Chapter 6: Elimination

Urinary catheterization

Evidence-based approaches

Rationale

Urinary catheterization is the insertion of a specially designed tube into the bladder using an aseptic technique for any of the indications listed below. It is an invasive procedure and should not be undertaken without full consideration of the benefits and risks. The presence of a catheter can be a traumatic experience for patients and have huge implications for body image, mobility, pain and discomfort (Chapple et al. [47] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0047); Fowler et al. [80] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0079)). Indwelling catheters are the primary source of UTIs within acute care (Nicolle [177] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0176)). It is essential that they are only used if clinically necessary, and they should not stay in place longer than required (Murphy et al. [152] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0151)).

Indications

Urinary catheterization may be carried out for the following reasons (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074), RCN [208] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0207)):

- acute and chronic urinary retention
- to maintain a continuous outflow of urine for patients with voiding difficulties as a result of neurological disorders that effect urination
- for patients who require prolonged immobilization (e.g. resulting from traumatic spinal injuries)
- for urological investigations and for accurate measurements of urinary output, such as in critically ill and perioperative patients
- in perioperative use for some surgical procedures, especially those involving urological surgery on contiguous structures of the genitourinary tract
- to assist in healing of open sacral or perineal wounds in incontinent patients
- to facilitate continence and maintain skin integrity (in cases of failure of conservative treatment methods)

- for bladder irrigation or lavage
- for the instillation of medications such as chemotherapy
- to ensure comfort for end-of-life care when indicated
- for management of intractable incontinence.

When to remove a catheter

The HOUDINI protocol (Table **6.2** (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-tbl-0002)) is a nurse-led patient safety tool that outlines clear criteria designed to guide nurses on when continued catheterization is indicated; patients who fall outside these criteria should have their catheter removed (Adams et al. [5] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0005)). The tool is designed to reduce the risk of catheter-associated urinary tract infections (CAUTIs) by reducing unnecessary duration of catheterization (Roser et al. [217] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0216)). However, if in any doubt, seek advice from the medical team first.

Table 6.2 The HOUDINI protocol

H	Haematuria
O	Obstruction, urinary
U	Urological surgery
D	Decubitus ulcers
I	Input/output measurements (in critical illness/haemodynamic instability)
N	Neurogenic bladder dysfunction/chronic indwelling catheter
I	Immobilization due to physical constraints

CAUTI is considered one of the most prevalent hospital-acquired infections (Tatham et al. [235] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0234)). Reducing CAUTIs is the focus of many safety improvement programmes across the UK and championed by NHS Improvement as part of the reducing gram-negative blood stream infections initiative. For further information on CAUTIs refer to the 'Catheter-associated complications' section below.

Clinical governance

Competencies

Nurses performing female and/or male urinary catheterization must have demonstrated the appropriate level of competency to carry out these procedures. They must be sure these procedures are within their scope of professional practice (NMC [178] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0177), RCN [208]

(https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0207)). Each organization will have its own arrangements for assessing individual competency.

Pre-procedural considerations

Patients should be risk assessed individually (RCN [208] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0207)) with regard to the ideal time to insert or change their catheter. This should be done in line with the manufacturer's guidance (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)). The HOUDINI protocol (Table 6.2 (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-tbl-0002)) can assist with identifying when catheters can be removed rather than changed. Always ensure the correct type of indwelling catheter is selected for the intended purpose (Table 6.3 (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-tbl-0003)). To improve consistency of catheter care, the Royal College of Nursing (RCN) ([208] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0207)) advocates the use of a catheter diary or passport; this will also help to ascertain any pattern of catheter blockages so that changes can be planned accordingly.

Table 6.3 Types of catheter

Catheter type	Materials	Uses
Balloon (Foley) two-way catheter: two channels, one for urine drainage and a second, smaller channel for balloon inflation	Latex, PTFE-coated latex, silicone elastomer coated, 100% silicone, hydrogel coated	Most commonly used for patients who require bladder drainage (short, medium or long term).
Balloon (Foley) three-way irrigation catheter: three channels, one for drainage, one for irrigation fluid and one for balloon inflation	Latex, PTFE-coated latex, silicone, plastic	To provide continuous irrigation (e.g. after transuretheral resection of the bladder/prostate). The potential for infection is reduced by minimizing the need to break the closed drainage system (Madeo and Roodhouse, [139] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0138)).
Non-balloon, straight catheter (e.g. Nelaton or Scotts), or intermittent catheter (one channel only)	PVC and other plastics	To empty the bladder or continent urinary reservoir intermittently; to instil solutions into the bladder.

