

# **PICU Urinary Catheter Insertion & Care Guideline & Bundles**

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## **Introduction**

Background: Urinary catheterisation is the insertion of a catheter into the bladder, using aseptic technique, for the purpose of evacuating or instilling fluids.

Urinary catheterisation is one of the commonest interventions in an acute hospital setting especially in the intensive care setting. However, urinary catheterisation is not without clinical risks. Catheter related UTI are one the most common causes of Health-care associated infection (HAI). This can lead to prolonged hospital stay, significant morbidity, mortality and financial burden. This can be minimised by introduction of a comprehensive urinary catheter care bundle which includes limiting urinary catheterisation to limited indications, urinary catheter insertion by completely aseptic methods by a trained skilled person, reviewing the need to continue catheter on a daily basis and appropriate care of the urinary bag, catheter and local area.

## **Education & Training**

All the staff involved in insertion and care of urethral catheterisation should be properly trained and re-assessed at frequent interval.

## **Catheterisation policy**

### **Assessing the need for catheterisation**

Urinary catheterisation should be used only when there is a clear clinical indication but not for the sake of convenience. Caution should be exercised in patients who have a history of:

- urethral stricture
- urethral injury
- 'false passage'
- recent surgery on bladder neck or urethra
- suspected UTI

### **Indications for catheterisation:**

- Urinary retention
- Pre and post-operative bladder drainage
- Bladder drainage as a result of obstruction  
e.g. Urethral abnormality or trauma, blood clots
- To measure the residual volume of urine
- For investigations  
e.g. Sterile urine specimen or urodynamic studies
- Measurement of urinary output in critically ill patients

Consent with parents/ carers should be taken and possible complications to be discussed.

Once a catheter has been inserted following documentation must be recorded in the patient's notes:

- Indication (s) for catheterisation and who decided
- Person inserting the catheter
- Date and time of catheterisation
- Catheter type, make, length and size
- Amount of water instilled in the balloon
- Batch number, manufacturer
- Problems encountered during procedure
- Date to review need for catheter or date of catheter change
- Volume of urine drained after catheterisation
- Date & time of removal

## Selection of catheter type and size

(Charriere gauge or Ch; also known as French or F)

- Use the smallest gauge catheter that will allow adequate urinary drainage
- Use a silicone catheter for long term use and those with a latex allergy
- See **appendix 1** for an approximate size guide

Smaller gauge catheters minimise urethral trauma, mucosal irritation and residual urine volumes compared to larger diameter ones which are likely to predispose to UTI.

Teflon coated latex catheters are used for short term ( $\leq 28$  days) and hydrogel coated latex or 100% silicone catheters for long-term use ( $\leq 12$  weeks). Silicone catheters have larger lumens and therefore are useful for patients who have frequent blockages and for those who have a latex allergy.

### Catheter insertion using aseptic non-touch technique (ANTT)

When undertaking any invasive procedure it is important that all the necessary equipment is gathered before commencing. The catheterisation procedure is detailed in **appendix 2**

Please note: Use sterile water for the catheter balloon. Do not use saline or blood stained fluid.

### Urinary Catheters & ECMO

Accurate fluid balance is essential in critically ill patients requiring ECMO. Ideally, a urinary catheter should be inserted prior to anticoagulation but if this is not possible, insertion whilst on ECMO should be performed by an experienced individual to minimise trauma. Urinary catheters should not routinely be removed whilst anticoagulated and receiving ECMO therapy due to the risks of bleeding associated with either removal or potential reinsertion if required.

