Catheter care in the community

Aims and intended learning outcomes

The aim of this article is to review urinary catheterisation in the community. It will examine various methods of catheterisation, the types of catheters available, selection principles and aspects of care. After reading this article, you should be able to:

- Advise patients as to the optimum method of catheterisation for their individual needs.
- Select the appropriate type of catheter, with regard to material, size and design.
- Advise a patient about the range of urinary drainage systems available.
- Describe the problems caused by catheter encrustation, its causes and treatment.
- Recognise that not all catheters are blocked by encrustation and may not require changing if leakage or bypass occurs.
- Recognise that catheterisation has wide-reaching implications for patients, their partners and carers.

Introduction

A catheter is a hollow tube which is inserted into a body organ or cavity to remove or instil fluid. Urinary catheters are designed for insertion into the urinary bladder, either intermittently or constantly, to enable drainage of urine or instillation of medication. The most common methods of insertion in the UK are urethral or suprapubic catheterisation. While access via the perineum is sometimes performed in male patients in the UK, it is more common in the US. Urinary catheterisation, both indwelling and intermittent, is a common procedure in the community with about 4 per cent of patients on district nursing caseloads having a long-term indwelling urinary catheter (Roe 1989).

Urinary catheters have an essential role in both medical and nursing care, but might result in serious complications. These include trauma, urinary tract infection, stricture formation, encrustation and bladder calculi, urethral perforation and carcinoma of the bladder (Lothian 1998, Stickler and Zimakoff 1994). The decision to use catheterisation, particularly of the indwelling type, should therefore only be taken as a last resort in managing urinary incontinence. Patients and carers should be fully involved about the decision process and catheterisation should only be performed after full consideration of the implications.

In a recent review of the possible complications caused by urinary catheterisation, the author concluded that urinary catheters should be avoided wherever possible. There are, however, a number of patients for whom a catheter is necessary (Box 1).

Intermittent catheterisation

People have been using intermittent catheterisation – the passing of a single channel, hollow tube into the bladder, intermittently via the urethra to drain urine – for many centuries. The earliest recorded use of intermittent catheters was in the third millennium BC, when catheters made from copper, tin, bronze and gold were used. In 100BC, the Chinese were using hollow onion stems, dried reeds and palm leaves treated with linseed oil and either dried in the sun or lacquered (Bard 1987). A double, curved bronze catheter was found in the surgeon’s house in Pompei, Italy, dating from...
about 79AD (Roe 1991). Patients are often taught to perform this simple procedure on themselves, using a ‘clean’ rather than an aseptic technique.

Intermittent self-catheterisation reduces the risk of infection usually associated with the process and can greatly improve the quality of life for many patients experiencing problems with voiding (Lapides et al 1972). If patients are unable to perform self-catheterisation, a relative or informal carer can be taught.

Intermittent catheters are made from latex, plastic, stainless steel and silver. Uncoated plastic catheters can be re-used for up to one week, and metal catheters for many years. Intermittent catheters with a lubricant coating are for single use only (Willis 1995).

**Indwelling catheterisation**

The Foley catheter is the most commonly used indwelling catheter used in the community. It was designed by Dr Frederick Foley in 1934. It is a self-retaining, flexible tube which is retained in the bladder by a balloon. Following insertion of the catheter, the balloon is inflated in the bladder using sterile water. The catheter may be inserted via the urethra (urethral catheterisation), or through an incision in the lower abdominal wall (suprapubic catheterisation). The most commonly used Foley catheters have two interior channels, one for draining urine and the other for inflating the balloon. There are many other variations on this design, with additional channels for instillation of fluids into, and irrigation of, the bladder, and incorporating additional ‘eyes’ distal to the balloon, though these are not currently available on prescription in the UK.

The balloon-type, self-retaining catheter was initially designed to promote haemostasis post-operatively, rather than as a method to hold the catheter in situ. This is an important factor when choosing what the infill volume of the balloon to be used should be.

Urethral catheterisation is the most common procedure, but it can result in urethral trauma and is linked to problems such as urethritis and strictures. Suprapubic catheterisation does not cause urethral trauma, and its use can be recommended when a urethral catheter might be uncomfortable because of its situation, such as in women with poor mobility or who are chairbound.

