



**衛生防護中心**  
Centre for Health Protection

# **Recommendations on Prevention of Catheter-associated Urinary Tract Infection**

**Scientific Committee on Infection Control, and  
Infection Control Branch, Centre for Health Protection,  
Department of Health**

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## **Background**

The Recommendations on Prevention of Catheter-associated Urinary Tract Infection (CAUTI) represent the third accomplishment of The Scientific Committee on Infection Control (SCIC) in the promulgation of preventive measures for the four major systems - namely, surgical site infection, intravascular catheter associated bloodstream infection, ventilator-associated pneumonia and catheter-associated urinary tract infection. It is believed that the recommendations presented in this report will provide guidance on good practice for the prevention of Catheter-associated Urinary Tract Infection, which would ideally set the standard of care in Hong Kong.

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## Introduction

Urinary catheter is a commonly used device for different patients in various healthcare settings. Their use may put patients at increased risk of urinary tract infection. Indwelling urinary catheter, as a foreign body, allows bacteria to colonize and enter the body. The rate of acquisition of bacteriuria is approximately 5% per day with an indwelling urinary catheter. (1) The longer the catheter is in place, the greater the risk of developing catheter-associated urinary tract infections (CAUTIs). CAUTIs account for a significant proportion (up to 30-40%) of healthcare-associated infections which in turn may have great financial impact to the healthcare system. (6-8)

2. The most effective strategy to prevent CAUTI is prompt removal of unnecessary urinary catheter. If the use of catheter is deemed necessary, care should be taken to minimize unnecessary manipulation, prevent trauma and maintain the system close and patent. Further well-designed studies are needed to generate high quality evidence. (2-5)

3. This recommendation provides the principles for best practice of urinary catheter care to healthcare professionals. It can serve as a model in formulation of strategies, programmes and plans for prevention of CAUTIs in individual institutions.

## **1. Education, Training and Competence Assessment**

- 1.1. Educate staff on the preventive measures of catheter-associated urinary tract infections (CAUTIs) in the orientation program and the in-service refresher training. (7, 9-13)
- 1.2. Ensure health care personnel, who involve in urinary catheter care, are trained and competent to perform the procedure with aseptic technique. (7, 9-13, 15, 16)
- 1.3. Keep an updated written Standard Operating Procedures (SOP) on urinary catheter care. (10, 13, 17)
- 1.4. Provide clear instruction to patients and carers on proper care of urinary catheter and drainage system. (12, 18)

## **2. Avoid Unnecessary Urinary Catheterization**

- 2.1. Limit the use of indwelling urinary catheter to patients with strong clinical indication and that the benefits outweigh the risks of CAUTI and its complications. (7, 15 -23)
- 2.2. Do not use indwelling urinary catheter for the following purposes: (15)
  - 2.2.1. as a means to obtain urine specimen when the patient can void voluntarily.
  - 2.2.2. as a substitute for nursing care in incontinent patients.
- 2.3. Restrict the use of indwelling urinary catheter for the following purposes: (7, 10, 11, 18, 24)
  - 2.3.1. to relieve urinary obstruction
  - 2.3.2. to monitor urine output in critically ill patients
  - 2.3.3. to aid in urologic surgery
  - 2.3.4. in urinary incontinent patients with open wound in sacral or perineal area
  - 2.3.5. in terminally ill patients, as request for comfort care
- 2.4. Consider use of alternative methods with lower infection risk such as suprapubic catheterization, condom catheter, intermittent urethral catheterization or use of disposable nappies as far as possible in appropriate patients. (7, 10, 12, 15-23)
- 2.5. Evidence has shown that use of bedside ultrasound to assess post-voiding residual volume can prevent a significant proportion of patients from unnecessary catheterization. (7, 10) Efforts should be initiated to train doctors and nurses to use bedside ultrasound.