PTFE, polytetrafluoroethylene; PVC, polyvinyl chloride.

Source: Reproduced with permission of The Royal Marsden.

Prior to opening any equipment, check the allergy status of the patient to ensure they are not allergic to any of the contents (e.g. equipment containing latex, chlorhexadine or lidocaine).

Equipment

Catheter selection

A wide range of urinary catheters are available, made from a variety of materials and with various design features. Careful assessment of the most appropriate material, size and balloon capacity will ensure that the catheter selected is as effective as possible for the intended purpose, that complications are minimized, and that patient comfort and quality of life are promoted (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)). Types of catheter are listed in Table **6.3** (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-tbl-0003) and illustrated in Figure 6.7 (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-fig-0007), together with their suggested uses. Catheters should be used in line with the manufacturer's recommendations, in order to avoid product liability.

(https://www.rmmonline.co.uk/illustration/c06-fig-0007)

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Figure 6.7 Types of catheter.

Balloon size

In 1932, Dr Fredrick Foley designed a catheter with an inflatable balloon to keep it positioned inside the bladder. This is commonly known as a 'Foley catheter'. Balloon sizes vary from 2.5 mL for children to 30 mL for adult bladder irrigation. A 5–10 mL balloon is recommended for adults and a 3–5 mL balloon for children for most indications.

With a Foley catheter, care should be taken to inflate the balloon according to the manufacturer's guidelines. Under- or overinflation can cause occlusion of draining eyelets, leading to possible irritation to the bladder wall and subsequent bladder spasms and/or spontaneous catheter loss (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)).

Sterile water should be used to inflate the balloons of all types of catheter. Inflation of silicone catheters with water can sometimes lead to water loss from the catheter balloon over time, although this has been found to be minimal (Huang et al. [103] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0102)). This may increase the risk of inadvertent catheter loss; silicone catheters should be used with caution where catheters are used

to protect an anastomosis (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)).

Catheter size

Urethral catheters are measured in charrières (ch). The charrière is the outer circumference of the catheter in millimetres and is equivalent to three times the diameter. Thus, a 12 ch catheter has a diameter of 4 mm. The bigger the catheter, the more the urethra is dilated. 12 ch is normally suitable for men and women (Nazarko [157] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0156)). The urethra is approximately 6 mm in diameter, which is equivalent to a size 16 ch catheter. This is useful to know as it has implications for patient comfort.

Potential side-effects of large-gauge catheters include:

- pain and discomfort
- pressure ulcers, which may lead to stricture formation
- blockage of paraurethral ducts
- abscess formation (Dellimore et al. [64] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0062))
- bypassing – urethral leakage.

The most important guiding principle is to choose the smallest size of catheter necessary to maintain adequate drainage (Yates [259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)). If the urine to be drained is likely to be clear, a 12 ch catheter should be considered. Larger-gauge catheters may be necessary if debris or clots are present in the urine as the diameter of the catheter directly correlates to the size of the drainage channel and also the eyelets (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)).

Catheter length

There are three lengths of catheter currently available:

- female length: 23–26 cm (*not for use in males*)
- paediatric: 30 cm
- standard length: 40–44 cm.

The shorter female-length catheter is often more discreet and less likely to cause trauma or infections because movement in and out of the urethra is reduced. Infection may also be caused by a longer catheter looping or kinking (Mangnall [141] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0140), Yates [259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)). In obese women or those in wheelchairs, however, the inflation valve of the shorter catheter may cause soreness by rubbing against the inside of the thigh, and the catheter is more likely to pull on

the bladder neck; therefore, the standard-length catheter should be used (Simpson [223] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0222)).

The male urethra is approximately 15–20 cm long and the female urethra is approximately 3–5cm long. Conditions such as benign prostatic hyperplasia in a male may extend the distance into the bladder further.

It is vital to stress that female catheters must not be used for male catheterization. A National Patient Safety Agency alert (NPSA [180] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0179)) was issued in 2009 after a series of incidents relating to the shorter female catheters being inserted into males. Female catheters are often too short to reach the bladder of a male patient; therefore, their use in males can cause severe trauma to the urethra as the balloon may be inflated inside the urethra. This can cause haematuria, penile swelling, retention and impaired renal function. For this reason, many organizations stock only male-length catheters to avoid serious incidents.

