

# Catheter care: a comprehensive guide

Although there are benefits with long-term catheterisation, there are also risks involved with its use. One of these risks is infection and the resulting potential for seriously impairing the patient's quality of life. As long-term catheter use is on the increase, it is important to minimise the chance of infection. **Lynn Kirkwood** reviews the use of long-term catheters and different strategies for reducing the complications.

**LYNN KIRKWOOD** is a Clinical Nurse Specialist from Weston-Super-Mare, North Somerset

**W**hen used appropriately, catheterisation can improve a patient's quality of life. However, it is an invasive procedure associated with several risks<sup>1</sup>. Therefore, catheters should only be used when they are clinically indicated. Unfortunately, there is evidence to suggest some catheter use is unjustified or is forgotten about once in place<sup>2</sup>.

The clinical indications for catheterisations are as follows: acute or chronic urinary retention, drainage of hypotonic bladder, managing urinary incontinence when other methods have failed and as a comfort measure in palliative care. As urinary catheterisation increases morbidity by a factor of three<sup>3</sup>, the need for continued catheterisation should be reviewed regularly for all patients. When deciding to use a catheter, the treating healthcare professional should balance the benefits against the risks. They also need to keep in mind the patient's mental capacity. If the patient does not have the capacity to give informed consent, the healthcare professional should work in the patient's best interest<sup>4</sup>.

## Catheter types

It is important when choosing a catheter to choose one that minimises the risk of complications in

susceptible individuals<sup>5</sup>. There are several types of catheters and these are made from a variety of materials including:

- > polytetrafluoroethylene (PTFE) coated latex pure silicone;
- > silicone coated latex;
- > hydrogel coated latex;
- > hydrogel coated all silicone;
- > and silver alloy coated latex.

As well as being made from different materials, catheters can differ in the way they are inserted.

## Urethral catheterisation

A disadvantage of the urethral catheterisation is that inadequately supported drainage bags (or heavy overfilled bags) can drag on the urethral meatus and – in men – cause the anterior urethra to split<sup>6</sup>. Another problem is people who have a urethral catheter often have a discharge. To prevent infection, the urethral area should be daily cleaned with mild soap<sup>7</sup>. Removing the catheter can cause trauma to the urethra – particularly if the catheter's tip has become encrusted.

## Suprapubic catheterisation

Before using a suprapubic catheterisation, it is important to assess the patient. Patients with a

weak pelvic floor often continue to leak urine if they use a suprapubic catheter; therefore, they may be better managed with a urethral catheter or incontinence pads.

But, suprapubic catheterisation does have advantages in other groups of patients. With a suprapubic catheter, the risk of urethral trauma is eliminated and it is more comfortable for people who are not mobile. It is also easier to manage and is possibly more comfortable for patients who are sexually active.

### Catheter complications

The majority of patients with a long-term catheter (75 per cent) suffer from one or more of the following: tissue damage (including pressure sores), bladder damage, infection, catheter encrustation and blockage<sup>8</sup>.

### Risks to tissue

As an indwelling catheter is a 'foreign body', it can cause an inflammatory response. This response can be mild or severe, and it can cause tissue damage. Moderate responses include mild oedema, while the most severe responses include haemorrhage and damage to the urethral and bladder mucosa.

Another tissue-damaging catheter complication is pressure necrosis. This can occur when the tip of the catheter presses on one area of the bladder wall<sup>9</sup>, leading to a sore. Pressure sores can also be caused by inadequately supported or overfull drainage bags. Therefore, as a prevention method, it is necessary to change the bag before it becomes overfull. It is important to bear in mind any manipulation and disconnection of the drainage system increases the risk of bacterial contamination and the potential for subsequent infection. So it is also important to remember there are some patients whose mental state means they are not suited to having a catheter (eg, confused patients can cause pressure sores by pulling or tugging at the device).

