Costs and benefits of using urinary catheters

A urinary catheter is a hollow tube that is inserted into the bladder, either intermittently or indwelling, for the purpose of draining urine or instilling fluids into the bladder. Urinary catheterization has been practised for thousands of years. The first recorded use of urethral catheters was from ancient Egypt, where papyrus reeds were used to artificially drain the bladder.

Throughout history, there is documented evidence that catheters made from a variety of materials have been successfully used to aid urinary drainage. However, catheters have become associated with numerous problems that ensue from their use.

This article looks at the advantages and disadvantages of their use.

Advantages of the use of urinary catheters
Urinary catheters are an essential tool in the effective management of urinary incontinence for some people in nursing and residential care homes. For some, such as those whose incontinence is a result of voiding difficulties, they provide a method of management that cannot be offered by any other product or aid.

As with any other aspect of care, it is the use of the right product, in the proper manner, for the right person, that will determine how effective catheterization will be in managing that person’s problem. The answer lies in thorough professional assessment, combined with up-to-date knowledge and experience in the selection, use and management of catheters.

Modern materials, a result of ongoing research and development by both clinicians and manufacturers, have resulted in a wide range of catheters and associated products that make catheterization such a valuable method of managing urinary incontinence.

In the past, catheters were uncomfortable or worse, caused damage to the urethra. Research into the development and use of more biocompatible materials and coatings has resulted in much better products, such as the wide range of hydrophilic-coated catheters for intermittent insertion (Table 1) and hydrogel-coated indwelling catheters, such as those produced by Bard Medical (www.bardmedical.com) (Webber, 2003).

Hydrophilic coatings and hydrogels are compounds that bond water onto the surface of the catheter, which makes them very slippery and reduces the damage to the urethra, making the catheter more comfortable both on insertion and in use.

Both intermittent and indwelling (urethral and suprapubic) catheterization methods are currently used successfully in care homes; their selection and use was described in a previous NRC article (Pomfret, 2004).

Urinary catheterization can offer dignity and a quality of life in a person’s final days. People with terminal conditions or other severe incapacitating diseases or disorders, which make toileting or other methods of urinary continence management inappropriate or impossible, may benefit from urinary catheterization.

Catheterization can make a significant difference, affording relief from the stress and worry of incontinence, or worse, the possibility of skin damage and risk of pressure sores.

The problems associated with catheterization have sometimes caused both medical and nursing staff to avoid catheterization, to the extent that some individuals are denied the benefits that catheterization can offer. The decision to catheterize should only be taken following full discussion with the person and medical/nursing staff, with relevant informed consent obtained, but it should be considered within the overall needs of the individual.

Catheters, properly selected and managed effectively by knowledgeable staff, are a valuable method of management of urinary incontinence for those people in care homes who are assessed to need their use.

Managing infections
A major problem with all forms of catheterization, but particularly with indwelling catheters, is infection. Catheters are a source of infection, and infection is a source of catheterization.

Table 1.

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<tr>
<th>Company</th>
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<tr>
<td>Astra Tech</td>
<td>LoFric</td>
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<td>Bard Medical</td>
<td>Foley catheters</td>
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<td>Hollister</td>
<td>Advance Hydro Soft</td>
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catheters, has been catheter-associated urinary tract infections (CAUTIs). Intermittent catheterization is associated with a lower risk of CAUTIs than indwelling catheterization and should be used in preference to an indwelling catheter when clinically appropriate (National Institute for Clinical Excellence (NICE), 2003).

There are many articles describing the problems caused by CAUTIs in people with indwelling catheters and methods of reducing the risk by following research-based principles (Wilson, 1998). Probably the most significant recent development in the prevention of CAUTIs is the development and introduction of silver alloy hydrogel-coated Foley catheters (Pomfret and Tew, 2004). Silver alloy coated Foley catheters have been shown to significantly reduce the risk of CAUTIs and are now available on prescription in the UK, up to 28 days in situ.

Some people may have a higher risk of CAUTI’s, for example those with:
- Prolonged catheterization
- Female gender
- Other infections
- Diabetes
- Malnutrition
- Renal failure
- Placement of the drainage tube above the level of the bladder
- Microbial virulence factors
- Older age.

These individuals may benefit from the use of silver alloy coated Foley catheters if they are experiencing problems with CAUTIs (Tew et al, 2005).

Urinary catheters are not suitable for the management of every person with urinary incontinence and even when the use is indicated, appropriate use should be ensured by:
- Educating health-care staff about adverse clinical outcomes, patient discomfort, embarrassment and restriction of activity
- Improving staff awareness of appropriate catheter use, including the use of alternatives to urethral catheterization
- Audit to decrease the inappropriate use of catheters
- Regulatory bodies to reduce inappropriate use of urinary catheters (Saint et al, 2002).

By following these recommendations, the risk and effect of CAUTIs should be reduced for those residents using indwelling catheterization as the optimum method of management for their urinary incontinence.

**The risks of long-term catheterization**

It is vitally important that people who are catheterized are catheterized for sound clinical reasons and not merely because a person is incontinent of urine. Catheterization is an invasive procedure that is sometimes unjustified or even forgotten when in place (Saint et al, 2005).