## Maintenance of the urinary catheter system

- **Review the need for a catheter daily** and remove at the earliest opportunity
  - Record this review on the urinary catheter care pathway chart – see appendices
- **Maintain free urinary flow at all times** e.g. ensure there are no kinks
  - Position the catheter to prevent backflow of urine
- **Do not** routinely change indwelling catheters or drainage bags
  - Change based on infection, obstruction, contamination or manufacturers instructions
- **Do not** break into the urinary drainage system unless absolutely necessary
- **Do not** use routine systemic antibiotics to prevent CAUTI
- **Do not** irrigate/flush the catheter if possible
  - Use a bladder scanner if obstruction is suspected
  - Consider removing/changing the catheter rather than flushing it if possible
- Infection Prevention
  - Wear a plastic apron, wash hands, use gloves and swab the outlet tap before accessing the circuit (70% alcohol, 2% chlorhexidine swabs)
  - Wash/gel hands after removing gloves
- **Do not** clean the peri-urethral area with antiseptics but do use warm soapy water at least once a day
- Empty the catheter drainage system at least twice a day or before  $\frac{3}{4}$  full
  - Avoid contact between the drainage tap and the collecting container
- Drainage bags should be **below the bladder and NOT touching the floor** at any time

## Sampling

There is no benefit from routine screening as asymptomatic bacteriuria is not uncommon and does not require any treatment.

Urine for urinalysis or culture should be freshly collected from the sampling port of the catheter tubing (not the drainage bag) or the hard plastic meter tap if there is no catheter sampling port. Do not disrupt the closed urinary drainage system if possible, as the integrity of this along with minimising the duration the catheter is in situ have been shown to be the two main risk factors for catheter associated urinary tract infection.

- Ensure hands are washed and a plastic apron and sterile gloves are worn
  - Whilst non-sterile gloves can be worn for emptying the drainage bag, **sterile gloves must be worn when collecting samples** and accessing the catheter
- Maintain the integrity of the closed urinary drainage system
- Ensure that in handling the catheter and drainage system, no urine drains back towards the patient
- **Clean the port with a sterile swab containing 70% alcohol and 2% Chlorhexidine both before and after accessing the system**

## Use of bladder scanners

The presence of urine in the bladder would indicate a potentially blocked catheter that either needs removing or could be flushed with saline. The absence of urine would suggest intravascular hypovolaemia or renal failure and would warrant assessment of hydration and consideration of further fluid administration.

Bladder scanners can also be used to help with assessing bladder volume and the degree of retention in a non-catheterised patient.

## Audit

Insertion bundle compliance

Care bundle compliance – monthly rolling audit

Number of CAUTIs per 1000 catheter days

Screening for asymptomatic bacteriuria is NOT RECOMMENDED

Insertion Bundle Elements (Also see appendices)

1. Insertion sticker/documentation in the medical notes
2. Date catheter inserted recorded
3. Type of catheter documented including the size
4. Volume of sterile water in the balloon documented
5. Non-touch sterile technique employed

Care Bundle Elements (Also see appendices)

1. Daily catheter care chart completed
2. Daily consideration of removal documented
3. Drainage bag below the level of the bladder but off the floor
4. Maintenance of a closed system
5. The catheter is secured so there is no traction on the catheter

**APPENDIX ONE**

Age	Weight	Foley
Neonate	< 1200g	3.5Fr umbilical catheter
Neonate	1200-1500g	5Fr umbilical catheter
Neonate	1500-2500g	5Fr umbilical catheter or size 6 Foley
0-6 months	3.5-7kg	6
1Y	10kg	6-8
2Y	12kg	8
3Y	14kg	8-10
5Y	18kg	10
6Y	21kg	10
8Y	27kg	10-12
12Y	Varies	12-14

## APPENDIX TWO

### Procedure for urethral catheterisation

- Explain the procedure to the patient/family and gain their consent
- Assist/move the patient into an appropriate supine position
- Wash hands and wear a disposable plastic apron
- Open a dressing pack and slide it onto the top of a clean trolley
- Place a conti-sheet under the patient's buttocks and thighs
- Clean hands with alcohol hand gel
- Put on sterile gloves
- Open the 0.9% sodium chloride solution and empty into the sterile pot
- Place the sterile paper over the patient's thighs to create a sterile field
  
- **For male patients**, wrap a gauze swab around the penis and retract the foreskin if necessary. Clean with swabs soaked in 0.9% sodium chloride solution using single strokes away from the meatus
- Change your gloves
- Grasp the penis behind the glans and extend upwards. Maintain extension throughout the procedure. Do not force the foreskin back.
- Place the **pre-connected** catheter bag on the sterile field
- Instil the 1% lignocaine lubricant to the area around the urethral meatus and the catheter – wait for 30-60 seconds for it to work before proceeding
- Holding the catheter through the packaging gently insert the catheter using a slow steady pressure until urine flows. It is sometimes helpful to extend the penis toward the toes when passing through the first sphincter. **DO NOT** use force.
  