Suprapubic catheters have been associated with lower rates of infection than urethral catheters, possibly because the urethral defence mechanisms are left intact and the site of entry is easier to keep clean (Winder 1994).

Bladder calculi might be a significant problem for patients with long-term suprapubic catheters, and an annual bladder ultra-sound review should be performed (Shah and Shah 1998).

**TIME OUT 2**

If a patient asked you for advice regarding the advantages and disadvantages of both intermittent and indwelling catheterisation, what advice would you give?

**Selecting catheters in the community**

The needs of each patient and the intended function of the catheter/drainage system should be the primary consideration in choosing the optimum method of catheterisation (intermittent or indwelling) and the equipment or products required.

The patient’s needs can change over time and some patients might require a combination of catheterisation methods; intermittent (self or aided), urethral indwelling, free-drainage or intermittent (valve drainage), or suprapubic, again free-drainage and/or intermittent. This wide range of options can present difficulties when trying to decide the best solution for each patient.

The widest range of choices occurs when considering indwelling or urethral catheterisation. Practitioners face choices on the material from which the catheter is made, its length and diameter, the balloon size and the type of drainage system.

**Catheter materials**

Catheters are usually described as being for long- or short-term use. The material from which the catheter is made determines the length of time the catheter can remain in the bladder. Subject to the manufacturer’s instructions, long-term catheters may normally be left in situ for up to 12 weeks, and short-term ones changed at intervals of between 14 and 28 days. According to the Drug Tariff (DoH 1999): ‘The average period that a Foley catheter is kept in place is given only as a guide and may vary considerably with individual patients. All patients should be assessed on an individual basis and their optimum time for catheter change established.’ In practice, it is possible to establish a pattern of episodes of blockage and plan catheter changes accordingly. This will be aided by completion of a ‘catheter diary’ by the nurse or patient.

**Short-term catheters**

Polyvinyl chloride (PVC) PVC or plastic catheters are not commonly used in the community as they are more rigid than other catheters and...
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Long-term catheters

All-silicone All-silicone catheters have thinner walls than latex-based catheters, which means they have a relatively large lumen in relation to their external diameter. The manufacturing process makes the lumen ‘D’ or crescent-shaped in cross section, which might predispose them to internal encrustation and blockage. They are more rigid than latex-cored catheters and might be less comfortable for some patients. The balloon may deflate more rapidly than latex ones, resulting in premature failure of the catheter (Barnes and Malone-Lee 1986). All-silicone catheters are suitable for use in patients with latex allergy and can remain in situ 12 weeks or according to manufacturer’s instructions.

Silicone elastomer coated Silicone elastomer coated catheters are latex catheters with a coating of silicone bonded to the latex. This makes very smooth internal and external surfaces which are more resistant to encrustation (Ryan-Woolley 1987). The silicone coating, as with Teflon, reduces absorption of water by the latex core. Silicone elastomer coated catheters can remain in situ for up to 12 weeks or according to manufacturer’s instructions.

Hydrogel coated Hydrogel-coated catheters are latex catheters with a hydrogel coating bonded to the latex. They are said to be highly compatible with human tissue, which makes the catheter more comfortable, easier to insert and more resistant to bacterial colonisation and encrustation (Cox et al 1988). Hydrogel coated catheters can remain in situ up to 12 weeks or according to the manufacturer’s instructions.

Selecting catheter size

Having decided the optimum catheter material(s) for the individual patient, the next choice is the size of catheter. This relates to the length and diameter of the catheter, and is important as it will affect both the comfort and performance of the catheter.

Length Foley catheters are available in three lengths, male (or standard), female and paediatric. British Standard 1616 states that the minimum length of male catheters is 380mm and 220mm in women. Manufacturers exceed these lengths by varying amounts, with the average male length being between 400mm and 450mm. Remember when catheterising adult male patients that only male length catheters are long enough to enter the bladder. Female patients might benefit by using the shorter female length catheters. These can be more discreet when wearing skirts or dresses and the shorter length can help reduce the risk of looping and kinking, both of which can result in drainage problems. However, female-length catheters may not be suitable for all women, and may be uncomfortable or cause pressure problems in obese patients.

