Insertion, care and management of suprapubic catheters


Summary
A suprapubic catheter may be used to drain the bladder of urine as an alternative to an indwelling urethral catheter. It can be inserted as a temporary or permanent measure in patients with urinary dysfunction or if initial urethral catheter insertion or recatheterisation is problematic. This article discusses insertion of suprapubic catheters, management and care, including changing suprapubic catheters, drainage systems and the importance of patient education.

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Aims and intended learning outcomes
The aim of this article is to define suprapubic catheterisation and its management. After reading this article you should be able to:

- Understand why a patient may require insertion of a suprapubic catheter.
- Outline how a suprapubic catheter is inserted.
- Identify which drainage systems can be used.
- Understand how to change a suprapubic catheter.

Introduction
The insertion of an indwelling urinary catheter should not be undertaken lightly as it is an invasive procedure that carries risks, for example trauma, blockage and infection (Pratt et al 2007). The insertion of a suprapubic catheter may have to be undertaken as an emergency, such as in the case of urinary retention where initial urethral catheterisation is difficult to undertake. In some cases it may be planned, for example in patients for whom urethral recatheterisation is problematic or it is considered to be more beneficial for patients.

Time out 1
With a colleague, identify two terminologies used for suprapubic catheterisation. List reasons why a suprapubic catheter may be inserted.

Time out 2
Research and discuss with colleagues the procedure for initial insertion of a suprapubic catheter.

Suprapubic catheterisation
The terminology used to describe the insertion of a suprapubic catheter is percutaneous suprapubic catheterisation or suprapubic cystostomy (Blandy and Moors 1989, Shah and Shah 1998). Initial suprapubic catheterisation is usually undertaken in the hospital setting or in some cases...
in the patient’s home by a urology clinical nurse specialist (Gujral et al 1999, Kirkwood 1999). Reasons for inserting a suprapubic catheter are outlined in Box 1.

**Initial insertion**

Initial insertion of a suprapubic catheter is an aseptic procedure performed in one of two ways, both of which require the patient to have a distended (full) bladder (McMahon-Parkes 1998, Shah and Shah 1998). First, in cases of urinary retention with the bladder already distended, the procedure can be undertaken using a local anaesthetic with or without mild sedation without using a cystoscope (an endoscope for examining the interior of the bladder). Second, when the bladder is distended, the procedure can be performed using a cystoscope under general anaesthetic in theatre.

First, a small incision is made midline just above the pubic bone. A trocar (a sharp surgical instrument) available in different Charrière (Ch) or gauge sizes is passed through the abdominal wall towards the urinary bladder (Figure 1). Once through the abdominal wall, the trocar is then passed through the detrusor muscle of the bladder wall into the distended bladder. The trocar is surrounded by a sheath and once inside the bladder the trocar is withdrawn and removed leaving the sheath in position, which allows urine to drain up the sheath. A standard length, or what is sometimes termed a male length, Foley self-retaining indwelling urinary catheter is then inserted down the sheath into the bladder (Shah and Shah 1998, Robinson 2005). This catheter material is either latex or 100% silicone, while Ch size ranges from 14-16Ch depending on the trocar size. The smaller female length catheter may be used in either gender provided that mobility, obesity and drainage system used are taken into consideration (Association for Continence Advice 2007).

Once urine begins to drain via the catheter, the catheter balloon is inflated with sterile water to keep the catheter in place inside the bladder and the shaft of the catheter slowly withdrawn, until the inflated balloon is against the inside of the bladder (detrusor) wall. A sterile drainage bag is then attached to the catheter. The sheath is removed and the surgical incision is sutured. The catheter is either sutured or taped to the abdomen to prevent it moving and to allow the cystostomy channel made by inserting the trocar to form and heal. The cystostomy area is then covered with a sterile dressing. Sutures are usually removed one week later.

