Urinary catheterization 1: indications

ABSTRACT

Urinary catheterization is an important procedure that is regularly performed in hospital. All clinicians should have a good working knowledge of urinary catheters and the competence to manage them effectively. This topic will be discussed over two articles: this first article will focus on indications, and the second on techniques and managing failure. There are multiple indications for urethral catheter insertion and a range of catheter types and sizes. The choice of catheter is dependent on the patient and indication. This article discusses this in more detail to help guide clinicians involved in urethral catheterization.

Urinary catheterization is a common procedure in clinical practice. Patients with urinary catheters, or those who require catheterization, are encountered by all clinicians. It is therefore important to have a thorough understanding of the indications for the procedure and to be able to subsequently choose the correct type of catheter.

Types of catheter

The urinary catheter is a flexible tube inserted through the urethra into the bladder, as a method of urinary diversion if an individual is unable to void independently.

The size of the catheter is an important clinical consideration, and the French scale is most commonly used for measurement. This system was devised by Charrier, a 19th century surgical instrument maker from Paris (Iserson, 1987). The French size (abbreviated as Fr or Ch after the inventor) equals three times the external diameter of the catheter in millimetres – the higher the number, the larger the diameter of the catheter. 12 Fr (4 mm diameter) is the smallest diameter of catheter available for use in adults but this is only used in exceptional circumstances, as catheters of this size block easily and may encounter issues of urine bypassing the catheter. The most commonly used sizes for adults are between 14 Fr and 18 Fr (4.7–6 mm diameter).

Indwelling temporary urinary catheters, also known as Foley catheters, come in different forms. Two-way catheters are most common, and these have two lumens, one to inflate the balloon after insertion and the other to drain urine. Three-way catheters have an extra lumen which connects to the bladder. Water can be inserted into the bladder through this third lumen to allow the bladder to be washed out. This form of catheter is commonly inserted when there are haemorrhagic clots or debris in the bladder that are likely to block the catheter. Coudé catheters are a more specialized type of catheter with a curved tip. These are particularly advantageous in men with partially obstructed urethras secondary to enlarged prostate glands, as the curved tip passes more easily through the stenosed region of the urethra.

Long-term catheters are also available for patients in the community if required. These consist of the catheter itself and a drainage bag. This bag may be on free drainage and therefore the individual empties this when it is full. However, there is also the option for a drainage bag to be under valve control. With this option, the bladder contents only drain into the bag when the individual switches the valve on and this therefore gives patients more freedom. Patients are provided with leg bags (500–750 ml) for the day and larger drainage bags (2 litres) for overnight use.

The prevalence of long-term catheterization in the adult population is of the order of 0.03–0.07%, rising to 0.5% in those over 75 years and 2% in those over 85 years old, as established by Evans et al (2000). More recent figures are not available, but considering the increasing ageing population, it is likely these figures have increased, as more patients are now being discharged with catheters in situ as a result of limited hospital bed capacity.

Although it is often recommended to change urinary catheters every 3 months, the latest Cochrane review by Cooper et al (2016) reported a lack of evidence to support a specific time interval for replacement. The review explains that earlier changes may reduce the risk of bacteria accumulation or catheter blockage, but frequent changes may also cause tissue disruption that can contribute to infection.

The material used varies depending on the anticipated duration of placement of the urinary catheter. Short-term catheters tend to be coated with cheaper materials, such as latex or polyvinyl chloride. For long-term catheters, there is an option to use silicone or silver alloy-coated materials. Although these are more expensive, the catheters are more durable and sustainable, as they are less vulnerable to antimicrobial colonisation. Silicone is also more bio-compatible than latex and therefore causes less of a foreign body reaction.

Indications

Common indications for urinary catheter insertion are presented in *Table 1* and explained in more detail below.

It is often helpful to classify urinary retention by either duration (acute *vs* chronic) or pressure (low *vs* high).

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Acute *vs* chronic urinary retention

Acute urinary retention is the sudden inability to pass urine, usually with associated pain, whereas chronic retention develops more gradually (over months or years) and is often painless.

Causes can differ and can be broadly categorized into those affecting patients under 50 years and those affecting patients over 50 years of age.

