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Major Article

Inappropriate urinary catheter reinsertion in hospitalized older patients

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Background: We investigated the incidence and rationale for inappropriate reinsertion of urinary catheters and elucidated whether reinsertion is an independent predictor of adverse outcomes.
Methods: A longitudinal study was adopted. Patients aged ≥65 years with urinary catheters placed within 24 hours of hospitalization were enrolled. Data collection, including demographic variables and health conditions, was conducted within 48 hours after admission. Patients with catheters in place were followed-up every day. If the patient had catheter reinsertion, the reinsertion information was reviewed from medical records. Adverse outcomes were collected at discharge.
Results: A total of 321 patients were enrolled. Urinary catheters were reinserted in 66 patients (20.6%), with 95 reinsertions; 49.5% of catheter reinsertions were found to be inappropriate. "No evident reason for urinary catheter use" was the most common rationale for inappropriate reinsertion. Inappropriate reinsertion was found to be a significant predictor for prolonged length of hospital stay, development of catheter-associated urinary tract infections and catheter-related complications, and decline in activities of daily living.
Conclusions: This study indicates a considerable percentage of inappropriate urinary catheter reinsertions in hospitalized older patients. Inappropriate reinsertion was significantly associated with worsening outcomes. Efforts to improve appropriateness of reinsertion and setting clinical policies for catheterization are necessary to reduce the high rate of inappropriate reinsertion.

Approximately 25% of hospitalized patients have a urinary catheter in place at some time during their hospitalization, and previous studies suggest that >18.5% of such urinary catheters were placed without a specific medical indication.[1-3] Hospitalized older patients are more prone to have urinary catheters placed without indication, of which 43.9%-54% have been shown to have been improperly used.[4-6] Reducing inappropriate use of urinary catheters has the potential to prevent catheter-associated urinary tract infections (CAUTIs) and other noninfectious adverse consequences of catheter use, such as pain, trauma, and mobility restriction.[7]

Eliminating inappropriate use of urinary catheters is certainly the most important goal in preventing catheter-associated adverse outcomes. A conceptual model of the lifecycle of the urinary catheter highlights interventions to prevent inappropriate use at 4 critical points: (1) initial catheter placement, (2) monitoring during catheterization, (3) reminders for catheter removal, and (4) during catheter reinsertion.[8] Most studies on this topic, however, have focused on assessing the appropriateness of catheter use at the time of the initial catheter placement and the ongoing process for early catheter withdrawal if its use is unnecessary throughout the hospital stay. To our knowledge, no published studies have addressed inappropriate use of urinary catheters during reinsertion. The aim of this study was therefore to investigate the incidence and rationale for inappropriate urinary catheter reinsertion and to elucidate

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whether inappropriate catheter reinsertion is an independent predictor of prolonged length of hospital stay, development of CAUTIs and catheter-related complications, decline in activities of daily living (ADLs), and new admission to nursing home.

METHODS

Design and sampling

A longitudinal study was used to evaluate inappropriate urinary catheter reinsertion in hospitalized older patients. Between October 1, 2012, and October 31, 2013, patients were recruited via convenience sampling from the adult wards (with the exception of obstetrics, gynecology, and hospice wards) of a 1,135-bed tertiary care medical center in Southern Taiwan. Patients aged ≥65 years with a urinary catheter placed within 24 hours of hospitalization were enrolled. Those who had urinary catheters placed before admission or were transferred to intensive care units or hospice services were excluded. The study was approved by the institutional review board of the study hospital. Written informed consents were obtained from the patients or their proxies before enrollment.

Indications of appropriateness for use of urinary catheters

Indications were developed based on a literature review.[3,9-14] The developed indications were validated through the expert consensus of 5 medical specialists from the study hospital: urology (n = 1), geriatrics (n = 2), rehabilitation medicine (n = 1), and infectious disease (n = 1). The experts achieved consensus and identified 6 urinary catheter use indications: (1) neurogenic bladder dysfunction, (2) urinary retention or bladder outlet obstruction, (3) medication instillation or bladder irrigation, (4) conditions that might warrant accurate measurement of urinary output in critically ill patients, (5) perioperative management in surgical patients, and (6) open sacral or perineal wounds with a need for urinary diversion in incontinent patients. Other indications not listed in the indications of appropriateness were identified as inappropriate use.