**Drainage systems**

Urine may be drained via a suprapublic catheter using a drainage bag system or catheter valves. **Drainage bag system** This consists of a sterile leg bag connected to the catheter for day use. At night a disposable, non-sterile, two-litre bag is connected to the base of the leg bag. This is known as a total closed link system, meaning the catheter and drainage system are on a continual circuit and the circuit is not broken until a change of catheter or drainage bag is required (Pomfret 1996, Robinson 2006a). Depending on the manufacturer and drainage bag selected, leg bag tubing is available in four sizes – direct, short tube, long tube and extra long tube – that have drainage bag capacities between 350ml and 750ml. The length of tubing of the drainage bag determines where the leg bag is secured:

- Direct – secured to the thigh area.
- Short tube – secured with one strap above and below the inner aspect of the knee.
- Long tube and extra long tube – secured to the inner aspect of the calf.
- Belly bag – secured around the waist.

**Time out 3**

Discuss with colleagues two drainage systems that can be used by patients with a suprapubic catheter in place. List some advantages and disadvantages of each system.

**Contents**

- Initial insertion of a suprapubic catheter
- Drainage systems
- Reasons for inserting a suprapubic catheter
- Procedures for inserting a suprapubic catheter
- Advantages and disadvantages of drainage systems
Drainage leg bags have different operating mechanisms for opening and closing. These are mainly push through, or 0-90° or 0-180° rotational opening and closing. It is important that patients are shown how to change and secure drainage bags correctly, not only for routine change, but also in case change is required as a result of leakage caused by damage to the bag. Leg bags need to be changed every five to seven days in line with the manufacturer’s and Department of Health (NHS Business Services Authority 2008) guidelines. Emptying the overnight drainage bag following disconnection from the leg bag is done either by cutting off a corner, a tear away section or opening the drainage tap. Disposable, non-sterile two-litre overnight bags must never be connected directly to the catheter. However, a sterile, drainable two-litre bag can be attached directly to the catheter and used for five to seven days. If possible drainage bags compatible with the catheter should be used to avoid unnecessary disconnection and leaking.

Leg bags are secured to the leg using Velcro straps or a sleeve in patients with swollen legs or circulatory problems. Sleeves are available in various sizes so leg measurement must be taken for correct sizing. To avoid what is known as catheter sway, and so the meatal irritation caused by the movement of the catheter, the catheter may be secured with a strap or tape.

Catheter valves
When not using drainage bags on continual drainage, catheter valves allow the bladder to be used as designed (Addison 1999a, 2001):

- They provide the sensation to want to pass urine.
- The bladder constricts when draining urine via a catheter valve.

Catheter valves are opened on average every three hours to drain urine from the bladder. However, they are not recommended for all patients, for example those individuals who have detrusor instability, ureteric reflux or renal impairment (Addison 1999a). The patient must be able to operate the catheter valve (Addison 1999a). At night an overnight drainage bag may be attached if desired.

Patient discharge
Following discharge from hospital patients are referred to the district nurse for ongoing teaching and training in the management of the catheter and drainage system being used. Where possible, this should have started while the patient was in hospital. District nurses should receive the information outlined in Box 2.

**BOX 2**

**Catheterised patient: discharge information requirements**

- The reason the patient was catheterised, including date.
- Type of catheter inserted including make, material, length, size, balloon infill volume, lot number and expiry date.
- Date when the catheter is due to be changed and where (occasionally the first change may be undertaken in the urology unit).
- Drainage system being used.
- Whether the patient is self-caring or requires help.
- Dates of any outpatient appointments or pending readmission for surgery.

**FIGURE 1**

**Initial insertion of a suprapubic catheter**

- Trocar inserted through abdominal wall into bladder
- Catheter placed in bladder through trocar sheath cover
- Trocar removed. Catheter balloon inflated and catheter secured to abdominal wall
First change of suprapubic catheter

Following initial insertion and depending on local protocols, the initial catheter is usually left in place for about four weeks to allow the cystostomy channel to form and heal. In the author’s primary care trust the first change is four weeks following initial insertion either in hospital or, more commonly, in the community by a competent, trained district nurse. If required, a member of the continence service experienced in this procedure will link up for teaching, training and to solve any problems. However, should the initial suprapubic catheter need to be changed before the end of the four-week period, patients are referred to the urology unit. Following the first change, in the author’s experience, suprapubic catheters are then changed at six weeks and then every eight weeks. In some cases, following teaching and training to change this type of catheter, the procedure may be undertaken by a carer, for example those caring for patients with a spinal injury whose catheter may become blocked and who are at risk of developing autonomic dysreflexia, which is a life-threatening condition.