Diameter The external diameter of the catheter shaft is measured in Charrière (Ch) or French gauge (Fg) units. Though named differently, these are the same measurements, one unit Charrière or French gauge being 0.33mm. A 12Ch/Fg catheter is therefore 4mm in external diameter.

The smallest diameter catheter which provides adequate drainage should be chosen, as urethral irritation and trauma may result from using a catheter which is too large.

As a general guide, size 12-16Ch catheters are adequate to drain clear, dilute urine; 16-18Ch will be required to drain urine containing debris; and 18Ch+ for drainage of haematuria and clots that could block smaller lumens. Suprapubic catheterisation allows use of larger gauge catheters which may be an advantage for some patients.

Selecting balloon size

Balloon sizes are related to the volume of sterile water required to inflate them. There are three sizes commonly used in the community: 5ml for paediatric catheters, 10ml and 30ml for adult ones. Some manufacturers have introduced an additional 20ml size, but as a general rule the 10ml infill volume should be used for long-term indwelling catheters, the 30ml size was originally designed to aid post-operative haemostasis by applying pressure to the bladder neck.
A 10ml infill volume balloon weighs approximately 17g, and a 30ml one 48.2g (Fig. 1). Leakage of urine around the catheter has been associated with balloon volumes over 10ml, and it is suggested that the larger sizes should be restricted to post-operative use (Winn 1996).

The balloon should only be inflated with sterile water, not tap water or saline which may block the inflation channel with debris or crystals and result in deflation problems (Falkiner 1993). The manufacturer’s instructions should always be followed with regard to the inflation volume used, and the balloon should not be under or over inflated, as this may result in balloon distortion and deflection of the catheter tip (Belfield 1988).

TIME OUT 3
Based on what you have read so far, what criteria would you consider when selecting an indwelling catheter for a patient in the community? Would your choice be affected if the patient was male, rather than female, or if a latex allergy was present?

Catheterisation

Having decided on the optimum type and size of indwelling catheter to be used, the next area of choice is the practical procedure of catheterisation. A community nurse would use an aseptic technique and sterile equipment. However, other people can also perform catheterisation, including informal carers and the patients themselves, and the nurse may have to adapt rigid clinical procedures to enable patients and carers to perform them in a clinically clean and safe way. Maintenance of asepsis to reduce incidence of urinary tract infection (UTI) is important, for example, the anaesthetic gel should be sterile and single use only (Wilson 1998).

This used to be restricted to male catheterisation, but this practice has been questioned, as has the use of anaesthetic gel advocated for female catheterisation (de Courcy-Ireland 1993, MacKenzie and Webb 1995). However, this may cause problems with drainage of newly inserted catheters due to the eyes of the new catheter being blocked by the lubricating/anaesthetic gel, initially preventing drainage.

The practice of patients and informal carers performing indwelling catheterisation, both urethral and suprapubic, might cause concern to some healthcare professionals. However, it is common practice to teach both intermittent self-catheterisation and aided intermittent catheterisation in the community. The procedures are not dissimilar, apart from the inflation of the self-retaining balloon.

Whether female nurses should catheterise male patients is often debated. In some areas male catheterisation was traditionally performed by doctors and male nurses, while female catheterisation was undertaken by female nurses (Winn 1998). Restricting male catheterisation to male nurses and doctors can cause problems in community settings. Indeed, a lack of trained and competent nursing and medical practitioners was linked in one study to 104 people being referred to hospital for treatment of catheter-related problems; 94 were men, though the number of males and females were equally distributed (Kohler-Ockmore and Freneley 1990). In practice, this means that men were nine times more likely than women to be sent to hospital for treatment.

Urinary catheterisation is usually a relatively simple procedure, but what can prove more difficult is managing the physical, psychological, social and sexual effects on the patient and family. Male catheterisation used to be an ‘extended role’ for many nurses. Today competent, accountable nurses should be skilled in enabling the optimum quality of life for all patients.

TIME OUT 4
Reflect on the issues surrounding catheterising patients of the opposite sex to yourself. What are the professional implications of this practice? Should patients have a choice regarding the sex of the person performing this procedure?

