


Concise Communication

Hygiene with wet wipes in bedridden patients to prevent catheter-associated urinary tract infection in cardiac surgery: A randomized controlled trial

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Abstract

We assessed hygiene with wet wipes in bedridden patients with urinary catheters for catheter-associated urinary tract infection (CAUTI) prevention. CAUTIs occurred in 16.5% of the control group compared to 5.9% of the intervention group ($P = .035$). Hygiene with wet wipes can substitute for conventional hygiene for preventing CAUTI.

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Urinary tract infections (UTIs) represented ~15%–20% of all healthcare-associated infections, and ~60% of these are associated with urinary catheters, which are used in up to 16% of inpatients.¹ Up to 70% of UTIs are avoidable with the use of evidence-based prevention practices.²

Personal hygiene, including bathing, is a nursing activity related to quality of life and of medical care. The most widespread, well-described technique is conventional hygiene, which consists of washing the patient with a sponge or cloth, soap, and water from a basin. Over the last decade, waterless hygiene with the use of presaturated clothes has emerged as an alternative to conventional regimens.³

Some researchers maintain that hygiene with water can increase the risk of nosocomial infection because the mechanical friction causes the shedding of cells containing microorganisms, which leads to contamination of the water. Similarly, tap water, toilets, sinks, and basins can act as a reservoir for microorganisms that cause nosocomial infections.^{4,5}

Given the importance of preventing UTIs and the scarcity of studies related to patient hygiene, we assessed hygiene with presaturated wipes versus conventional hygiene in cardiac-surgery,

bedridden patients for reducing catheter-associated urinary tract infections (CAUTIs).

Methods

This open-label, randomized controlled trial took place in the Germans Trias i Pujol University Hospital between January 2019 and February 2020. We followed the CONSORT reporting guidelines for studies of nonpharmacological interventions.⁶

Participants

Patients undergoing cardiac surgery who were bedridden, had an indwelling urinary catheter, and provided signed informed consent were eligible to participate in the study. Exclusion criteria included the following: missing records, patients admitted from other units with urinary catheters, patients with previous UTI in last 3 months, and language barrier. Patients were consecutively recruited until the sample size was reached. Upon enrollment, participants were randomized to parallel groups (1:1) using a random numbers table. Patients were withdrawn from the study if they demonstrated hypersensitivity to any component of the hygiene protocol, were transferred to other services, voluntarily dropped out, or died before completing the follow-up.

Intervention

The control group received conventional patient hygiene with water and soap, and the experimental group received dry hygiene with wipes impregnated with soap and moisturizing lotion containing polyhexanide (Prontoderm wipes, B. Braun, Melsungen, Germany). Nursing professionals in the participating

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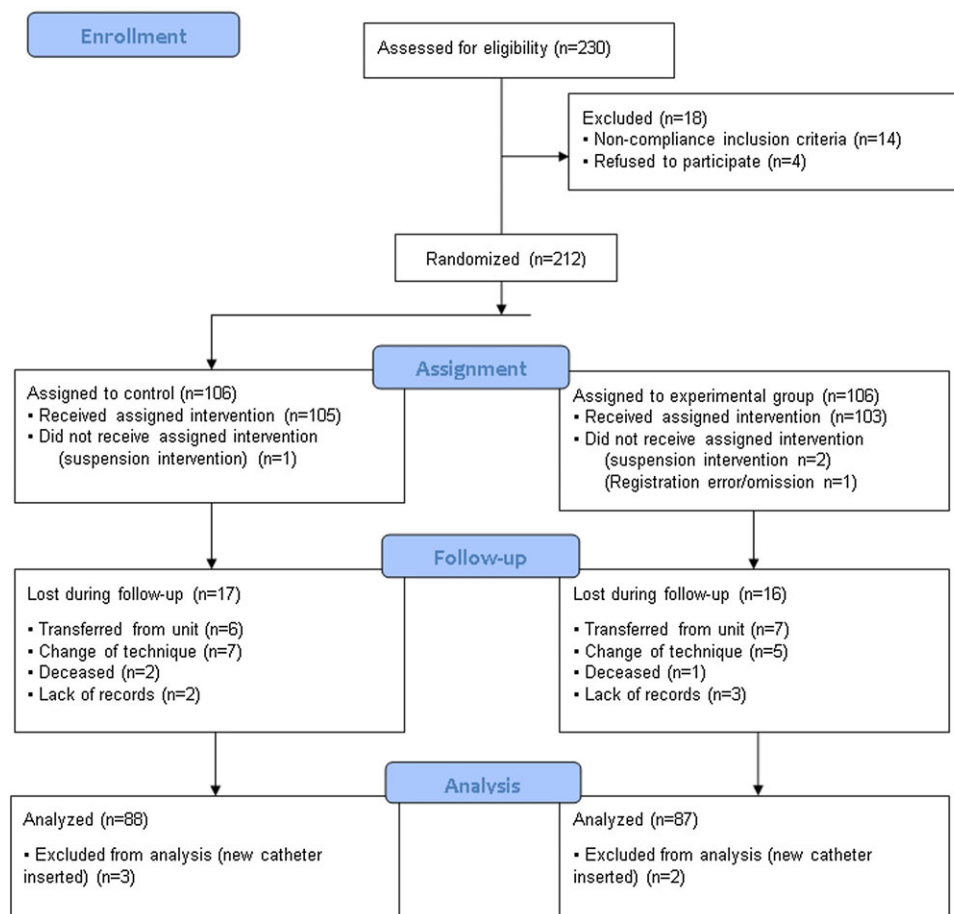