Changing a suprapubic catheter

All urinary catheters are licensed for urethral urinary catheterisation. However, not all catheters are licensed for suprapubic use (Robinson 2005). Therefore, to be sure that the catheter is licensed for suprapubic use, you should check the NHS Supply Chain (2008) catalogue or contact the catheter manufacturer.

It is important to check if local policies and protocols are available for this procedure (Table 1). Depending on local policies, the procedure may vary slightly. Practitioners should undergo a programme of teaching, training and clinical practice supervision by an experienced clinician to become confident and competent in changing suprapubic (including urethral) catheters (Addison 1999b, c, d). The procedure is aseptic and the equipment required is the same as for urethral catheterisation. If the patient is obese a second person, after washing their hands and wearing gloves and a disposable apron, may be required to separate the folds of overlapping skin to aid access to the cystostomy site. In some cases the patient may be able to assist the practitioner.

Time out 4
Write down in your own words how you would select the appropriate urinary catheter and describe how you would change a patient’s suprapubic catheter.

Time out 5
Consider what information you would give to patients concerning the care and management of their suprapubic catheter. You may wish to discuss your answer with a more experienced colleague.

Patient Information

The author, in collaboration with local infection control colleagues, is updating a patient information booklet for the local health authority to be issued to patients with a suprapubic catheter in place. Advice from the booklet concerning hygiene is outlined in Box 3.

Trial without suprapubic catheter

Before removing a suprapubic catheter permanently, patients need to undergo a trial without a suprapubic catheter. When undertaking a trial without a urethral catheter, the catheter is removed and the patient assessed and monitored on the amount of urine voided and post-voiding bladder residuals. However, the catheter is not removed in patients who have a suprapubic catheter in place.

Patients should be fitted with a catheter valve as voiding urine is monitored and recorded in two ways. First, the amount of urine voided per urethra is measured. Second, after urethral voiding the catheter valve is opened and the amount of residual urine drained via the suprapubic catheter is recorded. In the initial stages, voiding levels may be greater via the suprapubic catheter than the urethra. Once these levels have reversed, only then can a decision be made by the patient’s doctor or consultant that the suprapubic catheter can be removed (Robinson 2005). This trial may take a couple of days or weeks (Robinson 2005).

Time out 6
Identify any problems patients may encounter when they have a suprapubic catheter in place.

Suprapubic catheter problems

There are some disadvantages and contraindications to suprapubic catheter insertion (Shah and Shah 1998, Addison and Mould 2000, Robinson 2005):
Altered body image, which some patients may find difficult to accept.

Latex allergy.

Overgranulation at cystostomy entry site.

Occasional false passage.

Bypassing of urine both urethrally and via cystostomy channel.

Ulcers may develop in between the folds of skin in obese patients.

Unexplained blood in urine (haematuria).

Bladder tumours.

Small fibrotic bladders possibly caused by long-term free drainage (Addison and Mould 2000).

The presence of prosthetic devices or materials in lower abdomen (Shah and Shah 1998).

Limited time to insert a new catheter if the catheter is pulled or falls out.

Catheter balloon cuff formation Catheter balloon cuff formation is caused by the deflated catheter balloon membrane being pushed towards the tip of the catheter during removal. The cuff formation is caused by the detrusor and rectal muscles being stimulated as the catheter is being removed, gripping and forcing the deflated catheter balloon towards the catheter tip (Parkin et al 2002). In the author’s experience it predominantly affects patients with 100% silicone catheters but it can also affect patients with latex catheters.

To reduce the risk of catheter balloon cuff formation, a 100% silicone catheter with an integral balloon is available (L.I.N.C Medical Systems Ltd 2007, 2008). With this type of catheter the balloon area is level with the surface of the catheter, unlike most catheters, which are 1-2mm wider than the catheter in the balloon area (Robinson 2003a).