Catheter management in the community

Selecting the drainage system

Having selected the optimum method of catheterisation and the best type of catheter for the individual patient, the next choice is the type of urinary drainage system to be used, or if drainage using a catheter valve would be appropriate.

Catheter valves, which are used as an alternative to urine drainage bags for some patients, allow the bladder to fill prior to emptying, and are said to mimic normal bladder function. They can be used if the patient has a reasonable bladder capacity and is able to use this method of drainage (Rigby 1998). However, research evidence on the benefits of interrupted drainage is limited (Button et al 1998). Two types of urine collection systems are commonly used in the community: body-worn, held in place by straps, garments or suspensory systems; and larger capacity, night drainage bags which may or may not have outlet taps. When considering the use of a continuous drainage system, it is important to maintain a closed drainage system in which the catheter, tube, and bag form a continuous circuit. The closed drainage system is
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**REFERENCES**


**TIME OUT 5**

Obtain a current copy of the Drug Tariff. Read the section on catheters in part 9A and urinary drainage systems in part 9B.

How many of these products are you aware of? Could you advise patients about the best products for them? If you were not aware of the range available, is it possible for you to get further advice from your local continence adviser?

**Blockage – no encrustation**

Another cause of catheter blockage, not caused by encrustation, is occlusion of the catheter drainage eyes by the bladder mucosa. Hydrostatic suction may result from a column of urine forming in the drainage tubing, sufficient to suck the mucosa against the eyes of the catheter or partly into the catheter lumen. The level of suction created is equal to the vertical difference of the level between the catheter eyes and the drainage bag inlet valve (Egede Glahn et al 1988). The catheter may be sufficiently blocked to cause leakage and bypass of urine, and might result in inappropriate changes of catheters. If the catheter appears blocked and encrustation has not been a problem in the past, it might be worthwhile to instil gently 20-30ml of sterile water or saline into the catheter to see if this frees the mucosa from the eyes of the catheter. An alternative method would be to temporarily raise the urine drainage bag above the level of the bladder to reduce the level of suction and free the mucosa. Preventing reoccurrence of the problem can be difficult. Lothian recommended that no catheter drainage

significant in the prevention of infection (Wilson 1998).

For patients who are non-ambulant or confined to bed, a sterile, drainable, night bag may be connected directly to the catheter and emptied as required. The Drug Tariff recommends that these bags be changed on average every five to seven days (DoH 1999). Ambulant patients, especially in community, usually prefer to use a body-worn drainage system which provides greater freedom of movement and discretion. Closed system drainage can be maintained when using body-worn bags by the use of ‘link-drainage’, where a larger capacity bag is connected to the body-worn bag at night-time by using a connector. Body-worn bags, connected directly to the catheter, are usually sterile, though reusable leg drainage bags were employed in one study without an increase in urinary tract infections (UTIs) attributable to the use of such bags (Rooney 1994). When using a link-drainage system, a non-drainable night bag should be used for overnight drainage and disconnected on disconnection from the leg bag (Wilson 1998, Wilson and Coates 1996).

Male patients often prefer long-inlet tube leg bags which are designed to be worn below the knee and are easier to empty when wearing long trousers. Women, on the other hand, might prefer to wear short-inlet tube leg bags, worn above the knee. This difference in inlet tube lengths can cause problems when catheterised patients of both sexes are being cared for together, for example in residential care homes. It is not unknown for short-inlet tube bags to be fastened below the patient’s knee, causing traction to the catheter, or for long-inlet tube bags to be fastened above the patient’s knee, which results in excess tubing that may get kinked or the patient may sit on. Both of these actions can result in catheter related problems, such as leaking and bypass.

