Infection control technique may reduce infections in patients with catheters, drains

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Each year, approximately 5 million patients in the United States receive treatment that includes the insertion of a medical device such as a catheter, which puts them at increased risk of potentially life-threatening

infection.

Researchers have found a strategy that greatly reduced both overall infection and infection with antibiotic-resistant bacteria in a group of these patients. The results of their study were published today in the online issue of *The Lancet.*

The clinical trial known as Active Bathing to Eliminate (ABATE) Infection assessed the effectiveness of two infection control techniques: daily bathing with a soap containing the antiseptic chlorhexidine and adding the use of a nasal antibiotic, mupirocin, in patients with methicillin-resistant Staphylococcus aureus (MRSA).

These protocols already are being incorporated into care for intensive care unit (ICU) patients in many academic and community hospitals in the United States. In this large, randomized study, these two techniques instead were used in non-ICU patients.

"We know that several ICU trials have shown striking reductions in infections and antibiotic-resistant bacteria using these techniques. In this study, we wanted to know if patients who were not critically ill could benefit from a similar decolonization strategy," said Dr. Mary Hayden, an author of the study. Hayden is a professor of internal medicine and pathology, chief of the Division of Infectious Diseases, and director of the Division of Clinical Microbiology at Rush University Medical Center.

Decolonization refers to the removal of bacteria on the surface of the skin that normally are harmless, but that may enter the bloodstream following surgery or other procedures such as insertion of catheters and cause infection, including life-threatening sepsis.

"We found that chlorhexidine bathing and targeted mupirocin for MRSA

carriers did not reduce infection with multidrug-resistant organisms or bloodstream infections within the overall study population of non-critical care patients," said Hayden.

"However, we found that patients with medical devices such as central venous catheters (including accessed ports), midline catheters, and lumbar drains benefited if they received the combination intervention with chlorhexidine and mupirocin. This is important, because patients with vascular catheters and drains are at a higher risk for infection."

Among that subset of patients, investigators recorded a 30 percent decrease in bloodstream infections and a nearly 40 percent decrease in infections with antibiotic-resistant bacteria compared to rates seen in similar patients in the group that had standard bathing. The antibiotic-resistant bacteria included MRSA and strains of the enterococcus bacteria that are resistant to vancomycin, a drug commonly used to treat it.

The benefit of chlorhexidine bathing for patients with devices is notable, according to Dr. Susan Huang of the University of California Irvine School of Medicine, who led the research team. "While they represented only 12 percent of the total non-ICU patient population, patients with devices accounted for 37 percent of MRSA and vancomycin-resistant enterococcus clinical cultures and more than half of all bloodstream infections," she said.

The 21 month-long study enrolled 330,000 patients at 48 hospitals in the HCA Healthcare system, a Nashville, Tennessee-based corporation with facilities in 20 states. The hospitals were divided randomly between those providing routine bathing and those where patients received the decolonization regimen instructions. Patients enrolled in the trial received a total of 1.3 million days of hospital care.

Non-critical care units in the hospitals provided decolonization education had 4 percent rinse-off chlorhexidine liquid soap in the shower and 2 percent leave-on chlorhexidine disposable cloths for bed baths. Daily bathing or showering was encouraged with post-showering application of 2 percent leave-on chlorhexidine to wounds and devices.

In addition, patients known to be MRSA carriers received twice-daily nasal 2 percent mupirocin ointment for five days while on a participating unit. These patients were identified as carriers by reported history, prior culture result or information from transferring facilities.

Usual communication channels and implementation methods for quality improvement initiatives were used, including computer-based training, daily electronic charting of bathing compliance in routine nursing documentation systems, and charting of each mupirocin administration in medication records. Both groups received reminders about documenting bathing. In addition to the daily charting of bathing compliance, nursing leaders of participating units observed three CHG bed baths per quarter and obtained three patient self-assessments on bathing using a provided checklist to visually assess protocol adherence.

The study was implemented as a quality improvement effort using staff and caregivers already working in the units. Resources provided included coaching calls, training binders, and instructional handouts for patients and caregivers. Computer-based training was provided to 14,000 staff members in the participating hospitals. On request, trial team members visited sites to demonstrate chlorhexidine bathing techniques, but investigators were not on-site throughout the trial.

The ABATE Infection trial was initiated through the National Institutes of Health's Common Fund program and was managed by the National Institute of Allergy and Infectious Diseases (NIAID), an NIH component.

As a result of the study's findings, the HCA Healthcare system will adopt the study's decolonization strategy as best practice in patients with inserted medical devices across nearly 180 hospitals.

More information: SS Huang et al. Chlorhexidine versus routine bathing to prevent multidrug-resistant organisms and all-cause bloodstream infection in general medical and surgical units (ABATE Infection trial): a cluster-randomised trial. *The Lancet* (2019). DOI: 10.1016/S0140-6736(18)32593-5

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