Catheter balloon diffusion Catheter balloon diffusion means that once inflated with sterile water the catheter balloon slowly deflates as the water passes through the balloon membrane, especially when using 100% silicone catheters. To resolve this problem, 100% silicone catheter balloons may be inflated using a sterile preloaded syringe containing 5% aqueous glycerine in 10ml sterile water (Teleflex Medical 2005, L.I.N.C Medical Systems Ltd 2007).

Problems with drainage bags Occasionally, drainage bags are fitted in the wrong position. This leads to drainage problems which can range from bypassing of urine to urinary retention caused by kinking of the catheter or drainage system (Robinson 2004). Another disadvantage in using drainage bags long term is that bladder health and function deteriorate as a result of the bladder not being used as intended (Addison 2001).

Encrustation Some patients are more susceptible to encrustation forming on the inner and outer surface of the catheter, which can cause blockage. Depending on the severity, acidic bladder instillations may have to be undertaken regularly to help dissolve this substance and avoid blockage. Patients can be taught how to undertake this procedure safely. Another method is noting in a diary when the catheter blocks and adjusting intervals so that the catheter is changed before it blocks. Patients with severe encrustation or recurring catheter blockage should be investigated (Steggall 2001).

Bypassing This may occur in three ways: via the urethra, via the cystostomy site and occasionally via the urethra and cystostomy site. It may be caused by incorrect fitting of the drainage system causing restricted or no flow of urine. Bypassing can also be caused by straining when opening the bowels, inappropriate sitting positions, lifting or strenuous activity. Patients using catheter valves can cause bypassing by not emptying their bladder at regular intervals. It could be caused by an inappropriate catheter length, Ch size and catheter balloon infill volume, urine infection or a blocked catheter. Occasional bypassing is usually normal and of no concern. However, patients should seek advice if it occurs continually. If an unstable bladder is identified,

Patient information on hygiene and suprapubic catheters

It is important to maintain a good standard of cleanliness to reduce the risk of infection. To clean the suprapubic site:

Wash and dry hands thoroughly.

Remove any surface dressing and dispose of carefully.

If possible shower daily. Use a clean cloth just for this purpose with unscented soap and water. Gently clean around the catheter and insertion area to remove any matter. Ensure no soap is left on the skin surface. Dry the area with a clean towel.

Expose area to the air as much as possible after drying. If required a clean dressing may be applied for cosmetic purposes. If the surface area is dry with no discharge, wear loose cotton underwear and change if staining occurs.

Inspect the entry site for redness. Occasionally overgranulation of tissue may occur. This is nothing to worry about as your body is trying to heal the entry site. Contact your district nurse so treatment can be commenced to reduce this overgranulation.

Occasionally urine may seep from the suprapubic entry site as well as your urethra (the tube you normally use to pass urine). This may occur when you open your bowels or undertake strenuous activities. Usually this is nothing to worry about. However, if it is continual, contact your district nurse.
**TABLE 1**