Figure 1. Participant Flow.

services received training on the hygiene protocol designed for the study. Urine samples were collected following hospital protocol and only in patients with clinically suspected infection.

Ethical considerations

The hospital's clinical ethics committee approved the study (code PI-18-173), and participants were asked to sign informed consent forms. Infection control nursing staff collected the data using a questionnaire regarding the study variables.

Study variables

The primary outcome was the occurrence of a CAUTI as defined by the Centers for Disease Control and Prevention.⁷

Other variables included age, sex, comorbidity according to the Charlson comorbidity index, days of catheterization, skin integrity, microorganism in urine culture, antibiotic administration, treatment duration, and discharge outcome.

Statistical analysis

Assuming an α (alpha) risk of 5% and allowing a 5% dropout rate, to provide 80% power, 100 individuals were required in each group.

The accumulated incidence of CAUTI was calculated with 95% confidence intervals (CIs), and groups were compared in univariable analyses using the χ^2 test or the Fisher exact test or the Student *t* test or the Mann-Whitney *U* test. The study arm

(experimental or control) was introduced into a multivariable logistic regression model adjusted for sex and days of catheterization. All analyses were performed using SPSS version 24 statistical software (IBM, Armonk, NY). Two-tailed *P* values < .05 were considered significant.

Results

In total, 212 patients were included in the study, of whom 170 (85 per arm) were included in the analysis (Fig. 1). The only significant difference between groups was comorbidity: the Charlson index was higher in the control group (*P* = .008).

The duration of catheterization ranged from 1 to 35 days. CAUTI was significantly more frequent in the control group [*n* = 14 (16.5%; 95% CI, 9.7%–25.5%) vs *n* = 5 (5.9%; 95% CI, 2.2%–12.5%); *P* = .035]. The incidence of CAUTI was higher among female participants (25.0%; 95% CI, 13.9%–39.3%) than male participants (6.4%; 95% CI, 3.1%–11.8%; *P* = .002).

In the multivariable analysis (Table 1), CAUTI was independently associated with conventional hygiene (odds ratio [OR], 4.1; 95% CI, 1.3–12.7). In the 19 patients with CAUTI, 12 (60%) had infections caused by Enterobacteriaceae (*n* = 9 controls vs *n* = 3 experimental). *Pseudomonas* spp were isolated in 3 cases, all in the control group. Also, 4 patients (20%) presented with polymicrobial cultures (75% in the control group). In addition, 19 patients (95%) received antibiotics during their hospital stay, and 58% of these continued this treatment after discharge.

Table 1. Factors Associated With Catheter-Associated Urinary Tract Infection (CAUTI), Univariable and Multivariate Analysis

| Variable | UTI | | No UTI | | Univariable | | Multivariable | |
|--|-----------------|------|-----------------|------|------------------|---------|----------------|---------|
| | No. | % | No. | % | OR (95% CI) | P Value | OR (95% CI) | P Value |
| Group | | | | | | | | |
| Experimental | 5 | 5.9 | 80 | 94.1 | 1 | .035 | 1 | .014 |
| Control | 14 | 16.5 | 71 | 83.5 | 3.1 (1.1–9.1) | | 4.1 (1.3–12.7) | |
| Sex | | | | | | | | |
| Male | 8 | 6.4 | 117 | 93.6 | 1 | .002 | 1 | .001 |
| Female | 11 | 25.0 | 33 | 75.0 | 4.9 (1.8–13.1) | | 5.8 (2.1–16.6) | |
| Age, mean \pm SD | 69.2 \pm 12.7 | | 67.3 \pm 10.4 | | 1.01 (0.97–1.07) | .43 | | |
| Charlson comorbidity index | | | | | | | | |
| 0–1 | 10 | 10.3 | 87 | 89.7 | 1 | .68 | | |
| 2–4 | 9 | 12.3 | 64 | 87.7 | 1.2 (0.4–3.1) | | | |
| Days of catheterization, mean \pm SD | 5.7 \pm 2.8 | | 4.9 \pm 4.3 | | 1.0 (0.9–1.1) | .45 | 1.0 (0.9–1.1) | .71 |

Note. UTI, urinary tract infection; CI, confidence interval; OR, odds ratio; SD, standard deviation.