- **For female patients**, use a gauze swab to separate the labia minora to visualize the urethral meatus. Clean with swabs soaked in 0.9% sodium chloride solution using *single* downward strokes away from the meatus (front to back)
- Change your gloves
- Instil the 1% lignocaine lubricant to the area around the urethral meatus and the catheter – wait for 30-60 seconds for it to work before proceeding
- Place the **pre-connected** catheter bag on the sterile field
- Holding the catheter through the packaging gently insert the catheter using a slow steady pressure, into the meatus, upward at ~ 30° angle until urine flows
  
- Inflate the catheter balloon slowly using the syringe of sterile water observing the patient for discomfort – the volume of sterile water to use is detailed on the catheter packaging. **ALWAYS** ensure urine is flowing before inflating the balloon.
- Withdraw the catheter gently
- Clean away any excess lubricant and if applicable, reduce or reposition the foreskin.
- Remove the sterile field
- In preparation for stabilizing the catheter fully extend the leg and position the catheter straight on the front of the thigh. Then back the catheter up a couple of centimetres to create some slack but not so much that it can kink.
- Position the catheter bag below the bladder either on a stand ensuring that the drainage port is not in contact with the floor
- Dispose of all equipment in the clinical waste bag in line with local procedure
- Perform hand hygiene
- Measure the residual urine and document the procedure in the patient's records

## APPENDIX THREE

### Troubleshooting (problem management):

This is summarised in the table below:

#### Problem

	<b>Cause</b>	<b>Suggested action</b>
1. Urinary tract infection introduced during catheterisation	Inadequate ANNT and /or urethral cleansing. Contamination of catheter tip	Manage and treat immediate symptoms, inform medical staff. Obtain a CSU and send for culture. Treat UTI
2. Urinary tract infection introduced via the drainage system	Inappropriate handling of equipment. Breaking the closed system	As above
3. Urethral/prostatic trauma	Incorrect size or positioning of catheter. Poor insertion technique. Creation of false passage during catheter insertion	Check catheter drainage system and re-position as necessary. Re-catheterise patient with correct size catheter Remove catheter if it is not draining urine and seek medical advice
4. Inability to tolerate indwelling catheter	Urethral and/or bladder mucosal irritation	Use catheter support device to prevent catheter pulling Consider changing catheter to 100% silicone if latex allergy is suspected Consider prescription of anticholinergic medication
5. Inadequate drainage of urine	Kinked drainage tubing	Ensure free flow of urine DO NOT AUTOMATICALLY FLUSH THE CATHETER Check for kinks or obstruction Ultrasound scan the bladder to ensure it contains urine Reassess volume status of the patient – do they need more fluid? Can the catheter be removed/changed? ONLY flush the catheter once ALL of the above have been assessed
6. Blocked tubing with blood clots or debris		Irrigation should be commenced with saline

## APPENDIX FOUR

### CAUTI – Definition

All patients with a positive urine culture who did not have evidence of urinary tract infection when inserted or for the first 48 hours the catheter is in situ. This includes urinary tract infections isolated within 48 hours of catheter removal.

