**Format for Mini-CAT**

**Clinical Question:**

In a related question, the unit’s nurse manager has been advocating that instead of placing indwelling urinary catheters, post-op orthopedic patients who cannot use a bedpan should be “straight cathed” (using an as needed straight catheter which is only placed to empty the bladder at that time and then removed). What can you tell the chief of the service about this question?

**PICO Question:**

Which of the two: indwelling urinary catheters or intermittent catheter, reduces UTI and urinary retention rates in post-op orthopedic patients?

**Search Strategy:**

Outline the terms used, databases or other tools used, how many articles returned, and how you selected the final articles to base your CAT on

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| **P** | **I** | **C** | **O** |
| Orthopedic patients | Intermittent straight catheters | Indwelling urinary catheters | Urinary tract infections |
| Post op  | in/out catheters | Retention catheters | Rate of UTIs |
| Orthopedic surgery |  | Foley catheters | Post-operative urinary retention (POUR) |

PubMed

Intermittent catheter and indwelling catheter: 763 Articles

Intermittent versus indwelling catheterization: 46 Articles

urinary retention intermittent catheter hip surgery/Filters: Full text, publication dates: 10 years, Species: Humans: 2 Articles

CINAHL

Intermittent catheter and indwelling catheter: 65 Articles

We narrowed down our articles by choosing articles with the highest level of evidence, most recent, largest sample size, and articles that were specifically comparing the rate of urinary tract infection resulting from indwelling and intermittent catheterization. We make sure that the final articles include most of the PICO search terms. The selected articles will need to include intermittent and indwelling catheterization in the relevant patient population. The conclusion of the articles will also need to include the discussion of the outcome, such as UTI and POUR. The selected articles also have to be human studies,in English, and for adults. We also have difficulties finding articles of highest level evidence, and many relevant articles are too old to be use as recommendation and guideline. We ended up using 1 meta-analysis of RCTs, 1 RCT, and 2 cohorts.

**Articles Chosen for Inclusion:**

**[Indwelling versus Intermittent Urinary Catheterization following Total Joint Arthroplasty: A Systematic Review and Meta-Analysis.](https://www.ncbi.nlm.nih.gov/pubmed/26146830)**

**Zhang W, Liu A, Hu D, Xue D, Li C, Zhang K, Ma H, Yan S, Pan Z.**

**PLoS One. 2015 Jul 6;10(7):e0130636. doi: 10.1371/journal.pone.0130636. eCollection 2015. Review. PMID: 26146830**

Objective: The purpose of this study is to compare the rates of urinary tract infection (UTI) and postoperative urinary retention (POUR) in patients undergoing lower limb arthroplasty after either indwelling urinary catheterization or intermittent urinary catheterization.

Methods: We conducted a meta-analysis of relevant randomized controlled trials (RCT) to compare the rates of UTI and POUR in patients undergoing total joint arthroplasty after either indwelling urinary catheterization or intermittent urinary catheterization. A comprehensive search was carried out to identify RCTs. Study-specific risk ratios (RR) with 95% confidence intervals (CI) were pooled. Additionally, a meta-regression analysis, as well as a sensitivity analysis, was performed to evaluate the heterogeneity.

Results: Nine RCTs with 1771 patients were included in this meta-analysis. The results showed that there was no significant difference in the rate of UTIs between indwelling catheterization and intermittent catheterization groups (*P*>0.05). Moreover, indwelling catheterization reduced the risk of POUR, versus intermittent catheterization, in total joint surgery (*P*<0.01).

**Conclusion:** Based on the results of the meta-analysis, indwelling urinary catheterization, removed 24-48 h postoperatively, was superior to intermittent catheterization in preventing POUR. Furthermore, indwelling urinary catheterization with removal 24 to 48 hours postoperatively did not increase the risk of UTI. In patients with multiple risk factors for POUR undergoing total joint arthroplasty of lower limb, the preferred option should be indwelling urinary catheterization removed 24-48 h postoperatively.