Catheter tip design

Several different types of catheter tip are available in addition to the standard round tip (Figure 6.8 (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-fig-0008)). Each tip is designed to overcome a particular problem:

- The *Tiemann-tip* or *coude tip catheter* has a curved tip with one to three drainage eyes to allow greater drainage. This catheter is designed to negotiate the membranous and prostatic urethra in patients with prostatic hypertrophy. It is recommended that these catheters are only inserted by a urology specialist.
- The *whistle-tip catheter* has a lateral eye in the tip and eyes above the balloon to provide a large drainage area. This design is intended to facilitate drainage of debris, for example blood clots.
- The *Roberts catheter* has one eye above the balloon and another below it to facilitate the drainage of residual urine.
- Several new and novel tip designs are available for Nelaton catheters for intermittent catheterization. Some were developed for patients with a tortuous urethra; examples include the IQ-Cath and the SpeediCath Flex.

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Figure 6.8 Catheter tips.

Catheter material

A wide variety of materials are used to make catheters. The key criterion in selecting the appropriate material is the length of time the catheter is expected to remain in place. Three broad timescales have been identified:

- short term (1–7 days), e.g. polyvinyl chloride and intermittent catheters
- short to medium term (up to 28 days), e.g. polytetrafluoroethylene catheters
- medium to long term (6–12 weeks), e.g. hydrogel, all-silicone and silastic catheters.

The principal catheter materials are as follows.

Polyvinyl chloride

Catheters made from polyvinyl chloride (PVC) or plastic are quite rigid. They have a wide lumen, which allows a rapid flow rate, but their rigidity may cause some patients discomfort. They are mainly used for intermittent catheterization or post-operatively. They are recommended for short-term use (Gilbert [88] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0087)).

Latex

Latex is a purified form of rubber and is the softest of the catheter materials. It has a smooth surface, with a tendency to allow crust formation. It has been shown to cause urethral irritation; therefore, latex catheters are now usually coated with silicone elastomer or Teflon (as below).

Hypersensitivity to latex is well documented within the literature. Therefore, care must be taken to check allergy status and select an alternative, where indicated, to avoid anaphylaxis (Feneley et al. [77] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0076)).

Teflon and silicone elastomer coatings

A Teflon (polytetrafluoroethylene, or PTFE) or silicone elastomer coating is applied to latex catheters to render the latex inert and reduce urethral irritation (Bell [18] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0018)). Teflon is recommended for short-term use and silicone-elastomer-coated catheters are used for long-term catheterization.

All-silicone

Silicone is an inert material that is less likely than other materials to cause urethral irritation. Silicone catheters are not coated and therefore have a wider lumen. The lumen of these catheters, in cross-section, is crescent- or D-shaped, which may induce formation of encrustation. Silicone permits gas diffusion; therefore, balloons may lose water and cause the spontaneous loss of the catheter. For this reason, they should be used with caution in patients having urological surgery. These catheters may be more uncomfortable than the latex-cored types as they are more rigid. All-

silicone catheters are suitable for patients with latex allergies. Silicone catheters are suitable for long-term use (Singha et al. [226] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0225)).

Hydrogel coatings

Hydrophilic coated catheters provide improved patient comfort as the polymer coating is well tolerated by the urethral mucosa. They are composed of an inner core of latex encapsulated in a hydrophilic polymer coating and are commonly used for long-term catheterization. Hydrogel-coated catheters become smoother when rehydrated, reducing friction with the urethra. They are reported to be resistant to bacterial colonization; however, there is conflicting data surrounding this issue, and the lower level of colonization could be attributed to the different properties of catheter material or the type of hydrogel coating (Siddiq and Darouiche [222] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0221)).

Conformable catheter

Conformable catheters are designed to conform to the shape of the female urethra and allow partial filling of the bladder. The natural movement of the urethra against the collapsible catheter is intended to prevent obstructions. They are made of latex and have a silicone elastomer coating. Conformable catheters are approximately 3 cm longer than conventional catheters for women.

Other materials

Research into new types of catheter materials is ongoing, particularly examining materials that resist the formation of biofilms (bacterial colonies that develop and adhere to the catheter surface and drainage bag) and consequently reduce the incidence of UTIs (Hook et al. **[101]** (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0100), Loveday et al. [135] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0134), Mandakhalikar et al. [140] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0139)).