- **Criteria 1**

Must also have one of the following;

Fever  $>38^{\circ}\text{C}$

Suprapubic tenderness

Costovertebral angle pain or tenderness

#### AND EITHER

A positive urine culture of  $\geq 1 \times 10^5$  colony-forming units (CFU)/ml with no more than 2 species of microorganism

**OR**

A positive urine culture of  $\geq 1 \times 10^3$  and  $\leq 1 \times 10^5$  colony-forming units (CFU)/ml with no more than 2 species of microorganism

**WITH**

At least 1 of the following;

A positive dipstick for leucocytes and/or nitrites

Pyuria (Urine with  $\geq 10 \text{ wbc/mm}^3$  unspun urine or  $\geq 5 \text{ wbc/mm}^3$  high power field of spun urine)

Microorganisms seen on Gram's stain of unspun urine

- **Criteria 2**

Patient  $< 1$  year of age with at least one of the following;

Fever  $>38^{\circ}\text{C}$  or hypothermia  $<36^{\circ}\text{C}$

Apnoea

Lethargy

Bradycardia

Vomiting

Dysuria

} With no other recognised cause

#### AND EITHER

A positive urine culture of  $\geq 1 \times 10^5$  colony-forming units (CFU)/ml with no more than 2 species of microorganism

**OR**

A positive urine culture of  $\geq 1 \times 10^3$  and  $\leq 1 \times 10^5$  colony-forming units (CFU)/ml with no more than 2 species of microorganism

**WITH**

At least 1 of the following;