### [Urinary retention in older patients in connection with hip fracture surgery.](http://web.a.ebscohost.com/ehost/viewarticle/render?data=dGJyMPPp44rp2%2fdV0%2bnjisfk5Ie46bdKsqqyS7Sk63nn5Kx95uXxjL6rrVGtqK5JtpavUq6ruEuuls5lpOrweezp33vy3%2b2G59q7Sbaptkuxrq9Krpzqeezdu33snOJ6u9nhhaTq33%2b7t8w%2b3%2bS7Sa6rrk6urrFPpNztiuvX8lXk6%2bqE8tv2jAAA&vid=14&sid=6fe3e60b-3d67-46e2-8720-49c4595503f0@sessionmgr4008)

***Detail Only Available* Academic Journal**

**(includes abstract) Johansson R; Christensson L; Journal of Clinical Nursing, Aug2010; 19(15/16): 2110-2116. 7p. (Journal Article - research, tables/charts) ISSN: 0962-1067 PMID: 20659191**

**Objective**. The aim of this study was to examine the presence of urinary retention in older patients with hip fracture and to describe what actions nurses performed to detect, prevent and treat urinary retention.

**Background.** The incidence of urinary retention in patients with hip fracture is described as being as high as 82% before surgery and 56% after. Urinary retention is traditionally treated with an **indwelling** urethral **catheter** or **intermittent** catheterisation. Urinary retention and treatment with an **indwelling** urethral **catheter** are associated with high risks.

**Design.** A prospective, descriptive study.

**Methods.** The study included 48 patients, 65 years or older who were recovering from hip fracture and receiving hospital care at a geriatric rehabilitation clinic. Six months before the study, a programme for the early detection, prevention and treatment of urinary retention was implemented. The presence of urinary retention, bacteriuria, the patient's cognitive function, use of ultra-sound bladder scan and type of treatment whether the patient suffered from urinary retention were examined during the study period. **Results**. Urinary retention was found in 18 (38%) of the patients. No patients were examined using ultrasound bladder scan according to the programme, and the mean time of **indwelling** urethral **catheter** was three times longer than the programme suggested. The patients who were treated with **intermittent** catheterisation had had voiding satisfaction earlier and had not had repeated urinary retention compared to patients with **indwelling** urethral **catheter**.

**Conclusion**. In most patients, the programme was not followed and urinary retention was commonly present. Relevance to clinical practice. There is knowledge on how to reduce the presence of urinary retention, but the great challenge is how to implement this knowledge.

[**Intermittent** versus **indwelling** urinary **catheterisation** in hip surgery patients: a randomised controlled trial with cost-effectiveness analysis.](https://www.ncbi.nlm.nih.gov/pubmed/23768410)

Hälleberg Nyman M, Gustafsson M, Langius-Eklöf A, Johansson JE, Norlin R, Hagberg L.

Int J Nurs Stud. 2013 Dec;50(12):1589-98. doi: 10.1016/j.ijnurstu.2013.05.007. Epub 2013 Jun 12. PMID:23768410

#### **BACKGROUND:** Hip surgery is associated with the risk of postoperative urinary retention. To avoid urinary retention hip surgery patients undergo urinary catheterisation. Urinary catheterisation, however, is associated with increased risk for urinary tract infection (UTI). At present, there is limited evidence for whether intermittent or indwelling urinary catheterisation is the preferred choice for short-term bladder drainage in patients undergoing hip surgery.

#### **OBJECTIVES:** The aim of the study was to investigate differences between intermittent and indwelling urinary catheterisation in hip surgery patients in relation to nosocomial UTI and cost-effectiveness.

#### **DESIGN:**Randomised controlled trial with cost-effectiveness analysis.

#### **SETTING:** The study was carried out at an orthopaedic department at a Swedish University Hospital.

#### **METHODS:** One hundred and seventy hip surgery patients (patients with fractures or with osteoarthritis) were randomly allocated to either intermittent or indwelling urinary catheterisation. Data collection took place at four time points: during stay in hospital, at discharge and at 4 weeks and 4 months after discharge.