Most patients (94.1%) maintained skin integrity. More patients receiving conventional (7.1%) versus dry hygiene (3.5%) developed moisture-induced skin lesions, but the difference was not significant.

Regarding the discharge outcome, 89.1% of participants were discharged home and 4.1% died from noninfectious causes.

Discussion

Our study provides evidence from an open-label, randomized controlled trial that water-based hygiene in bedridden patients with a urinary catheter is associated with a higher risk of CAUTI than hygiene with presaturated wipes.

A systematic review showed that waterless hygiene reduces the incidence of urinary infection⁸ and recommended that healthcare centers consider eliminating patient bathing with basins. Other researchers⁹ found a reduction in UTIs when dry bathing practices were implemented, although most evidence is from before-and-after studies comparing wet wipes impregnated with chlorhexidine to traditional soap, so the reduction could be due to the incorporation of the antiseptic.

In contrast, other researchers¹⁰ found insufficient evidence for the clinical efficacy of wet wipes with chlorhexidine and suggested the need for randomized clinical trials.

In our study, CAUTI was independently associated with conventional water-based hygiene.

Most of the patients with CAUTI (60%) had an enterobacterial infection. The polymicrobial cultures, which were more frequent in the water-based hygiene arm, could reflect an excess of periurethral ascending contamination during washing with soap and water.

Groven et al³ found that dry washing was associated with fewer skin lesions than conventional hygiene. We also observed that more patients receiving conventional versus dry hygiene developed skin lesions, although we failed to detect a statistically significant difference. One of the strengths of the current study was the inclusion of a randomly assigned control group and the incorporation of the change in hygiene technique with wet wipes as an isolated measure, rather than part of a multicomponent intervention.

This study had several limitations. The study was not double-blinded due to the type of intervention. Also, patients lost to

follow-up in both study arms, which may have led to bias due to the lack of information on these patients. Also, the study was limited to cardiac surgery patients; thus, these results may not be generalizable to other populations.

In conclusion, in bedridden patients with a urinary catheter, the use of presaturated wipes significantly reduced the incidence of CAUTI compared to conventional soap-and-water hygiene. Despite not containing an antiseptic, the wipes used in our study reduced the incidence of CAUTI without disruption of skin integrity. Thus, performing skin hygiene presaturated wipes is a safe alternative to soap and water.

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Conflicts of interest. All authors report no conflicts of interest relevant to this article.

References

1. Sonda uretral en los pacientes críticos ingresados en las unidades de cuidados intensivos “PROYECTO ITU-ZERO.” Ministerio de Sanidad y consumo de España website. <https://www.seguridaddelpaciente.es/resources/documentos/2018/04/itu-zero/definitivo/PROYECTO-ITU-ZERO-2018-2020.pdf>. Published 2018. Accessed August 1, 2023.
2. Umscheid CA, Mitchell MD, Doshi JA, Agarwal R, Williams K, Brennan PJ. Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs. *Infect Control Hosp Epidemiol* 2011;32:101–14.
3. Groven FMV, Zwakhalen SMG, Odekerken-Schröder G, Joosten EJT, Hamers JPH. How does washing without water perform compared to the traditional bed bath: a systematic review. *BMC Geriatr* 2017;17:1–16.
4. Anaissie EJ, Penzak SR, Dignani MC. The hospital water supply as a source of nosocomial infections a plea for action. *Arch Intern Med* 2022; 162:1483–1492.

5. Shaw E, Gavalda L, Càmarà J, *et al*. Control of endemic multidrug-resistant gram-negative bacteria after removal of sinks and implementing a new water-safe policy in an intensive care unit. *J Hosp Infect* 2018;98:275–281.
6. Barbour V, Bhui K, Chescheir N, *et al*. CONSORT statement for randomized trials of nonpharmacologic treatments: a 2017 update and a CONSORT extension for nonpharmacologic trial abstracts. *Ann Intern Med* 2017;167:40–47.
7. Horan TC, Andrus M, Dudeck MA. CDC/NHSN surveillance definition of healthcare-associated infection and criteria for specific types of infections in the acute-care setting. *Am J Infect Control* 2008;36:309–332.
8. Strouse AC. Appraising the literature on bathing practices and catheter-associated urinary tract infection prevention. *Urol Nurs* 2015;35:11–17.
9. Reagan KA, Chan DM, Vanhoozer G, *et al*. You get back what you give: decreased hospital infections with improvement in CHG bathing, a mathematical modeling and cost analysis. *Am J Infect Control* 2019;47:1471–1473.
10. Boonyasiri A, Thaisiam P, Permpikul C, *et al*. Effectiveness of chlorhexidine wipes for the prevention of multidrug-resistant bacterial colonization and hospital-acquired infections in intensive care unit patients: a randomized trial in Thailand. *Infect Control Hosp Epidemiol* 2016;37:245–253.