### Effects on the bladder

Catheter use means the bladder does not fulfill its function (ie, to fill and then empty). Continued-drainage catheters reduce the bladder's capacity and can also cause it to become misshapen. The use of catheter valves can reduce the risk of this damage. The valves mimic normal bladder function

by allowing the bladder to fill normally and then drain when full. As catheter valves are not suitable for every patient<sup>10,11</sup>, patients who require catheters should be told of all the available options<sup>12</sup>.

### Infection

An estimated two to six per cent of people with catheters will develop a catheter-associated urinary tract infection<sup>13</sup> (CAUTI). One of the reasons why CAUTIs develop is because catheters are a portal of entry for infection. During catheter insertion, bacteria can enter the bladder via the catheter lumen and along the catheter urethral interface<sup>14</sup>. As well as this, a bacteria biofilm can develop on the surface of the catheter and drainage equipment. The biofilm protects bacteria from antibiotics; this in turn, makes any resulting infection more difficult to treat<sup>15</sup>.

Catheters should only be inserted when they are clinically indicated in order to reduce the risk of any additional infection for the patient. If possible, urethral catheterisation should be avoided in patients who are faecally incontinent. This is because the catheter could become contaminated with faeces, which would predispose the patient to infection.

The EPIC Project guideline<sup>16</sup> lists four interventions that can minimise the risk of a CAUTI. These are assessing the need for catheterisation, selecting the catheter type, aseptic catheter insertion and catheter maintenance<sup>16</sup>. There is some evidence silver alloy-coated catheters reduce bacterial adherence helping to reduce both infection and blockage<sup>17</sup>.

### Leakages and blockages

About half of the patients who have a long-term bladder catheter will suffer from encrustation<sup>8</sup>. Encrustation can cause repeated blockage and leakage and, as a result, bladder stones may develop. Certain bacteria (urease producers) can cause urine, although usually acidic, to become alkaline. When urine is alkaline, it leaks certain substances – the most common being struvite. It is these substances that can lead to stones developing, and they can also stick to the tip and interior of the catheter.

The only patients to suffer from encrustation are those whose catheters block in the first place – these patients are known as 'blockers'. As a result

of this encrustation and blockage, the life of their catheter is reduced. But the choice of catheter, a programme of planned catheter changes and the regular use of catheter maintenance solutions can all help to prevent both blockages and encrustations.

There are advantages and disadvantages to using catheter maintenance solutions. They are commonly put in practice in the community and there are patients who could benefit from their use, as they can prolong catheter life. The disadvantage in using catheter maintenance solutions is that it involves breaking the seal between the bag and the catheter, thereby increasing the risk of infection – such solutions can also damage the bladder mucosa.

At present, there is no large scale clinical trial evidence to demonstrate the efficacy of maintenance solutions. But, there are a few studies that have shown them to be effective<sup>17</sup>. On the other hand, according to some practitioners the solutions are not effective<sup>18</sup>. Instead they advocate the use of planned catheter changes – although if the patient tends to block within a few days of catheter change, this strategy may be counter-productive<sup>5</sup>. Catheter maintenance solutions should only be prescribed following assessment<sup>19</sup>.

### Complications in the elderly

The impaired immune response associated with ageing can sometimes make detecting infection in the elderly difficult. In addition, there are several age-related medications that mask the signs of infection. These include the prescribing of analgesia, steroids and non-steroidal anti-inflammatory drugs<sup>20</sup>. Catheterisation has a definite impact on nursing home residents. Residents with a catheter are three times more likely to receive antibiotics and require hospitalisation than those who are not catheterised. They are also three times more likely to die within a year<sup>21</sup>.

### Conclusion

Catheters, like most healthcare interventions, have advantages as well as disadvantages. Effective management ensures that there is a clinical need for catheterisation and uses evidence-based practice to reduce the risk of complications.

**Conflict of interest: none declared.**

### Key points

- > Catheters should only be used when clinically indicated.
- > Long-term catheterisation can cause infection, encrustation and blocking so all patients should be re-assessed.
- > At re-assessment, evidence of catheter related urinary tract infections should be established.