#### **RESULTS:** Eighteen patients contracted nosocomial UTIs, 8 in the intermittent catheterisation group and 10 in the indwelling catheterisation group (absolute difference 2.4%, 95% CI -6.9-11.6%) The patients in the intermittent catheterisation group were more often catheterised (p<0.001) and required more bladder scans (p<0.001) but regained normal bladder function sooner than the patients in the indwelling catheterisation group (p<0.001). Fourteen percent of the patients in the intermittent group did not need any catheterisation. Cost-effectiveness was similar between the indwelling and intermittent urinary catheterisation methods.

#### **CONCLUSIONS:** Both indwelling and intermittent methods could be appropriate in clinical practice. Both methods have advantages and disadvantages but by not using routine indwelling catheterisation, unnecessary catheterisations might be avoided in this patient group.

**[Risk factors of postoperative urinary retention after hip surgery for femoral neck fracture in elderly women.](https://www.ncbi.nlm.nih.gov/pubmed/24215579)**

**Tobu S, Noguchi M, Hashikawa T, Uozumi J.**

**Geriatr Gerontol Int. 2014 Jul;14(3):636-9. doi: 10.1111/ggi.12150. Epub 2013 Nov 12.**

**PMID: 24215579**

**AIM:** The aim of the present study was to evaluate risk factors for postoperative urinary retention (POUR) in female patients with femoral neck fractures.

**METHODS:** We recruited 72 female patients (age 86.5 ± 6.7 years) from among 90 cases of hip surgery carried out between January and December 2011 at Goto Chuo Hospital. We evaluated the risk factors for POUR, including the administration of anticholinergic drugs, diabetes mellitus, preoperative dementia and/or delirium, neurological disorders, age, hypertension, overactive bladder, and the postoperative duration of the use of an indwelling urethral catheter using a multiple logistic regression analysis.

**RESULTS:** In the present study, POUR occurred in eight out of 72 cases (11.1%). The multivariate analysis showed that the indwelling period of the urethral catheter (per 1-day increase; P = 0.04, OR 0.33 95% CI 0.11-0.96), and preoperative dementia and/or delirium (P = 0.03, OR10.4, 95%CI 1.21-89.2) correlated with the occurrence of POUR. Diabetes mellitus (P = 0.78), anticholinergic agents (P = 0.23), neurological disorders (P = 0.83), age (P = 0.86), hypertension (P = 0.76) and overactive bladder (P = 0.34) did not significantly correlate with the occurrence of POUR.

**CONCLUSIONS:** The present study showed that the early removal of the urethral catheter, and preoperative dementia and/or delirium had significant correlations with POUR. The femoral neck fractures and the surgical procedure used for the hip surgery do not induce damage to the bladder and nerve system related to the voiding function, and the voiding function in all of the patients recovered after short-term intermittent catheterization. Physicians should not place permanent indwelling urethral catheters without carrying out urological assessments.