Data collection

This longitudinal study was supported by the National Science Council of Taiwan. Information about urinary catheter placement and catheterization during maintenance has been published elsewhere.[15,16] Data collection was conducted by the first author and a trained research nurse. The consistency between these 2 researchers was examined before data collection, and the inter-rater reliability was 0.96.

The first phase of data collection was conducted within 48 hours after admission; the data obtained from medical records included demographic variables (age and sex) and health conditions, including the Charlson Comorbidity Index, body mass index, urinary tract infection diagnosis, and bedsore information. The Charlson Comorbidity Index indicates the number and severity of comorbidities. Scores range from 0-37, with higher scores indicating more severe comorbidities.[17] Interviews were conducted for measurement of the Short Portable Mental Status Questionnaire (SPMSQ)[18] and the Geriatric Depression Scale Short-Form.[19] Cognitive impairment was defined as ≥2 errors after adjusting for education level on the SPMSQ. In the case of patients who were unable to respond appropriately, the SPMSQ was coded automatically as cognitive impairment. A total score >8 on the Geriatric Depression Scale Short-Form was defined as depressive symptoms. Urinary incontinence information was also collected through interviews. If patients were incompetent regarding communication, their main caregiver was asked. Urinary incontinence was defined as patients having reported wetting themselves within the previous 2 weeks.[20] Accordingly, the Katz Index of Independence in Activities of Daily Living (ADLs) was measured by researcher observation. The Katz Index of Independence in ADLs was measured using 6 items (impairment in bathing, dressing, visiting the toilet, getting up out of a chair, eating, and use of incontinence materials).[21] Scores range from 0-12, with higher scores indicating more independence in terms of ADLs.

For the second phase of data collection, patients with urinary catheters in place were followed-up every day by the researchers to evaluate appropriateness of use. Patient medical records from the notes of both physicians and nurses were reviewed to clarify indications for urinary catheters. If the medical record did not explicitly document the indication for catheterization, the patients' physician or primary care nurse was consulted. If there was no reliable information for the indication, the inappropriate catheter use was coded as "no evident reason for use of urinary catheter," and this condition was identified as inappropriate use of a urinary catheter. Each day with a urinary catheter in place was considered 1 catheter day. Time to first removal of the urinary catheter and inappropriate catheter days before removal were calculated until catheter removal. During this phase, interviews were also conducted for the measurement of caregivers' perceptions of convenience related to the use of urinary catheters and patients' perceptions of convenience and comfort related to the use of a catheter. A visual analog scale from 0-10 was used to measure the perceptions of convenience and comfort during use of urinary catheters.

For the third phase of data collection, if the patient had urinary catheter reinsertion, the medical record was reviewed for the unit in which the reinsertion was performed, time from catheter removal to reinsertion, and rationale for catheter reinsertion. If the medical record did not explicitly document the indication for catheter reinsertion, the patient's physician or primary care nurse was consulted.

The last phase was conducted at discharge, when adverse outcome data were collected, including length of hospital stay, incidence of CAUTIs and catheter-related complications, change in ADLs, and new admission to nursing home. All of the outcomes were collected from medical records with the exception of change in ADLs. CAUTIs were defined as when patients had developed pyuria, bacteriuria, or clinical signs or symptoms of urinary tract infection after catheterization.[22] Catheter-related complications were defined as the patients having one of the following diagnoses after catheterization: internal trauma (pain, gross hematuria, incidentally noted catheter migration, or overt mechanical trauma), external trauma (gangrene of penis, paraphimosis, or meatal erosion), genital infection (epididymitis), fistula, and bladder stones.[23,24] Change in ADLs was assessed by researchers; this measure was calculated by the score changes in the Katz Index of Independence in ADLs between admission and discharge. New admission to nursing home was defined as when a patient was discharged to a nursing home and had not been residing in one before admission.

Statistical analysis

The rationales for urinary catheter reinsertion were summarized using descriptive statistics. Differences in the proportions of dichotomous variables and continuous variables were analyzed using χ^2 test or 1-way analysis of variance. In all of the analyses, patients were subdivided into 3 groups: (1) those who did not experience urinary catheter reinsertion, (2) those who experienced appropriate urinary catheter reinsertion, and (3) and those who experienced inappropriate urinary catheter reinsertion.