Current preventive strategies include coating catheter surfaces with antibiotic drugs or silver toxins to create a hostile environment for bacteria. A Cochrane review examining the available evidence concluded that these coatings are often not effective in reducing infection rates, with any benefit likely to be small (Lam et al. [122] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0121)). Such catheters were found to be more likely to cause patient discomfort and were more expensive to purchase, adding overall cost and inefficiency to patient treatment (Singha et al. [226] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0225)).

Drainage bags

A wide variety of drainage systems are available. When selecting a system, consideration should be given to the reasons for catheterization, the intended duration, the patient's wishes and infection control issues.

To reduce the number of possible entry sites for pathogens into the urinary system, a closed catheter drainage system should be adopted. This is an aseptic system in which the path from the catheter tip to the drainage bag remains as one system. However, this path must be broken to allow emptying and changing of drainage bag (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)).

Urine drainage bags should only be changed according to clinical need – that is, when the catheter is changed or if the bag is leaking, or at times dictated by the manufacturer's instructions, for example every 5–7 days (Loveday et al. [135] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0134)). Urine drainage bags positioned above the level of the bladder and full bags cause urine to reflux, which is associated with infection. Therefore, bags should always be positioned below the level of the bladder (dependent drainage) to maintain an unobstructed flow, and they should be emptied appropriately. Urine drainage bags should be hung on suitable stands to avoid contact with the floor. When emptying drainage bags, separate clean containers should be used for each patient and care should be taken to avoid contact between the drainage tap and the container (Loveday et al. [135] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0134)).

Urine drainage bags are available in a wide selection of sizes ranging from large 2 L bags, which are most commonly used in non-ambulatory patients and overnight, to 350–750 mL leg bags (Figures 6.9 (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-fig-0009) and **6.10** (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-fig-0010)). There are also large drainage bags that incorporate urine-measuring devices (urometers), which are used when very close monitoring of urine output is required (Figure 6.11 (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-fig-0011)).


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Figure 6.9 Urinary catheter bag: large.

(https://www.rmmonline.co.uk/illustration/c06-fig-0010)

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Figure 6.10 Urinary catheter leg bag.

(https://www.rmmonline.co.uk/illustration/c06-fig-0011)

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Figure 6.11 Urinary catheter bag with urometer.

There are a number of different styles of drainage bags in addition to the standard leg-worn bags. They allow patients greater mobility and can be worn under the patient's own clothes and therefore are much more discreet, helping to preserve the patient's privacy and dignity. Shapes vary from oblong to oval, and some have cloth backing for greater comfort when in contact with the skin. Others are ridged to encourage an even distribution of urine through the bag, resulting in better conformity to the leg. The length of the inlet tube also varies (direct, short, long or adjustable length), as does the intended position on the leg (thigh, knee or lower leg) (Yates [259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)). The patient should be asked to identify the most comfortable position for the bag (Yates [259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)). The majority of drainage bags are fitted with an anti-reflux valve to prevent the backflow of urine into the bladder. Several different tap designs exist and selection should be based on the patient's manual dexterity. Most leg bags allow for larger 1–2 L bags to be connected via the outlet tap, to increase capacity for night-time use.

A variety of supports are available for use with these bags, including sporran waist belts, leg holsters, knickers/pants and leg straps.

Leg straps

The use of thigh straps (e.g. the Simpla G-Strap) and other fixation devices (e.g. the Bard StatLock™ Foley stabilization device (Figure **6.12** (https://www.rmmonline.co.uk/manual/c06-sec-0034#c06-fig-0012)), the Loc-Strap™ or the Clinimed CliniFix) helps to immobilize the catheter and thus reduce the trauma potential to the bladder neck and urethra (Eastwood [70] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0070)). It is recommended that all

catheter users secure their catheter in this way. Guidance from the [206] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0205) and NHS Scotland (NHSQIS [169] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0168)) reiterates the importance of catheter tetherage to promote patient comfort and to limit the potential complications of catheter migration and subsequent need for recatheterization. The application of these devices is not without potential complications; for example, restriction of the circulation to the limb with a thigh strap may give rise to deep vein thrombosis, while tension and traction to the urethra can cause trauma and necrosis, especially in men (Yates [260] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0260)). For this reason, the thigh fixation device should be fitted by an appropriately trained individual.

