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Major Article

Bathing hospitalized dependent patients with prepackaged disposable washcloths instead of traditional bath basins: A case-crossover study

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Background: Basins used for patient bathing have been shown to be contaminated with multidrug-resistant organisms (MDROs) and have prompted the evaluation of alternatives to soap and water bathing methods.

Methods: We conducted a prospective, randomized, open-label interventional crossover study to assess the impact of replacing traditional bath basins with prepackaged washcloths on the incidence of hospital-associated infections (HAIs), MDROs, and secondarily, rates of skin deterioration. Unit-wide use of disposable washcloths over an 8-month period was compared with an 8-month period of standard care using basins.

Results: A total of 2,637 patients were included from 2 medical-surgical units at a single tertiary medical center, contributing 16,034 patient days. During the study period, there were a total of 33 unit-acquired infections, the rates of which were not statistically different between study phases (incidence rate ratio, 1.05; 95% confidence interval [CI], 0.50-2.23; $P = .88$). However, occurrence of skin integrity deterioration was significantly less in the intervention group (odds ratio, 0.44; 95% CI, 0.22-0.88; $P = .02$).

Conclusions: Although we were unable to demonstrate a significant reduction in HAI or MDRO acquisition, we found a decrease in skin deterioration with the use of disposable washcloths and confirmed earlier findings of MDRO contamination of wash basins.

Hospital-associated infections (HAIs) are responsible for >700,000 infections[1] and an estimated $9.8 billion[2] annually in the United States. The hospital environment has been increasingly recognized as an important reservoir for nosocomial pathogens and a facilitator of the transfer of multidrug resistant organisms (MDROs) between patients.[3] Although bathing of patients is routinely performed to improve hygiene, evidence suggests that this practice in some instances might contribute to the spread of hospital pathogens. Standard bathing practice of patients involves the use of a plastic basin, standard soap, water, washcloths, and towels. In particular, bath basins, commonly used in intensive care unit settings, have been shown to be contaminated with nosocomial pathogens, including MDROs in patient care settings. Previous research has shown alarmingly high bath basin contamination rates ranging from 62%-98%[4,5]. However, the degree to which bath basin contamination contributes to incident HAIs in patients is unclear.

Beyond the potential of MDRO transmission from contaminated basins, soap and water bathing itself has been associated with skin deterioration in hospitalized patients.[6] Effective alternatives to

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traditional basin-based bathing may have the added benefit of reducing skin deterioration and maintaining the integrity of the skin as an important barrier to infection. Skin deterioration can lead to pressure ulcers, which are costly to both the patient and hospital and are categorized as a hospital-acquired condition by the Centers for Medicare and Medicaid Services and can impact reimbursement.[7] There are numerous prepackaged bathing products on the market; however, studies examining their benefits over traditional bathing are few.[8]

In this randomized crossover trial, we aimed to assess the impact of replacing traditional bath basins with prepackaged washcloths on the incidence of HAIs and, secondarily, on rates of skin deterioration.

METHODS

This was a prospective, randomized, open-label, interventional study with a crossover design. The study was conducted at Detroit Receiving Hospital, a 268-bed hospital in Detroit, Michigan, from January 10, 2012-July 14, 2013. All study procedures were approved by the Wayne State University Institutional Review Board, and a waiver of informed consent was obtained prior to the initiation of all study procedures. The study was conducted on 2 medical-surgical units (units A and B). During the study period, unit A was a 20-bed unit and was staffed by 15 nurses and 2 patient care assistants. Unit B was a 15-bed unit and was staffed by 15 nurses and no patient care assistants. An 8-month intervention period with implementation of bathing with disposable washcloths was compared with an 8-month control period where preexisting, standard bathing practices protocols were used. The order of the intervention period versus the control period for each of the units was selected randomly. Each intervention period was separated by a 2-month washout period (Fig 1) during which standard bathing procedures were followed.

