Nursing interventions reduce postoperative urinary retention in fast-track total hip arthroplasty: A pilot study

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Abstract

Background. Postoperative urinary retention (POUR) is a common complication of spinal anesthesia that occurs in 10–80% of patients after total hip replacement (THR). Bladder catheterization carries risks for urinary tract infections, mechanical urethral trauma, urethral inflammation and subsequent strictures, pain, discomfort, an increased length of hospital stay, and a loss of patient dignity.

Objectives. We investigated whether simple postoperative nurse-driven intervention protocols, including the sound of running tap water, followed by caffeinated hot beverages (tea or coffee) and pouring warm saline on the perineal area, could reduce POUR and the need for bladder catheterization.

Materials and methods. This pilot study included 60 patients undergoing elective fast-track THR with spinal anesthesia and early patient ambulation. Patients with postoperative voiding difficulties received nursing interventions, including hearing running tap water, ingesting caffeinated beverages (tea and coffee), and warm saline poured over the perineal area. If voiding difficulties continued, bladder distention was examined by ultrasound. Catheterization was performed if the volume exceeded 500 mL or if distension caused discomfort or pain.

Results. Seven patients (11%) were excluded from the study due to prophylactic preoperative catheterization. Among the 53 included patients, 27 (51%) experienced spontaneous voiding difficulties and received nursing interventions, which induced voiding in 24 patients (45%, $p = 0.0027$), while 3 (6%) required catheterization.

Conclusions. Simple nursing interventions reduced the need for bladder catheterization after fast-track THR.

Key words: total hip replacement, urinary retention, fast track, nursing intervention, urinary catheter

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Introduction

Acute postoperative urinary retention (POUR) occurs as a complication of surgical anesthesia in 10–80% of patients.[1–3] Intermittent or indwelling bladder catheterization reduces the risks of POUR, bladder overdistention and possible renal impairment. However, catheterization carries increased risks of hospital-acquired urinary tract infections, mechanical urethral trauma, urethral inflammation and subsequent strictures, pain, discomfort, an increased length of hospital stay, and a loss of patient dignity. Moreover, both POUR and catheterization can lead to hematogenous bacteremia, seeding of the implant and subsequent periprosthetic infection.[4–7]

The classic criteria for urinary catheterization, published in 1999 by Saint and Lipsky, do not recognize elective total hip replacement (THR) as an appropriate indication for indwelling bladder catheter use.[8] Compared to general anesthesia, spinal anesthesia with the routine addition of intrathecal morphine is superior in fast-track total hip arthroplasty, but may increase the risk of POUR.[5,9] Although there are currently no standard protocols for urinary catheter use in elective total hip arthroplasty, many institutions routinely use urinary catheters in patients who undergo spinal anesthesia.

Bladder function and micturition are complex physiological processes. However, bladder emptying can sometimes be encouraged using simple procedures described in every classic handbook for nurses and doctors, including the sound of tap running water, ingesting caffeinated beverages, or pouring warm water on the perineal area. The effectiveness of these techniques for reducing POUR and the need for bladder catheterization in patients undergoing fast-track total hip arthroplasty remains unknown.

Objectives

The present study aimed to investigate the effectiveness of classic nursing interventions for reducing the incidence of POUR and the need for bladder catheterization among patients undergoing fast-track THR.

Materials and methods

This prospective observational pilot study included 60 consecutive patients undergoing fast-track primary THR. No exclusion criteria were applied. All participants signed written consent forms, and the study protocol was approved by the bioethical committee at the Pomeranian Medical University in Szczecin, Poland (approval No. KB-0012/71/11). The average participant age was 64 ±11.12 years, and the average participant body mass index (BMI) was 26 ±4 kg/m^2. Table 1 shows the patients' preoperative characteristics and comorbidities.

Table 1. Patients' preoperative characteristics and comorbidities

Patients' characteristics and comorbidities		n (%)
Gender	male	28 (53.0)
	female	25 (47.0)
Diabetes type I		2 (3.5)
Diabetes type II		5 (9.5)
Hypo-/hyperthyroidism		7 (13.0)
Gout		3 (5.7)
Prostate cancer		1 (1.9)
Coronary artery disease		10 (18.9)
Hypertension		22 (41.5)

A modified fast-track protocol was utilized in all patients. Thirty minutes before surgery, the patients received intravenous cefazolin (1.0 g). Spinal anesthesia was performed using Marcaine Spinal 0.5% Heavy (Aspen Pharmacare, Durban, South Africa; dose depending on the patient's height (3.5–4 mL), planned level of anesthesia was Th10). The surgery was carried out using an anterolateral approach to the hip joint, and all patients received a cementless hip implant. Several surgical parameters were recorded, including the duration of surgery, blood loss and the need for blood transfusion.