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Figure 6.12 Bard StatLock™ Foley stabilization device. *Source: Reproduced with permission of C.R. Bard, Inc.*

Catheter valves

Catheter valves, which eliminate the need for drainage bags, are also available. The valve allows the bladder to be emptied intermittently and is particularly appropriate for patients who require long-term catheterization and do not require a drainage bag.

Catheter valves are only suitable for patients who have good cognitive function, sufficient manual dexterity to manipulate the valve and an adequate bladder capacity (Woodward [257] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0256)). It is important that catheter valves are released at regular intervals to ensure that the bladder does not become over-distended. These valves must not be used on patients following surgical procedures to the prostate or bladder, as continuous drainage of the bladder is required and free drainage is the preferred method. As catheter valves preclude free drainage, they are not appropriate for patients with uncontrolled detrusor overactivity, ureteric reflux or renal impairment. Catheter valves are designed to fit with linked systems so it is possible for patients to connect them to a drainage bag. This may be necessary when access to toilets may be limited, for example overnight or on long journeys.

Catheter valves are recommended to remain *in situ* for 5–7 days, which corresponds with most manufacturers' recommendations (Woodward [257] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0256)).

Pharmacological support

The use of anaesthetic lubricating gels is well recognized for male catheterization, but there is some uncertainty about the benefits in female catheterization. Loveday et al. ([135] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0134)) recommend the use of a lubricant to minimize urethral discomfort and trauma during catheterization. In male patients the anaesthetic lubricating gel is typically instilled directly into the urethra; this can then be milked along the length of the urethra or a gentle clamp applied to the tip of the penis. Onset of anaesthetic action is typically achieved within 5 minutes (Ahluwalia et al. [8] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0008), Losco et al. [134] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0133)). Evidence suggests that increasing numbers of individuals are experiencing hypersensitivity reactions to the antiseptic ingredient chlorhexidine, which is in many catheterization gels; therefore, allergy status must be checked before use and the gel should be used with caution (Williams [249] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0248)). In female patients, anaesthetic lubricating gel is applied to the meatus and slowly instilled into the urethra (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)). This process also maintains mild ureteral dilation, thereby assisting with the insertion of the catheter (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074), Williams [249] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0248)).

Routine use of antiseptic lubricants for catheter insertion is not necessary (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074)). This said, anaesthetic lubricant gel without chlorhexidine is widely available in the UK and should be considered for routine catheterization. Furthermore, Loveday et al. ([135] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0134)) and Wilson ([254] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0253)) found limited evidence to support the routine use of antiseptic or antimicrobial agents for meatal cleaning prior to insertion to minimize CAUTI. Loveday et al. ([135] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0134)) recommend cleansing the meatus with normal sterile saline, whereas NICE ([174] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0173)) recommends checking local guidelines.

Procedure guideline 6.4

Urinary catheterization: male (https://www.rmmonline.co.uk/manual/c06-fca-0005) ›

Procedure guideline 6.5

Urinary catheterization: female (https://www.rmmonline.co.uk/manual/c06-fea-0006) ›

Chapter 6: Elimination

6.5 Urinary catheterization: female

Essential equipment

- Personal protective equipment
- Sterile catheterization pack containing gallipots, receiver, gauze swabs, disposable towels and forceps
- Leg strap for tethering
- 0.9% sodium chloride or 0.1% chlorhexidine solution
- Two syringes
- Drainage bag and stand or holder
- Clean towel or similar cover
- Disposable pad
- Sterile gloves
- Selection of appropriate catheters
- Sterile anaesthetic lubricating gel
- Universal specimen container (if a sample is required)
- Light source

Pre-procedure

Action

1. Introduce yourself to the patient, explain and discuss the procedure with them, and gain their consent to proceed. Offer a chaperone.

   Rationale

   To ensure that the patient feels at ease, understands the procedure and gives their valid consent (NMC ***[178]*** *(https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0177), C; RCN* ***[208]*** *(https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0207), C).*

2. Screen the bed.

   Rationale

To ensure the patient's privacy. To allow dust and airborne organisms to settle before the sterile field is exposed (Fraise and Bradley [81] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0080), E).

3. Prepare the trolley, placing all equipment (**Action figure 3** (https://www.rmmonline.co.uk/manual/c06-fea-0006#c06-fig-0013)) required on the bottom shelf. (See also 'Catheter selection' under 'Equipment' above.)

   Rationale
   The top shelf acts as a clean working surface. E

4. Take the trolley to the patient's bedside, disturbing the screens as little as possible.

   Rationale
   To minimize airborne contamination (Fraise and Bradley [81] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0080), C).