During the intervention period, nursing staff used disposable washcloths (Comfort Bath Cleansing Washcloths, Sage Products, Cary, IL) for patient cleaning instead of standard-of-care soap and water bathing. Patients who were bedbound but able to bathe themselves were trained in either basin-based bathing or bathing using a prepackaged washcloth, depending on the intervention period and unit. Patients who were ambulatory and could shower independently, did not partake in either intervention. Patients and staff were trained to use prepackaged washcloths for routine standard of care bathing intervals for the entire intervention period. Total number of days or frequency of bathing varied by patient based on standard practice. During intervention periods with the prepackaged washcloths, nursing staff were directed to remove plastic basins from the unit. Training prior to the intervention period was conducted by industry personnel and was overseen by the study principal investigator (KSK). During the study period, study personnel performed walk rounds on each study unit 2 times per week to make certain that bath basins were not present on the intervention unit and that Comfort Bath Cleansing Washcloths were not present on the standard-of-care unit.

Control periods involved the use of standard-of-care bathing protocols using a plastic basin, bar soap, and washcloths. Although changes in incontinence care were not part of the intervention, Comfort Shield Barrier Cream Cloths (Sage Products, Cary, Illinois) were routinely used for incontinence care during both control and intervention periods.

Data collection and analysis

During the 18-month study period, data including demographics, microbiologic test results, comorbid conditions, and clinical outcomes were collected from medical records as patients were admitted to and discharged from study units. Skin integrity was assessed through review of daily nursing notes. All patients were evaluated for risk of pressure ulcer development at admission to the unit and on a daily basis using the Braden Scale[9]; assessments were performed more frequently when warranted clinically. Patients with a Braden Scale score <12 were evaluated every shift. Skin deterioration was defined as a worsening of skin integrity since admission to the unit. Study personnel categorized infections according to standard National Healthcare Safety Network criteria.[10] All infections meeting National Healthcare Safety Network criteria were confirmed through review with an infectious diseases epidemiologist (KSK) and an intensivist. In addition, surveillance of clinical cultures during the study periods was performed for the following MDROs: methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus*, extended-spectrum β-lactamase–producing *Escherichia coli* (ESBL) or *Klebsiella* spp, carbapenem-resistant Enterobacteriaceae (CRE), *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Clostridium difficile*. Clinical cultures of individuals with infection were collected at the discretion of the treating physician following standard clinical practice. No screening cultures were collected. Data on clinical cultures were obtained from admission through 2 days after discharge. Infections were categorized as unit-acquired if they were diagnosed at least 3 days after admission to the unit through 2 days after discharge.

Laboratory methods

During the study period, environmental swabs were collected from plastic basins located in rooms of patients with a clinical culture positive for an MDRO with a stay of at least ≥3 days after the collection of the positive clinical culture. Environmental swabs were collected by wiping twice on all inside surfaces, including the edge of the bath basins. Samples were sent immediately to the clinical laboratory for qualitative microbial analysis. Bath basin isolates were identified to the species level by the Detroit Medical Center Clinical Laboratory, and antibiotic susceptibilities were determined by Microscan (Siemens, Munich, Germany). Selective culturing

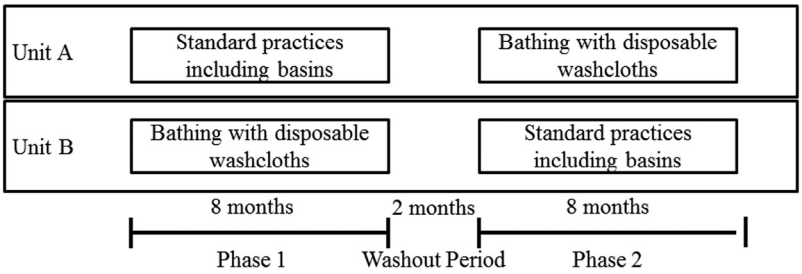

Fig 1. Flowchart of study intervention periods by unit.