included daily cleaning with chlorine-based solution (500 ppm) in Facility A, twice daily cleaning with tap water in Facility B, and daily cleaning with diluted (1/20 strength) chlorine dioxide coating (398 ppm) in Facility C. Twenty environmental sites were sampled on the same day of each week between 10 AM and 12 PM (ie, before the first time cleaning).

Only 6 of 212 sites remained coated with chlorine dioxide after 1 week (2.8%; 95% confidence interval, 1.3%-6.0%). The median total aerobic count of the chlorine dioxide-coated surfaces ($n = 155$) was similar to that of uncoated surfaces ($n = 276$) (median, 2.70 vs 2.63 CFU/cm^2; $P = .68$). Bedside tables were the most heavily burdened objects, with a maximum aerobic count of 50 CFU/cm^2, 20 times higher than the benchmark level for transferring pathogens (Fig 1). Only the coated light switches of Facility C showed significantly reduced microbial burden by 17 times (median, 0.04 vs 0.7 CFU/cm^2; $P = .046$) (Fig 1). The VRE carrier residing in the room was bedbound and therefore was postulated to use the light switches infrequently. Of note, VRE was isolated not uncommonly in the immediate environment of VRE carriers (5%), especially for residents who are dependent on caregivers for daily activities (7% difference; $P = .008$). The presence of VRE on frequent-touch surfaces may contribute to its cross-transfer if proper hand hygiene is not practiced. The potential contamination of hands during the handwashing process by a VRE-contaminated sink tap was of particular concern. This highlights the important role of self-disinfecting surfaces that could reduce the dependency on