Incidence of Urinary Retention in Post-Operative Orthopedic and Trauma Patients

Priscilla H. Pagán, BSN, RN
DNP Chair: Mary DiGiulio, DNP, APN, FAANP   DNP Team Member: Kelly Reilly, PhD, RN-BC, NEA-BC   DNP Team Member: Ariele Pollack, MSN, AGPCNP-BC

Introduction
The purpose of this project was to implement the nurse-driven CAUTI protocol to measure whether discontinuation of an indwelling catheter at midnight or 8 hours post-operatively resulted in decreased or increased incidence of urinary retention in orthopedic and trauma patients.

Background & Significance
- "Each year over 300,000 older people—those 65 and older—are hospitalized for hip fractures" (Center for Disease Control and Prevention, 2016)
- Up to 25% of all hospital patients undergo urinary catheterization to accurately monitor urine output following surgery and to treat urinary retention (Pamaiahgari, 2019)
- The current population at highest risk of urinary retention and catheter-associated urinary tract infections are post-operative orthopedic and trauma patients (Stefanik et al., 2015)
- Patients who develop post-operative urinary retention are at increased risk of urinary tract infection and increased length of stay (Kort et al., 2018).
- Urinary tract infections associated with catheter use increase patient length of stay (2-4 days), increase health care cost ($340-450 million/year), mortality, and decrease patient satisfaction (Agency for Healthcare Research and Quality, 2015)
- Because the Centers for Medicare and Medicaid will not reimburse costs associated with hospital-acquired catheter-associated urinary tract infections, there is financial incentive to decrease catheter use because it is associated with $1,300-1,600 additional cost per patient, not adjusted for inflation (Agency for Healthcare Research and Quality, 2015)

Opportunities
- Nursing Autonomy
- Implementation of a Hospital-Approved Protocol

Limitations
- Small Sample Size
- Stakeholder Non-Compliance-14.3%

Results
- Participants were mainly female gender (85.7%) with a mean age of 80.6 years old; 40% of participants were 89 years or older
- The most frequent type of surgery was the IM Nailing/Pinning for surgical fixation including 17 participants
- The average bladder scan volume was >400 ml in the intervention group and is congruent with the standard margin for intervention
- The mean voiding trial was 7.86 hours with a normal distribution and SD of 3.637
- The 8-hour voiding trial had the highest frequency (8 participants=38.1%) between both groups and may be accepted as an appropriate standard of practice
- The mean length of stay was 5.52 days with an SD: 3.696 between both groups; the highest frequency was 4 days (52.4%)
- 61.9% of participants were alert and oriented to person, place, and time and the mean for mobility was 1.86 (post op day 1-2)
- There was a significant relationship between age and mobility with a Pearson Correlation of .440, 2-tailed significance p=.046, 95% CI: .000 to .728. There were no other significant correlations between age, hours given for voiding trial, bladder scan volume, length of stay, mobility, or cognitive status
- Two participants in intervention group experienced failed 8-hour voiding trial with a bladder scan volume >400 ml and re-insertion of indwelling catheter. Of 18 control participants, 5 failed the 8-hour voiding trial but more time was given to 3 participants who eventually voided and the remaining 2 required catheter reinsertion; the bladder scan volume for the control group is unknown excluding 1 participant. It is unclear how long indwelling catheters should be maintained to avoid failed voiding trials
- An independent-samples t-test was conducted to compare the bladder scan volume and hours given for voiding trial between the intervention and control group. There were significant differences (t (2.028) = 1.910, p=<0.01 in the scores with the mean score for the intervention group (M=1.33, SD=1.155) being higher than the control group M=0.06, SD=.236. The magnitude of differences in the means (mean difference = 1.278, 95% CI: =1.563 to 4.119 was significant. This finding may suggest that the early removal of indwelling urinary catheters in post-operative patients increases the incidence of urinary retention. However, due to the small sample size and inconsistent use of bladder scan assessment, this finding may not be generalizable

Group Statistics

Interventon Versus Control Group		N	Mean	Std. Deviation	Std. Error Mean
Bladder Scan Volume	Intervention Group	3	1.33	1.155	.667
	Control Group	18	.06	.236	.056
Hours given for Voiding Trial	Intervention Group	3	8.67	4.041	2.333
	Control Group	18	7.72	3.675	.866

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Bladder Scan Volume	Equal variances assumed	28.802	<.001	4.700	19	<.001	1.278	.272	.709	1.847
	Equal variances not assumed			1.910	2.028	.195	1.278	.669	-1.563	4.119
Hours given for Voiding Trial	Equal variances assumed	.082	.778	.408	19	.688	.944	2.317	-3.905	5.794
	Equal variances not assumed			.379	2.584	.733	.944	2.489	-7.750	9.639

Discussion
- The findings may suggest that early removal of catheters 8 hours post-operatively increases urinary retention however further research with a larger sample size may be necessary to validate or refute this finding
- Catheter reinsertion occurred at the same frequency between groups to manage failed trials to void. This finding may suggest that indwelling catheter maintenance may be appropriate to prevent and manage urinary retention (excluding other interventions such as IV hydration)
- Bladder scan assessment is an easy, painless tool that can be implemented for all 8-hour voiding trials to guide decision-making and be documented in the EHR nursing data base
- Using the PDSA cycle, there is an opportunity for discussion among medical and nursing providers regarding this protocol's use in this surgical population. The protocol may require amendments that consider increasing the maintenance time for indwelling urinary catheters to 12-48 hours and including other risk factors for urinary retention not included in this study (i.e., history of urinary retention, UTI, BPH, anesthesia, GU consultation for indwelling catheter insertion, hypovolemia, worsening labs, serum albumin, neurological disease)
- This study's findings are congruent with some studies found in the literature review
- Opportunity for discussion and implementation of nurse-driven straight catheter protocol for failed trials to void in patients that have received standard care (12-48 hours of catheter maintenance). This is evidence-based practice and was an intervention not used in this study.

Study Design and Sample
The surgical population included in this quasi-experimental study are orthopedic and trauma patients who have undergone surgical fixation of a femoral fracture excluding the following criteria: strict intake and output, bladder injury, mechanical ventilation, pressor support, multiple traumas, pelvic fractures, in a 6-week time period. The study collected data on 3 participants in the intervention group who had indwelling catheters removed 8 hours or at midnight post-operatively and 18 participants in a control group who experienced standard practice with removal of an indwelling urinary catheter 12-48 hours post-operatively. The study took place on a surgical unit in a large, community teaching hospital in a borough of New York.

Data Collection
After implementation of the nurse-driven CAUTI protocol, data collection was implemented through a retrospective chart review of the participants' type of surgery, length of stay, discontinuation of indwelling urinary catheter, voiding trial, bladder scan volume, intervention (additional time given or reinsertion of straight vs. indwelling urinary catheter). Data regarding age, gender, mobility, and cognitive status was also collected and measured.

Data Analysis
Descriptive comparative statistics was used for mean and frequency to determine central tendency of data. The data was organized in quartiles and standard deviation was used to measure the dispersion of data. Inferential statistics were applied with an alpha level of 95% and p-value of 0.05. Independent Samples T-test was used as the testing family. Coding was applied for each variable in IBM SPSS version 27. Pearson Correlation 2-tailed test was used to assess the relationship between age, hours given for voiding trial, bladder scan volume, length of stay, mobility, and cognitive status in relation to one another.

Scan QR Code for References