### **3. Shorten the Duration of Indwelling Urinary Catheterization**

Establish a system to ensure the urinary catheter is removed promptly when it is no longer indicated. (7, 8, 10-12, 15, 16, 19, 21, 24-27)

- 3.1. Develop criteria for indications of continuous urinary catheterization (7, 10)
- 3.2. Document the indication clearly.
- 3.3. Assess and document the indication for continuous urinary catheterization on daily basis. (7, 10) Renewal order is required for continuous catheter use. (7, 10)
- 3.4. Empower nurses to remove the catheters if it is no longer indicated. (7, 10)
- 3.5. Consider use of automatic urinary catheter stop order whenever applicable. (7, 10)
- 3.6. Every renewal of catheter must be documented in the patient's records. (7, 10)

### **4. Proper Hand Hygiene and Using of Gloves**

- 4.1. Perform hand hygiene immediately before and after urinary catheter care. (7, 9, 11, 15, 18)
- 4.2. Wear gloves when there is potential risk of body fluid contamination. (7, 12, 15, 17)
- 4.3. Change gloves between patients to prevent cross-infection. (17, 18)

### **5. Aseptic Urinary Catheter Insertion**

- 5.1. Ensure the catheter is inserted by trained and competent persons (e.g. health care workers, family members or patients). (13, 15, 16, 18, 21, 23)
- 5.2. Maintain aseptic technique for catheter insertion. (10, 11, 15, 16, 18)
- 5.3. Use sterile equipment and supplies: use single-use packet of sterile lubricant jelly, sterile urinary catheter, sterile gloves and sterile drape. (7, 10, 13, 15, 16) Do not sterilize used urinary catheters for re-use. (13)
- 5.4. Use appropriate antiseptic solution to clean the peri-urethral skin thoroughly before insertion. (7, 10, 11, 15, 16)
- 5.5. Minimize the risk of urethral trauma
  - 5.5.1. Use the smallest possible size, good drainage urinary catheter unless otherwise clinically indicated. (10-12, 15, 17, 18, 28)

- 5.5.2. Apply adequate lubricant on the catheter before insertion. (10-12, 15, 17, 18, 28)
- 5.5.3. Ensure the catheter is always firmly secured to prevent in-and-out movement and urethral traction. (7, 10, 15, 23, 29, 30)

## **6. Maintain Unobstructed Urine Flow**

- 6.1. Prevent kinking or sagging of the urinary catheter to ensure unobstructed flow of urine. (7, 9, 11, 15)
- 6.2. Prevent retrograde flow of urine from collection bag to the bladder.
  - 6.2.1. Keep the drainage bag below the level of bladder. The outlet should never rest on the floor. (7, 9, 12, 15)
  - 6.2.2. Clamp the drainage tube before raising the drainage bag above bladder level. (13)
  - 6.2.3. Do not allow the drainage bag to be overfilled. (7, 12, 14)

## **7. Maintain a Sterile and Closed Urinary Drainage System**

- 7.1. Minimize opening and manipulating the catheter and the drainage system. (7, 10-12, 15, 16, 18, 21)
- 7.2. Do not re-use the drainage bag. (13)
- 7.3. During emptying the drainage bag:
  - 7.3.1. Use a designated urine-collecting container for each patient. Disinfect the container and keep it dry after each use. (7, 11-14, 31)
  - 7.3.2. Perform hand hygiene and wear clean gloves for the procedure. (12-14) Gloves should be removed and hand hygiene should be performed immediately afterwards. (12)
  - 7.3.3. Disinfect the outlet of the drainage bag with alcohol before and after each opening. (9, 14)
  - 7.3.4. Prevent the outlet of drainage bag from touching the collecting container while emptying. (7, 14, 15)
- 7.4. Changing of urinary bag:
  - 7.4.1. Change the urinary drainage bag in line with manufacturer's recommendation and when the urinary catheter is changed or the bag leaks (19)
  - 7.4.2. Follow manufacturer's recommendation on changing of catheter valve. (14)
  - 7.4.3. Disinfect the catheter-tubing junction before disconnecting the drainage system. (11)

## 8. Individualized Catheter Change Intervals

- 8.1. Do not change the urinary catheter at routine, fixed intervals for all patients. (7, 11, 12, 15) The optimal time for changing catheter depends on the manufacturers' instructions and patients' characteristics. Some patients form deposit in the catheter lumen quicker than others and they may require earlier catheter change. (13, 14, 32) It is preferable to change the catheter before blockage is anticipated to occur. (14, 17, 33)
- 8.2. Replace the catheter whenever it is contaminated, e.g. accidental opening. (23)

## 9. Good Meatal Care

- 9.1. Use soap and water for the daily cleansing of the meatal area to maintain good catheter-urethral interface hygiene. (7, 11, 13, 34)
- 9.2. Keep peri-urethral area clean and dry. (13)
- 9.3. Remove gross debris from the catheter tubing during bathing or showering. (7, 12, 14, 16)
- 9.4. Additional cleansing is indicated for patients with diarrhoea or incontinence. (21)