After the operation, the patients received multimodal, opioid-sparing analgesia, including intravenous administration of ketoprofen (100 mg) every 12 h (changing to oral administration on the 1st postoperative day), oral paracetamol (100 mg) every 6 h and oral tramadol (50–100 mg) every 8 h. For breakthrough pain, patients received intravenous morphine (1–2 mg). At 3–4 h after surgery, once motor blockade resolved, physical therapy and ambulation with weight-bearing as tolerated were initiated.

In every patient who experienced postoperative difficulties in voiding after ambulation, a nurse-driven intervention protocol was introduced. First, the sound of running tap water was initiated, followed by the ingestion of caffeinated hot beverages (tea or coffee) and the pouring of warm saline on the perineal area. If the patient was still unable to void, bladder distention was examined by ultrasound. If the volume exceeded 500 mL, or if bladder distension caused the patient discomfort and pain, a Foley catheter was inserted.

Statistical analyses

Dichotomous data are presented as percentages, while continuous variables are presented as medians. Dichotomous data were compared using the Fisher's exact test. A value of $p < 0.05$ was considered statistically significant. Statistical analyses were performed using Statistica v. 10 (StatSoft Inc., Tulsa, USA).

Results

Seven patients (11%) were prophylactically catheterized after surgery without clear indication (due to anesthesiologist preferences) and were therefore excluded from the analysis. Among the 53 patients available for further assessment, 26 (49%) spontaneously emptied their bladder after early ambulation. The remaining 27 patients (51%) experienced voiding difficulty and urine retention, which the nursing staff recognized and responded to with micturition-supporting interventions. The sound of running tap water was successful in 14 patients (26%), caffeinated beverages (tea/coffee) in 7 patients (13%), and pouring warm saline on the perineal area in 3 patients (6%). Only 3 patients (6%) required subsequent catheterization. Overall, using all methods together one after the other appeared very effective in promoting bladder emptying in 24 patients (45%). The methods were ineffective in only 3 patients (6%) who required subsequent catheterization ($p = 0.0004$; Fisher's exact test).

Discussion

Postoperative urinary retention can prolong hospitalization, increase hospital readmission rates and negate the benefits of THR. However, bladder catheterization and related complications can lead to the same negative consequences. There are presently no clear guidelines for orthopedic surgeons and nurses regarding POUR prevention and treatment, and only limited evidence is available indicating whether intermittent or indwelling catheterization is preferable after THR.[4–6]

The use of the International Prostate Symptoms Score (IPSS) revealed that older patients with obstructive symptoms are at an elevated risk of developing POUR. Weekes et al. created a urinary symptoms questionnaire aiming to identify patients at high risk for POUR before surgery.[3] However, the use of that questionnaire does not help avoid the complications of bladder catheterization itself or reduce the number of unnecessary elective catheterizations.[1,10,11] Bjerregaard et al. identified other modifiable risk factors for POUR, including anesthesia technique, opioid use (intrathecal and parenteral), postoperative pain management, and fluid therapy.[7] Griesdale et al. found that POUR commonly occurs after total knee replacement in patients receiving spinal anesthesia with morphine.[2] In contrast, Miller et al. found that spinal anesthesia is associated with a low POUR risk in THR patients.[5] Advances in fast-track total hip arthroplasty have led to a number of positive modifications in perioperative bladder management.[7] Balderi et al. confirmed the usefulness of an ultrasonographic nurse-driven protocol for avoiding elective and unnecessary catheterization.[12] Leach et al. suggested that caffeine ingestion increases voiding volume and helps to avoid subsequent catheterization after the removal of the indwelling catheter following joint arthroplasty.[13]

The current pilot study was designed to measure the clinical effectiveness of simple and well-known nursing techniques for avoiding elective and unnecessary catheterizations. To our knowledge, no similar study has been performed before. The results showed that the nursing protocol was successful in the selected group of patients. The present study has several limitations, including a small number of participants and the lack of a control group. Moreover, discriminant analyses do not identify any factors related to urine retention or to the effectiveness of micturition-supporting methods in the examined group. Rather, the current results indicate that the tested methods were effective, with no relation to epidemiological differences.

Conclusions

Overall, the present results suggest that simple nursing techniques can successfully reduce POUR in patients undergoing fast-track THR, and encourage further studies on this subject.

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