All long-term catheterization carries risks (Tew et al, 2005) and 75% of all people who have long-term catheters suffer from one or more recurrent problems (Getliffe, 1994).

The risks are:
- **Tissue damage**
- **Bladder damage**
- **Infection**
- **Catheter encrustation and blockage**

**Tissue damage**

This occurs because of either an inflammatory reaction or trauma to the urethra and bladder. The catheter is a foreign body and can trigger an inflammatory response, which may be mild or severe. Mild responses include mild oedema; severe responses include haemorrhage and damage to the urethral and bladder mucosa. Choosing an appropriate catheter can minimize the risk of reaction in susceptible individuals (Pomfret, 2000).

A survey of care over 15,000 care home residents found that 78% of residents were cognitively impaired (Bowman et al, 2004). Catheters can feel uncomfortable and people who are confused can tug at them and damage delicate tissues.

Heavy, over-full, or inadequately supported drainage bags may cause the urethral meatus to split in men (Getliffe, 1997).

**Bladder damage**

Using a catheter and a drainage bag means that the bladder does not fill and empty, as it is designed to do. Catheterization and continual drainage thus reduces bladder capacity.

Some people who become incontinent, for example after a stroke, will regain continence naturally. If the person is catheterized, that person is deprived of the opportunity to recover continence (Nazarko, 2003).

The use of catheter valves allows the bladder to fill normally and to be drained when full. This mimicking of normal bladder function is considered to reduce the risk of bladder damage (Addison, 1999; Scottish Intercollegiate Guidelines Network, 2004).

In a lab-based research project, valve-regulated catheters took longer to block with crystalline biofilm than those left on free drainage (Sabhula et al, 2005). People with catheters should be offered this option.

**Infection**

Bacteria can enter the bladder during catheter insertion, through the catheter lumen and along the catheter–urethral interface (Salgado et al, 2003). In community settings, the bladder becomes colonised with bacteria within 28 days of catheter insertion. An estimated 2–6% of people with catheters will develop a urinary tract infection (Pellowe and Pratt, 2004).

Bacteria colonise the surface of the catheter and drainage equipment. This colonisation is known as a biofilm. This makes infections more difficult to treat because the biofilm protects bacteria from antibiotics (Trautner and Darouiche, 2004).

Urinary catheterization should be avoided, whenever possible, in patients who are incontinent of faeces as contamination of the catheter with faeces may increase the risk of infection.

**Encrustation and blockage**

Around 50% of people who have long-term catheters suffer from encrustation. This can cause repeated blockage of the catheter and leakage. Urine is normally acid; however, certain bacteria known as urease producers cause urine to become alkaline. When the urine is alkaline, calcium and phosphate salts precipitate from the urine and can cause stones in the bladder. They also stick to the outside and interior of the catheter.

Methods of dealing with blockage include choice of catheter, a programme of planned catheter changes and possibly the use of bladder washouts. Silver alloy coated Foley catheters that reduce the risks of bacterial adherence may help to reduce both infection and blockage (Ahearn et al, 2000). Monitoring catheter interventions and introducing a planned programme of catheter changes may avoid blockage (NICE, 2003).

**Suprapubic catheterization**

Suprapubic catheterization is not superior to urethral catheterization. It has advantages...
with certain groups of people, which are:
- The risk of urethral trauma is eliminated
- It is more comfortable for people who are not mobile
- The person with a suprapubic catheter can continue to enjoy sex
- Many people with catheters find them easier to manage.

Suprapubic catheters are not suitable for people who are very obese. They are also not suitable for people who have a weak pelvic floor, who will often continue to leak urine urethrally.

Reducing the risks of complications

Urinary catheterization increases morbidity by a factor of three (Saint et al., 2002). Infection can be difficult to detect in older people because of the impaired immune response associated with ageing and prescribing of analgesia, steroids and non-steroidal anti-inflammatory medications that mask the cardinal signs of infection (Nazarko, 2005).

Catheterized people living in nursing homes are three times more likely to receive antibiotics and require hospitalization than those who are not catheterized. They are three times more likely to die within a year (Kunin et al., 1992). It is essential to ensure that indwelling urinary catheters are only used when clinically indicated. The need for continued catheterization should be reviewed regularly. Box 1 outlines clinical indications.

When a person is discharged from hospital with an indwelling catheter, it can be difficult to ascertain the reasons why the person remains catheterized. In such circumstances, trial without a catheter should be considered. This may be performed in liaison with the community nursing or continence advisory services.

Catheters, when used appropriately, can contribute to quality of life and it is the clinician’s responsibility to balance the risks of long-term catheterization against other factors. When the person has capacity, he or she should be given sufficient information to enable informed consent. If the person lacks capacity, the clinician can treat in the person’s best interest (Nazarko, 2004).

Conclusion

Catheters, like all interventions, have costs as well as benefits. Effective management ensures that there is a clinical need for catheterization and uses evidence-based practice to reduce risks of complications.

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KEY POINTS

- Long-term catheterization is associated with increased morbidity.
- Catheterization should only be carried out when clinically indicated.
- The catheterized person is at risk of tissue damage, bladder damage, infection, encrustation and blockage.
- The need for continued catheterization should be reviewed regularly.
- The person with a catheter must give informed consent whenever capacity is present.
- If the person lacks capacity, the clinician must act in the person’s best interests.