Blockage of an indwelling catheter is traumatic for patients and their carers, as it often causes pain and distress. It also has cost implications in terms of time, materials and service resources for community healthcare professionals, such as district nurses and GPs. The most common cause of catheter encrustation is the formation of calcium phosphate and magnesium ammonium phosphate salts, called ‘struvite’ (Getliffe 1993, Hesse et al 1992). This occurs when the urine becomes alkaline due to urease-forming bacteria, such as Proteus mirabilis, Pseudomonas aeruginosa and Klebsiella, entering the bladder. Urease is an enzyme that breaks down urea to form ammonia and free hydrogen ions which causes the pH of the urine to rise, making it alkaline (Winn 1998). As these salts form in alkaline urine, prevention and treatment methods involve acidification of the urine to prevent or dissolve the encrustation. Treatments commonly used in the community include the use of acidic bladder washouts (citric acid solutions), or systemic agents such as ascorbic acid (vitamin C), though studies have failed to provide clear evidence in support of this (Winn 1998). While there is some laboratory evidence that acidic bladder wash-outs significantly reduce catheter encrustation (Getliffe 1994), another study actually states that acidification of urine is not a feasible method for preventing encrustation of indwelling urinary catheters (Bibby and Hukins 1993). The best method of management for patients whose catheters are blocking with struvite encrustation and for whom acidic bladder wash-outs are ineffective, is to plan re-catheterisation prior to expected episodes of blockage. An individual ‘catheter diary’ may be of help in this.
bag should be allowed to hang more than 30cm below the bladder for any length of time (Lothian 1991), though in practice this might be difficult to achieve for some patients.

**Fluid intake**

Traditionally, nurses have advised patients with indwelling catheters to maintain a high-fluid intake. This will not prevent or reduce UTI (Getiflfe 1993), but it will result in a dilute urine output, which will allow the use of smaller gauge catheters and reduce the risk of urethritis. Additionally, an adequate fluid intake will reduce the risk of constipation, which could be a contributory factor in causing leakage and bypass of urine (Rees-Williams et al. 1988). Constipation might also result in expulsion of the catheter while straining to defaecate (Rigby 1998).

**Meatal hygiene**

Cleansing of the urethral meatus is another practice advocated for good catheter care, yet trials using various methods of cleansing have failed to demonstrate any reduction in the rate of bacteriuria (Mulhall et al. 1988). Meatal hygiene is required to remove the ‘smegma ring’ which can form around the catheter at the point of entry into the meatus. If not removed, this can act as a source of irritation, particularly for patients where the normal movement of the penis along the catheter shaft may result in friction and trauma to the meatus and glans penis. Removal using soap and water in the course of normal social hygiene is all that is required (Burkitt and Randall 1987).

**Maintaining quality of life**

For many patients in the community, catheterisation, indwelling and intermittent, can offer a method of urinary management which may enable them to achieve and maintain a level of independence and self-care.

Sex and sexuality in regard to catheters are aspects of care not often discussed, but they might be of major importance to some patients and their partners. Nurses should be prepared to discuss these matters with patients, and be able to advise them on appropriate methods of management to maintain the optimum quality of life. Intermittent catheterisation, either self or aided by a partner, where possible, probably offers the least restrictions in regard to the physical expression of sexuality, but indwelling catheterisation need not be a bar to this. Suprapubic catheters, if acceptable to the patient and partner, offer an alternative to urethral catheterisation, and are less restrictive for sexually active couples, but even urethral catheter management can be adapted to accommodate for sexual needs. Rigby describes folding the catheter back along the penis and covering it with a condom, and female patients repositioning the drainage bag to enable sexual intercourse (Rigby 1998).

However, this can be unacceptable and too intrusive for some couples. It might be possible to teach the patient or his or her partner to remove the catheter and to replace it with a new one following sexual activity.

The issue of catheterisation and subsequent catheter care should be open to discussion with patients and carers. It is common practice in the community to arrange for the change of catheters by healthcare professionals, usually community nurses. How often do we ask the patients and carers if they would like to be taught how to do this?

Of course, not all patients or carers would wish to do this, but even with older patients and carers, teaching them to perform the procedure and relevant catheter care can greatly improve their quality of life and independence.

**Conclusion**

Catheter care is a challenging and interesting aspect of community nursing care. By teaching patients about catheter care and involving them in the many choices and decisions that need to be made, we can improve the quality of life for many catheterised patients in the community.

**TIME OUT 6**

Reflect on a patient or patients using catheters, either intermittently or indwelling, to whom you have recently given catheter care or advice. Having read this article, are there any aspects of their care that you feel could be improved? If possible, discuss this with a colleague or your local continence adviser.

**TIME OUT 7**

Now that you have completed the article, you might like to think about writing a practice profile. Guidelines to help you write and submit a profile are outlined on page 53.

**REFERENCES**