5. Remove the patient's underwear. Assist the patient to get into the supine position with knees bent, hips flexed and feet resting about 60 cm apart (**Action figure 5** (https://www.rmmonline.co.uk/manual/c06-fea-0006#c06-fig-0014)).

   Rationale
   To enable the genital area to be seen. E

6. Place a towel over the patient's thighs and genital area.

   Rationale
   To maintain the patient's dignity and comfort (NMC [178] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0177), C).

7. Ensure that a good light source is available.

   Rationale
   To enable the genital area to be seen clearly. E

8. Wash hands using bactericidal soap and water or alcohol-based handrub. Apply personal protective equipment.

   Rationale
   To reduce the risk of cross-infection (NHS England and NHSI [161] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0160), C).

Procedure

9. Open the outer cover of the catheterization pack and slide the pack onto the top shelf of

the trolley.

Rationale

*To prepare the equipment. **E***

10. Using an aseptic technique, open the sterile pack. Open the selected catheter and place it on the sterile field.

    Rationale

    *To reduce the risk of introducing infection into the urinary tract. **E***

11. Remove the towel, maintaining the patient's privacy, and position a disposable pad under the patient's buttocks.

    Rationale

    *To ensure urine does not leak onto the bedclothes. **E***

12. Clean hands with alcohol-based handrub.

    Rationale

    *Hands may have become contaminated by handling of outer packs (Fraise and Bradley **[81]** (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0080), **C**).*

13. Put on sterile gloves.

    Rationale

    *To reduce the risk of cross-infection (NICE **[174]** (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0173), **C**).*

14. On the sterile field, place the catheter into the sterile receiver.

    Rationale

    *To ensure a closed system, minimizing infection risk (EAUN **[71]** (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074), **C**).*

15. Place sterile towels under the patient's buttocks.

    Rationale

    *To create a sterile field. **E***

16. Using gauze swabs, separate the labia minora so that the urethral meatus is seen. Your non-dominant hand should be used to maintain labial separation until the catheter is inserted and urine is flowing (**Action figure 16** (https://www.rmmonline.co.uk/manual/c06-fea-0006#c06-fig-0015)).

    Rationale

This manoeuvre provides better access to the urethral orifice and helps to prevent labial contamination of the catheter. E

17. Clean around the urethral orifice with swabs soaked with 0.9% sodium chloride or 0.1% chlorhexidine solution held between forceps using single downward strokes, being careful not to touch the surrounding skin (**Action figure 16** (https://www.rmmonline.co.uk/manual/c06-fea-0006#c06-fig-0015)).

    Rationale
    *To clean the urethra orifice and thereby reduce the risk of CAUTI (Loveday et al. **[135]** (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0134), **R**).*

18. Apply anaesthetic lubrication to the meatus and then insert the nozzle of the syringe into the urethra and instil gel into the urethra, being careful not to touch the surrounding skin (**Action figure 18** (https://www.rmmonline.co.uk/manual/c06-fea-0006#c06-fig-0016)).

    Rationale
    *Adequate lubrication helps to prevent urethral trauma. Use of a local anaesthetic minimizes the patient's discomfort (Ghaffary et al. **[87]** (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0086), **E**).*

19. Place the catheter, in the sterile receiver, between the patient's legs and attach the drainage bag.

    Rationale
    *To ensure a closed system, minimizing infection risk (EAUN [71] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074), **C**).*

20. Using your dominant hand, introduce the tip of the catheter into the urethral orifice in an upward and backward direction. If the meatus is difficult to identify, this may be due to vaginal atrophy (see Problem-solving table **6.4** (https://www.rmmonline.co.uk/manual/c06-sec-0070#c06-tbl-0004)). Advance the catheter until urine is draining and up to the bifurcation (hilt) (**Action figure 20** (https://www.rmmonline.co.uk/manual/c06-fea-0006#c06-fig-0017)).

    Rationale
    The direction of insertion and the length of the catheter inserted should relate to the anatomical structure of the area. E

21. If there is no urine present, check that the catheter has not accidentally been inserted into the vagina. If the urethral meatus is clearly visible, consider removing the catheter and re-attempting the procedure with a second sterile catheter. If the meatus is not clearly visible, see Problem-solving table **6.4** (https://www.rmmonline.co.uk/manual/c06-sec-0070#c06-tbl-0004).