### References

1. Tew L, Pomfret I, King D (2005). Infection risks associated with urinary catheters. *Nursing Standard* 20: 7: 555-61
2. Saint S, Kaufman SR, Thompson M, Rogers MA, Chenoweth CE. A reminder reduces urinary catheterisation in hospitalised patients. *Joint Commission Journal on quality and Patient Safety* 2005. 31 (8): 455-462
3. Saint S, Lipsky BA, Goold SD. Indwelling urinary catheters: a one point restraint? *Annals of Internal Medicine* 2002; 137: 2: 125-127
4. Nazarko L. Consent to clinical decisions when capacity is absent. Part one, making decisions. *Nursing Manag* (Harrow) 2004; 10(10): 18-22
5. Pomfret I. Catheter care in the community. *Nursing Standard* 2000; 14: 27:45-61
6. Getliffe KA (1997). Catheters and catheterisation. In Promoting continence – A clinical research resource. Balliere Tindal, London
7. Burki D, Randall J (1987) Safe procedures. *Nursing Times* 1987; 83 (43): 65-66
8. Getliffe KA. The characteristics and management of patients with recurrent blockage of long term urinary catheters. *Journal of Advanced nursing* 1994; 20: 140-149
9. Stickler DJ, Zimakoff J (1994): Complications of urinary tract infections associated with devices used for long term bladder management. *Journal Hospital Infection*; 28:177-194
10. Addison R. Catheter valves: a special focus on the Bard Flip flo. *British Journal of Nursing* 1999; 8: 9: 576-580
11. Getliffe K and Dolman M, eds. 2003. Promoting Continence: A Clinical and Research Resource. 2nd edition: Balliere Tindall. London
12. SIGN (2004). Scottish Intercollegiate Guidelines Network. 79: Management of urinary incontinence in primary care. SIGN, Royal College of Physicians Edinburgh. <http://www.sign.ac.uk/pdf/sign79.pdf> (date last accessed: 07/08/06)
13. Pellowe C, Pratt R. Catheter-associated urinary tract infections: primary care guidelines. *Nursing Times* 2004; 100: 53-59
14. Salgado CD, Karchmer TB, Farr BM. Prevention of catheter associated urinary tract infections. In Wenzel RP (editor) Prevention and control of nosocomial infections. Fourth edition. Lipincott, Williams and Wilkins. Philadelphia 2003. Pages 297-311
15. Trautner, B Darouiche, RO. Catheter-Associated Infections: Pathogenesis Affects Prevention. [Review]. *Archives of Internal Medicine* 2004 164: 8: 842-850
16. Pratt RJ, Pellowe C, Loveday HP, et al. The Epic Project: guidelines for preventing infections associated with the insertion of short-term urethral catheters in acute care. *Journal of Hospital Infection* 2001; 47 (Suppl A): S39-S46
17. Ahearn DG, Grace DT, Jenning MJ et al. Effects of hydrogel silver coatings on in vitro adhesion to catheters of bacteria associated with urinary tract infections. *Current microbiology* 2000; 41 (2): 120-125
18. National Institute for Clinical Excellence (2003). Infection control: Prevention of Healthcare Associated Infection in Primary and Community Care. NICE, London. <http://www.nice.org.uk/pdf/CG2fullguidelineinfectioncontrol.pdf> (date last accessed: 07/09/06)
19. NHS Quality Improvement (2004) Best Practice Statement ~ June 2004: Urinary Catheterisation & Catheter Care. NHS Quality Improvement. Scotland. [http://www.nhshealthquality.org/nhsqis/files/Urinary\\_Cath\\_COMPLETE.pdf](http://www.nhshealthquality.org/nhsqis/files/Urinary_Cath_COMPLETE.pdf) (date last accessed 07/08/06)
20. Nazarko L. Nurse prescribing, urinary tract infection and older men. *Nursing Times* 2005: 101: 12: 69-70
21. Kunin C, Douthitt S, Dancing J et al. The association between the use of urinary catheters and morbidity and mortality among elderly patients in nursing homes. *American Journal of Epidemiology* 1992; 135 (3) 291-301