A positive dipstick for leucocytes and/or nitrites

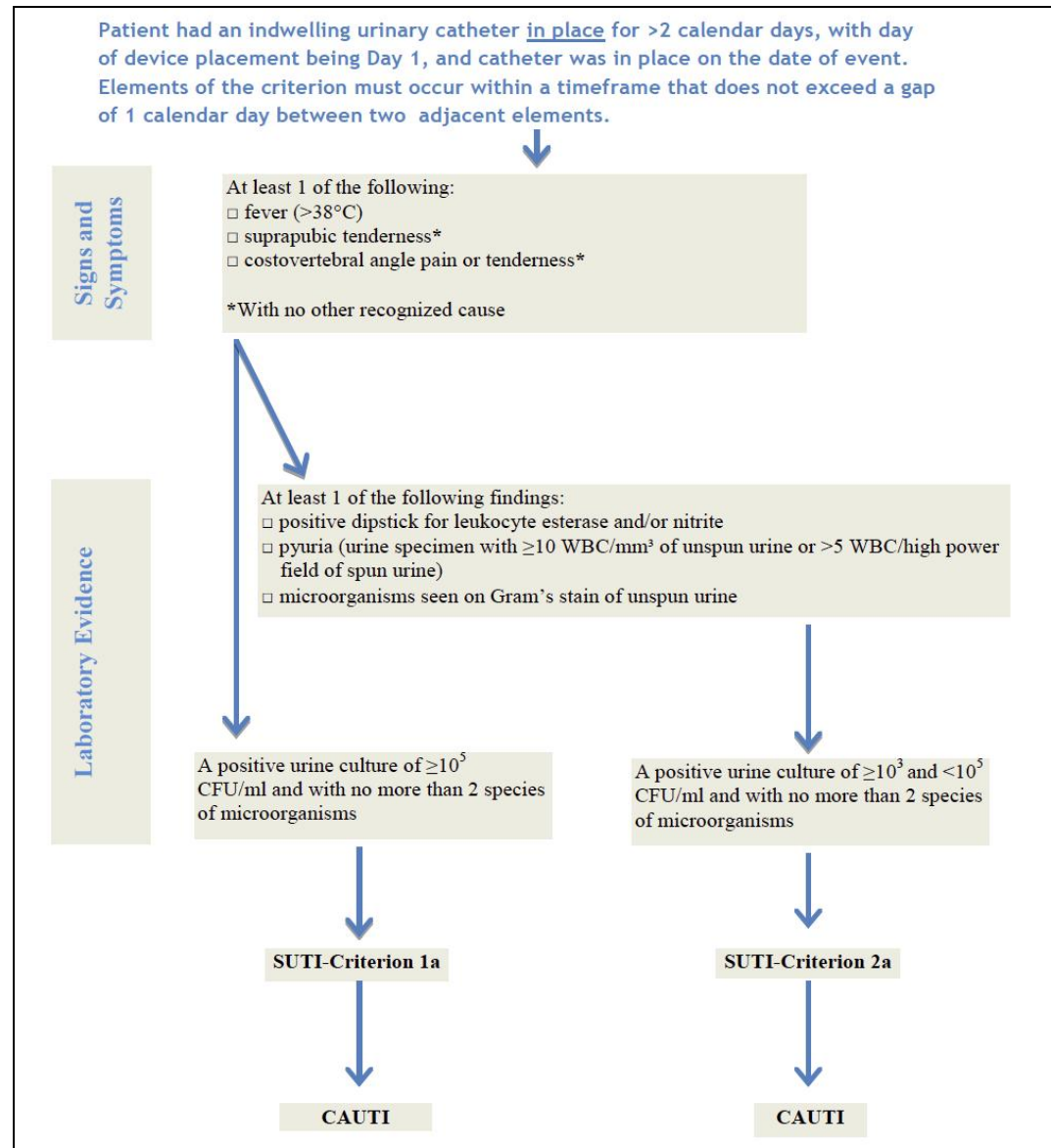
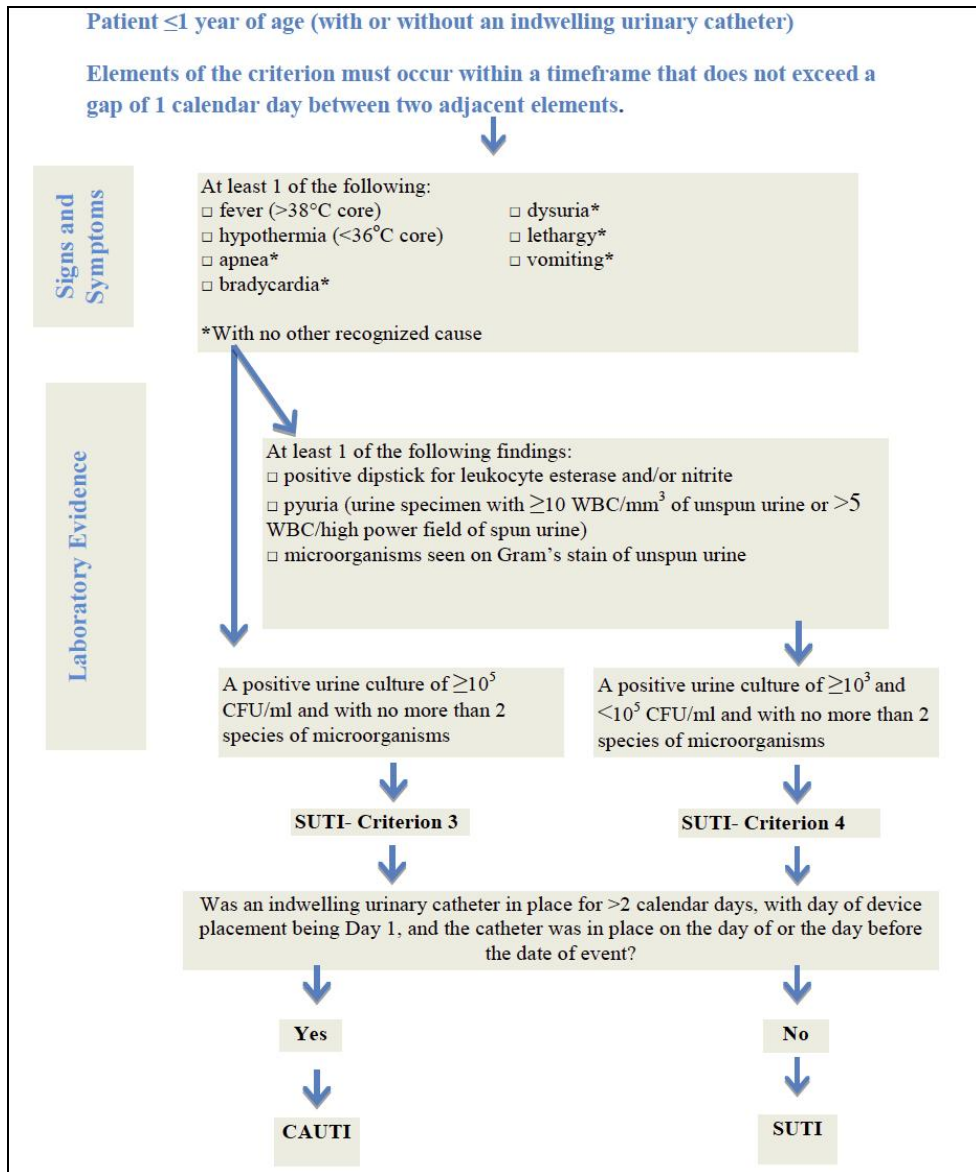
Pyuria (Urine with  $\geq 10 \text{ wbc/mm}^3$  unspun urine or  $\geq 5 \text{ wbc/mm}^3$  high power field of spun urine)