    Rationale

This prevents repeated misplacement of the catheter. E

22. Inflate the balloon according to the manufacturer's instructions, having ensured that the catheter is draining adequately (**Action figure 22** (https://www.rmmonline.co.uk/manual/c06-fea-0006#c06-fig-0018)).

    Rationale
    Inadvertent inflation of the balloon within the urethra is painful and causes urethral trauma (Ghaffary et al. ***[87]*** *(https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0086), **E**).*

23. Withdraw the catheter slightly so that the balloon is sitting at the bladder neck.

    Rationale
    *To ensure that the balloon is inflated and the catheter is secure. **E***

24. Support the catheter using a specially designed support, for example the Simpla G-Strap or the Bard StatLock™ Foley stabilization device. Ensure that the catheter does not become taut when the patient is mobilizing. Ensure that the catheter lumen is not occluded by the fixation device.

    Rationale
    To maintain patient comfort and to reduce the risk of urethral and bladder neck trauma. Care must be taken when applying securing devices to ensure these do not interfere with the drainage of the catheter by being applied too tightly. Leg straps must not impair circulation (Yates ***[260]*** *(https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0260), **E**).*

Post-procedure

25. Assist the patient to replace her underwear and clothing, feeding the catheter down the leg. Replace the bedcovers and ensure that the area is dry.

    Rationale
    *So that the catheter it is not occluded by clothing or tight underwear and is aided to drain by gravity. **E***
    If the area is left wet or moist, secondary infection and skin irritation may occur (Voegeli ***[238]*** *(https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0237), **E**).*

26. Measure the amount of urine.

    Rationale
    To be aware of bladder capacity for patients who have presented with urinary retention. To monitor renal function and fluid balance if clinically indicated. It is not necessary to measure the amount of urine if the patient is having a routine catheter change (EAUN ***[71]*** *(https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0074), **C**).*

27. If required, take a urine specimen for laboratory examination.

Rationale

For further information, see Procedure guideline 14.7: Urinalysis: reagent strip and Chapter c13 (https://www.rmmonline.co.uk/chapter/13): Diagnostic tests.

28. Dispose of equipment (including apron and gloves) in a clinical waste bag as per local policy.

Rationale

To reduce the risk of infection (NHS England and NHSI [161] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0160), C).

29. Draw back the screen.

Rationale

30. Wash hands thoroughly with soap and water.

Rationale

To reduce the risk of infection (NHS England and NHSI [161] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0160), C).

31. Record information in relevant documents; this should include:

- reasons for catheterization
- date and time of catheterization
- catheter type, length and size
- amount of water instilled into the balloon
- batch number and manufacturer
- any problems negotiated during the procedure
- a review date to assess the need for continued catheterization or date of change of catheter.

Rationale

To ensure accurate documentation and provide a point of reference or comparison in the event of later queries (NMC [178] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0177), C).


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Action Figure 3 Prepare the trolley, placing all required equipment on the bottom shelf. *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*


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Action Figure 5 Assist the patient into the supine position with knees bent, hips flexed and feet resting about 60 cm apart. *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*


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Action Figure 16 Using gauze swabs, separate the labia minora, and with the other hand clean the meatus with gauze swabs soaked in 0.9% sodium chloride, using single downward strokes. *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*


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Action Figure 18 Apply anaesthetic lubrication to the meatus and then insert the nozzle of the syringe into the urethra and instil gel into the urethra. *Source: Adapted*

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Action Figure 20 Advance the catheter until urine is draining and up to the bifurcation (hilt). *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*

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Action Figure 22 Inflate the balloon according to the manufacturer's instructions, having ensured that the catheter is draining adequately. *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*

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Action Figure 3 Prepare the trolley, placing all required equipment on the bottom shelf. *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*

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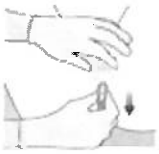
Action Figure 5 Assist the patient into the supine position with knees bent, hips flexed and feet resting about 60 cm apart. *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*



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Action Figure 18 Apply anaesthetic lubrication to the meatus and then insert the nozzle of the syringe into the urethra and instil gel into the urethra. *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*

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Action Figure 20 Advance the catheter until urine is draining and up to the bifurcation (hilt). *Source: Adapted from Yates ([259] (https://www.rmmonline.co.uk/manual/c06-bibl-0001#c06-bib-0259)) with permission of EMAP Publishing Limited.*

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