**Summary of the Evidence:**

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| **Author (Date)** | **Level of Evidence** | **Sample/Setting****(# of subjects/ studies, cohort definition etc. )** | **Outcome(s) studied** | **Key Findings** | **Limitations and Biases** |
|  Wei Zhang, An Liu, Dongcai Hu, Deting Xue, Chao Li, Kai Zhang, Honghai Ma, Shigui Yan, Zhijun PanPublished on 07/06/2015 |  Level 1, meta analysis and systematic review |  9 RCTs with 1771 patients: 870 in the indwelling and 901 in the intermittent |  Rate of UTI and postoperative urinary retention(POUR) in patients undergoing lower limb arthroplasty after indwelling or intermittent catheterization |  1) No significant difference was detected between the 2 groups [95%Cl (0.85, 1.76), P=0.268]. 2) No difference in risk of UTI between 2 groups [95%Cl, (0.7, 1.51), P=0.29]3) indwelling catheterization with removal 24-48 h postoperatively reduced risk of POUR compared to intermittent |  A small number of RCTs are included in this study.There is no precise definition of POUR. The study did not specify whether the other variables are consistent when comparing the 2 groups such as the use of opiates and antibiotics. |
|  Maria Halleberg Nyman, Margareta Gustafsson, Ann Languis-Eklof, Jan-Erik Johansson, Rolf Norlin, Lars Hagberg, 2013 | Level 2Randomised Control Trial  | 170 participants included , 85 intermittent catheterization, 85 indwelling catheterization. Patients post hip replacement for either osteoarthritis or hip fracture. | Rate of nosocomial UTIs contracted in both the indwelling and intermittent catheterized groups, time until regain of normal bladder function, number of intermittent catheterization, number of bladder scans to normal bladder function, and catheterization costs.  |  No significant difference was found in the occurrence of nosocomial UTIs in the two groups. Intermittent cathed regained bladder function after 24 hours while indwelling catheter patients regained bladder function after 48 hours. Those patients who contracted nosocomial UTIs had higher total costs as well as longer hospital stay. No statistically significant difference in costs between indwelling and intermittent catheterization was found.  | The sample size was small.No blinding was done for those analyzing the results.Study records the time needed to regain normal bladder function for intermittent catheters as 24 hours and indwelling catheters as 48 hours. It is unclear is this is the case because the indwelling catheters were placed for 48 hours regardless of bladder function.  |
| Rose-Marie Johansson and Lennart ChristenssonPublished on 08/2010    | Level 3, Prospective cohort , descriptive, study | A total of 48 patients, 36 were female, that were recovering from hip fracture surgery  | Urinary retention measured postoperatively in patients undergoing hip fracture surgery. Then treatment of reducing urinary retention using intermittent catheter versus indwelling urethral catheter is measured to stratify the risks and satisfaction of following certain guidelines, to manage secondary recurrences of UR and voiding satisfaction.  | 38% of patients had some sort of urinary retention. Of the 18 out of 48 patients, 20 were treated without an indications for indwelling urethral catheter. Intermittent catheter treatment did not cause a recurrence of urinary retention. Patients treated with intermittent catheter reported 100% voiding satisfaction within 24 hours. 9 Patients who were treated with Indwelling urethral catheter reported returned voiding satisfaction in 2-10 days post surgery, and 4 did not return any satisfaction during hospital stay.  | The programme was not followed through.Reporting bias because only 38% of patients were observed for urinary retention. Article does mention nurses did not report accurately.Management with ultrasound bladder scan of post-op UR reduced catheterization and UR rates. This is unclear because only 12 patients received initial u/s bladder scan upon admittance and it not indicated why the others were left out. It was unclear what level of post residual urine levels were defined as risky and thus harder to treat. Cognitive impairment common in hip fractures and thus mini mental exam performed. However, not being performed on the same day as the time of diagnosis can deter from the validity of the results. |
| Tobu S, Noguchi M, Hashikawa T, Uozumi J.; Published on 31 July 2014 | Level 3: A prospective, cohort descriptive study |  72 female patients between the ages of 80 - 93 who had hip surgery in the year 2011 at the Goto Chuo Hospital, Goto, Japan. There was no control group. | Rate of POUR in elder females who had hip surgery, after using indwelling catheterization.  | The duration of indwelling catheter correlated with the incidence of POUR. There is a significant correlation between POUR and early removal of indwelling catheter. | No previous urinary issues before admission, but also no “voiding dysfunction” test was carried out before the operation, to find out any preoperative bladder issues with the patients.The sample size is too small to have strong conclusion about the usage of intermittent and indwelling catheterization post-op orthopedic patient.  |

**Conclusion(s):**

Indwelling catheterization is superior in preventing POUR (postoperative urinary retention) when compared with intermittent catheterization. However, the result of the meta-analysis shows that there is no significant difference in the risk of UTI when comparing the two groups. For the cohort studies, the use of intermittent catheter is suggested as a better alternative to indwelling catheter, but these studies were based on samples less than 100 people each. We will be following the recommendation from the meta-analysis because higher level of evidence is more persuasive and reliable. It is also the most recent and includes a larger sample size compared to the other studies. Further search is also needed because not many recent and relevant articles can be found. More research should have be done to compare the rate of UTI between indwelling and intermittent catheter after post-orthopedic surgery.

 **Clinical Bottom Line:**

According to the most recent evidence based medicine, our recommendation to the chief of the service is to continue using indwelling catheters for post-op orthopedic patients who cannot use bedpan.