Microorganisms seen on Gram's stain of unspun urine

Note: Elements of the criteria must occur within 24 hours of each other to be included



## APPENDIX FOUR



## Urinary Catheter INSERTION Bundle

	Urinary Catheter Insertion Standard	Yes	No	Comment
1	Have alternatives to urinary catheterisation been considered and documented?			
2	Is the clinical reason for insertion specified and documented?			
3	Is the healthcare worker trained in catheterisation or supervised by a trained person?			
4	Is the smallest gauge catheter used for effective drainage?			
5	Is hand hygiene performed before urinary catheterisation?			
6	Is a single use apron worn for urinary catheterisation?			
7	Are single use sterile gloves worn for the aseptic procedure?			
8	Is the urethral meatus area cleaned with sterile normal saline prior to urinary catheterisation?			
9	Is asepsis maintained throughout the procedure?			
10	Is sterile, single use lubricant used prior to insertion?			
11	Is the catheter connected aseptically to a sterile closed drainage system?			
12	Is the urinary catheter bag positioned below the level of the bladder for effective drainage?			
13	Is waste discarded into the appropriate waste stream according to local policy?			
14	Is all personal protective equipment removed?			



# Urinary Catheter Care Pathway

## Details:

Date of Insertion: ..... Operator: .....

Reason for Insertion: .....

Catheter Type: Long Term / Short Term (Circle as appropriate)

Catheter Type/Make/Length/Size: .....

Volume of Sterile Water in Balloon: .....

Is a green insertion sticker in the notes? Yes / No / Catheterised Outside UHL

## Continuing clinical indication

- A urinary Catheter is a clinical need
- If not required then the catheter should be removed at the earliest opportunity
- This needs reviewing and documenting daily

## Catheter Care

- A wash should be completed once in 12 hours in the nappy region ensuring the catheter itself is clean – use warm soapy water, not antiseptics
- Soiled nappies should be changed immediately taking care that the catheter itself is clean
- Ensure the catheter is secure to prevent it dislodging with balloon inflated causing trauma

## Closed Bag System

- **Do not** routinely change indwelling catheters or drainage bags
  - Change based on infection, obstruction or contamination
- **Maintain free urinary flow at all times** e.g. ensure there are no kinks
- **Do not** irrigate/flush the catheter if possible
  - Use a bladder scanner if obstruction is suspected
  - Consider removing/changing the catheter rather than flushing it if possible
- Drainage bags should be **below the bladder and NOT touching the floor** at all times

## Access

- Infection Control
  - Wear a plastic apron, wash hands, use gloves and swab the outlet tap before accessing the circuit (70% alcohol, 2% chlorhexidine swabs)
  - Wash/gel hands after removing gloves
- Empty the catheter drainage system when  $\frac{3}{4}$  full or every 4 hours (whatever occurs first)
  - Avoid contact between the drainage tap and the collecting container
  - Samples should be taken from the hard plastic meter port, not the drainage bag