Under the age of 50 years, urinary retention is usually caused by a urethral stricture (e.g. meatal stenosis, severe phimosis) or is secondary to a neurological condition. By the time a stricture has caused retention, the narrowing is so tight that attempted catheterization can exacerbate the stricture, making subsequent management more difficult. Therefore catheterization with a 14 Fr Foley catheter should only be attempted once. Thereafter, urological referral should be undertaken for further assessment. Less common causes of retention include pelvic masses, atonic bladder and detrusor sphincter dyssynergia.

The common dictum is that if a 14 Fr Foley catheter passes easily into the bladder in a man under the age of 50 years with urinary retention, an obstructive cause (stricture) is unlikely. A neurological cause for inability to void is then more likely, such as transient viral transverse myelitis or a neurological tumour.

In older men (over 55 years of age), benign prostatic enlargement and urethral strictures are the most common obstructive causes of retention. In most cases of benign prostatic enlargement, catheterization using a 16 Fr Foley catheter will be successful if the technique outlined in the second article is followed. If unsuccessful, suprapubic catheter insertion can be considered, using either an open or closed method. The closed trocar system is widely used and the more recent Seldinger technique is now thought to be safer than using the more traditional larger trocar sets (e.g. Bard set), as it allows more controlled insertion of the trocar and sleeve (Harrison et al, 2011).

Urinary retention is less common in women and the cause is often predictable based on a known medical history. Causes include:

- Medication (amitriptyline or antidepressants)
- Neurological problems (multiple sclerosis or spina bifida)
- Cancers from pelvic organs that have spread through the natural fascial planes
- Constipation
- Urethral stenosis
- Fowler's syndrome (presents in the third or fourth decade as a result of failure of the sphincter muscle to relax, possibly associated with polycystic ovaries).

Low *vs* high pressure

Urinary retention can also be classified into low pressure retention and high pressure retention, according to the detrusor pressure at the end of micturition.

Low pressure retention commonly presents as increased frequency, poor stream and a palpable bladder. A bladder ultrasound scan will typically show a bladder volume of over 500 ml, often exceeding 800 ml. However, there is no associated renal dysfunction or hydronephrosis. These patients can be managed adequately with catheterization acutely and with the input of the urology team as an outpatient if chronic. If found as an incidental finding, discussion with the urology team before discharge is appropriate.

In high pressure retention, the bladder volume is greater than 500 ml and the intravesical pressure is above 30 cmH_20. In these cases there is associated deranged renal function and hydronephrosis; urgent urological hospital admission is usually required. This form of retention commonly occurs following long-term obstruction. The bladder wall thickens over time as the detrusor muscle strenuously contracts in order to overcome the obstruction. If unable to overcome the obstruction, fibrous tissue may then form in the detrusor muscle, leading to acute-on-chronic urinary retention. Patients in this scenario may still be passing urine and normally present with nocturnal enuresis, increased frequency, and eventually acute retention of urine.

Acute illness

Catheterization is usually a temporary requirement in the management of acute illness. If normal bladder function is maintained, the use of a sheath catheter (Conveen) is an alternative to bladder catheterization in men. It may also be required during long surgical procedures, such as abdominal and pelvic surgery to prevent accidental injury to the bladder, or following bladder or prostate procedures. Sheath catheters may also be beneficial for men when control of urinary incontinence is needed for social and hygiene reasons. The use of urethral catheters should be avoided if catheterization is required long term, and suprapubic catheters are the preferred option in these cases.

Table 1. Indications for urinary catheterization

Acute urinary retention
Chronic urinary retention (+500 ml residual)
Urinary output measurement in acutely unwell patients
Management of acutely unwell to protect bladder, e.g. patients who have had a stroke
Anaesthesia (long procedures, or abdominal or pelvic surgery)
Social and hygiene reasons, e.g. a palliative care patient, or a patient with decubitus ulcers
Uncorrectable bladder outlet obstruction
Neurogenic bladder
Severely impaired continence

Conclusions

Urinary catheterization is a commonly performed procedure. It is therefore important to recognize the indication for catheterization in a patient and to be able to determine the correct type of catheter for this use. The second article on this topic will focus on techniques of catheter insertion and how to manage failure if it occurs. **BJHM**

KEY POINTS

- Acute urinary retention is an emergency and requires immediate catheterization and investigation to establish the cause.
- Always ensure the correct type and size of catheter is chosen depending on the patient and indication.

Conflict of interest: none.

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CURRICULUM CHECKLIST

This article addresses the following requirements from the general internal medicine training curriculum:

- Providing continuity of care to medical in-patients, including management of comorbidities and cognitive impairment.