## 10. Aseptic Urine Specimen Collection

- 10.1. Apply aseptic technique; perform hand hygiene and wear clean gloves for the procedure. (7, 14)
- 10.2. To collect small volume urine sample or urine for culture:
  - 10.2.1. Disinfect the sampling port or distal end\* of the urinary catheter with appropriate disinfectant (70% alcohol) and allow time (>30 seconds) for the disinfectant to work before puncture. (9, 10, 13)  
\* Never puncture silicone urinary catheter with a needle as it cannot reseal over the puncture holes. (23)
  - 10.2.2. Use sterile small size syringe to aspirate urine. (11, 13, 15)
- 10.3. Follow point 7.3 aseptic procedures for collecting large volume urine sample from urinary drainage bag, e.g. urine electrolytes analysis. (9, 11, 15) However, urine sample from the drainage bag is unsuitable for culture purpose.
- 10.4. In patients with chronic indwelling catheter suspected to have UTI, urine specimen for culture should be obtained from a newly inserted catheter (not the catheter port) prior to initiating antimicrobial therapy. (14, 20)

## 11. Avoid Bladder Washout

- 11.1. Do not perform bladder washout or irrigation as a means to prevent infection. (7, 11-15)
- 11.2. Remove and replace a blocked catheter rather than attempting bladder washout. (13-15)
- 11.3. When bladder irrigation is necessary, e.g. prevention of blood clots formation after bladder or prostate surgeries:
  - 11.3.1. Perform the procedure in a closed irrigation and drainage system with a three-way catheter to decrease the frequency of opening. (11)
  - 11.3.2. Use sterile irrigation solution and administration set.
  - 11.3.3. Manipulate the system with aseptic technique. Before each change or disconnection, thoroughly disinfect the junction with alcohol and allow it to dry. (11)
- 11.4. Ensure adequate hydration in patients with indwelling catheter to dilute the urine and make it acidic to prevent or dissolve the encrustation. (14)

## 12. Use of Antimicrobial Agents

- 12.1. Routine prophylactic antibiotics for urinary catheterization is not recommended (10, 17), as it increases the risk of emergence of resistant bacteria unless otherwise clinically indicated. (10, 17)
- 12.2. Routine use of antibiotics for asymptomatic catheter-associated bacteriuria is not recommended, unless in high risk patients such as pregnant women. (23, 28, 35)
- 12.3. Routine application of topical antibiotics to the catheter, urethra or meatus is not recommended. (17)
- 12.4. Addition of antibacterial solutions to drainage bags is not recommended. (17, 34)
- 12.5. Use of antimicrobial impregnated or antiseptic coated urinary catheter as an infection preventive measure is not routinely recommended. (17, 34, 36, 37)
- 12.6. Use of antimicrobial impregnated or antiseptic coated urinary catheter should be considered if the CAUTI rate is not decreasing after implementing a comprehensive strategy to reduce rates of CAUTI. (4, 15)

Silver alloy catheters were found to significantly reduce the incidence of asymptomatic bacteriuria in hospitalized adults catheterized for 2-10 days in some studies. (4, 38-40)

### **13. Documentation and Monitoring**

13.1. Maintain proper documentation on the need for urethral catheterization, insertion, care and removal. (7, 10, 18, 19)

13.2. Monitor patients' signs and symptoms of urinary tract infection.

### **14. Surveillance and Quality Improvement Programs**

14.1. Maintain a surveillance system to monitor the symptomatic catheter-associated urinary tract infection. Rates should be reported as per 1,000 catheter-days. (7, 18, 20)

14.2. Routine bacteriologic monitoring in catheterized patients is not recommended as an infection control measure. (11, 15, 16, 35)

14.3. Regularly feedback the performance measures (e.g., compliance) and surveillance results to the hospital or nursing management as well as to frontline staff. (7, 10, 14, 41, 42)

Performance measures include:

14.3.1. Compliance with documentation of catheter insertion & removal date.

14.3.2. Compliance with documentation of indication for catheter placement.

14.3.3. Compliance with the standard procedure.

14.4. Continue identify the chances of quality improvement on CAUTI. (2, 7, 10, 14, 18, 43)

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## **Hong Kong Bundle to Prevent CAUTI**

1. The indication for urinary catheter needs to be reviewed daily
2. Empower nurse to stop catheter when no longer indicated
3. Implement auto-stop reminder whenever applicable
4. Perform hand hygiene before and after urinary catheter care
5. Consider using bedside ultrasound to screen for post-voiding residual urine volume before insertion of catheter in selective group of patients