Place Patient Label Here



Date	Time	Days Catheter in situ	Catheter Needed (Y/N)	Catheter Care Performed	Catheter Positioned Correctly	Aseptic Sample Taken	Catheter Bag Changed	Signed
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		9						
		10						
		11						
		12						
		13						
		14						

## APPENDIX EIGHT

### Background behind 'Maintenance of the Urinary Catheter System'

Review of whether there is a continuing need for the catheter should be carried out on a daily basis by the patient's medical team as the presence of a urinary catheter and the duration of its insertion are contributory factors in the development of UTI. The risk of acquiring a catheter-associated infection (CAUTI) increases by 5-8% per day. Bacteriuria is virtually inevitable as bacteria can gain access to the bladder extra-luminally (during catheterisation procedure), intra-luminally (by migration within the catheter lumen from the drainage bag or catheter-drainage tube junction) and extra-luminally (via the mucus film adherent to the external catheter surface). Removal of the catheter should be done as soon as it is no longer needed but if it is needed for a longer period of time then a catheter that is designed for long-term use should be selected. The reason for extended catheter use should be documented in the patients' medical notes.

The urinary drainage system must be kept closed to the external environment to remain sterile. In an open system the frequency of infection is as high as 97% (EPIC2 guidelines) Breaches of the closed system are likely to increase the risk of infection and should be avoided.

When manipulating the drainage system, a plastic apron must be worn, the hands should be decontaminated and clean non-sterile gloves should be worn. The hands must be cleaned after the gloves have been removed. Catheters should be positioned to prevent backflow of urine. This means that the catheter drainage bag must be positioned below the bladder on a suitable stand with the drainage tap clear of the floor. Hands must be cleaned and gloves worn before emptying a urine drainage bag. Sterile swabs containing 70% alcohol and 2% Chlorhexidine should be used to decontaminate the outlet tap before and after emptying the bag.

The tap should be completely emptied to minimise the build up of organisms at the tap outlet. After emptying the drainage bag, gloves should be removed and hands decontaminated with soap and water before emptying any further urinary drainage bags or performing other duties

Urinary drainage bags and catheters should only be replaced when there is a clinical need i.e. catheter blockage, leakage, UTI, or when specified by the catheter manufacturer which in most cases is every 5-7 days. The addition of antimicrobials and/or disinfectants to drainage bags does not reduce the incidence of bacteriuria and is not recommended. The connection between the catheter and the drainage bag should not be broken without a good reason i.e. changing the drainage bag according to the manufacturer's instructions. If a urine sample is required it should be taken from a sampling port using aseptic technique. Paediatric catheters do not tend to have sampling ports, in which case, the drainage port closest to the patient should be used.

Meatal hygiene with antiseptic solutions is not recommended because it does not reduce the frequency of bacteriuria compared with routine daily bathing. Bladder irrigation, instillation or washout with antiseptic agents does not reduce the frequency of catheter-associated infections. Many agents have toxic effects on the bladder mucosa and may contribute to the development of resistant organisms. Bladder irrigation, instillation and washout are therefore not recommended for the prevention of infection and may actually increase the risk due to introduction of organisms. Bladder irrigation is occasionally but

rarely necessary and should be with 0.9% saline. An example of when it is needed is following urological surgery to prevent catheter blockage with clots.

### **Use of antibiotics**

Long-term antibiotic prophylaxis is ineffective and should not be used. Treatment of asymptomatic bacteriuria is also not indicated in catheterised patients. Patients should be treated with antibiotics only if there is clinical evidence of infection i.e. the patient is febrile, has a raised white cell count and has proven bacteriuria. If treatment of a urinary tract infection is required the catheter must be changed and if possible removed. Removal of a urinary catheter is often sufficient to eliminate bacteriuria without the need for antibiotic treatment.

The use of prophylaxis in catheter manipulation/change of catheter is not indicated under most circumstances but is indicated in patients routinely if they are neutropaenic.

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