Changing a suprapubic catheter

<table>
<thead>
<tr>
<th>Action</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain to the patient why the suprapubic catheter needs to be changed.</td>
<td>Patient understands why suprapubtic catheter needs to be changed.</td>
</tr>
<tr>
<td>Allow the patient time to ask questions and provide clear, understandable answers.</td>
<td>Patients’ questions have been answered, which may help to alleviate anxiety.</td>
</tr>
<tr>
<td>Obtain verbal consent.</td>
<td>To ensure the patient has agreed to the procedure being undertaken. The patient has the right to have the catheter changed by someone of his or her sex and cultural background if available.</td>
</tr>
<tr>
<td>If possible, ask the patient to first wash around the cystostomy site using soap and water.</td>
<td>The cystostomy area is cleaned to reduce the risk of infection. If the patient cannot do this, be prepared to do it on his or her behalf.</td>
</tr>
<tr>
<td>Close doors and curtains. Remove clothing to area to be exposed, lay the patient down and make him or her comfortable.</td>
<td>To ensure patient comfort, dignity and privacy during the procedure.</td>
</tr>
<tr>
<td>Put on disposable gown.</td>
<td>To reduce risk of cross-infection of micro-organisms.</td>
</tr>
<tr>
<td>Wash and dry hands thoroughly using antibacterial soap or alcohol handrub.</td>
<td>To reduce risk of infection during the procedure.</td>
</tr>
<tr>
<td>Clean and prepare suitable work surface.</td>
<td>Area to be used for procedure is clean and suitable for use.</td>
</tr>
<tr>
<td>Place all equipment required on a clean work surface. Check all equipment is undamaged and unsoiled, and expiry dates on equipment.</td>
<td>All equipment being used is sterile, undamaged, unsoiled and within expiry dates.</td>
</tr>
<tr>
<td>Check the catheter to be inserted is licensed for suprapubic catheterisation.</td>
<td>Not all urinary catheters are licensed for this procedure.</td>
</tr>
<tr>
<td>If using latex catheters or wearing latex gloves, ask the patient if he or she is allergic to latex products.</td>
<td>To prevent latex allergy reactions.</td>
</tr>
<tr>
<td>Open all equipment using aseptic technique and place on a clean work surface.</td>
<td>All equipment required is on clean working surface.</td>
</tr>
<tr>
<td>Place disposable sheet under patient’s buttocks.</td>
<td>To prevent soiling of the bed if leakage occurs.</td>
</tr>
<tr>
<td>Wash and dry hands thoroughly.</td>
<td>To reduce risk of infection during procedure.</td>
</tr>
<tr>
<td>Wearing disposable gloves, dispose of any old dressings before the procedure.</td>
<td>To remove old dressings and expose the cystostomy site.</td>
</tr>
<tr>
<td>Wash and dry hands thoroughly and put on sterile gloves.</td>
<td>To reduce risk of infection during the procedure.</td>
</tr>
<tr>
<td>Drape sterile towels above and below cystostomy site.</td>
<td>To provide a sterile working area.</td>
</tr>
<tr>
<td>Prepare new catheter and place on sterile working area.</td>
<td>Catheter is available for insertion.</td>
</tr>
<tr>
<td>Place a small amount of sterile lubricant on the tip of catheter to be inserted.</td>
<td>To lubricate the tip of catheter to aid insertion.</td>
</tr>
<tr>
<td>Cleanse cystostomy site with 0.9% sodium chloride or suitable antibacterial lotion.</td>
<td>To clean the area before removing the old catheter.</td>
</tr>
<tr>
<td>Attach syringe to the catheter balloon inflation valve and deflate the catheter balloon.</td>
<td>To deflate the catheter balloon safely before catheter removal.</td>
</tr>
<tr>
<td>Grip the old catheter at skin surface and place a finger on either side of the catheter.</td>
<td>To support the abdomen during catheter removal.</td>
</tr>
<tr>
<td>Gently remove the old catheter in an upward direction with a slight rotation. Often resistance may be felt if removing 100% silicone catheters, which are prone to catheter balloon cuff formation (see under ‘catheter balloon cuff formation’), so a little force may be required.</td>
<td>To remove the old catheter safely.</td>
</tr>
</tbody>
</table>
this can be treated with anticholinergic medication (Robinson 2004, 2005, 2006b). **Discolouration** Discolouration can appear in the urine or staining to drainage bags. This can be caused by certain medications, in which case a warning for patients is attached to their medication packaging, or by food, for example fresh beetroot (Collins 2002). Patients who have been catheterised for long periods can develop a condition known as purple urinary bag syndrome (PUBS). This not only stains the drainage bag but also affects the catheter and gives off an odour. Although usually harmless it should be investigated by testing the patient’s urine and possibly blood samples to rule out any undetected medical problems (Robinson 2003b).

**Conclusion**
If possible, any form of indwelling urinary catheterisation should be avoided unless clinically necessary. Some patients may view having a catheter inserted as ‘the beginning of the end’ when this is not the case. The reason why a

| TABLE 1 |
| Changing a suprapubic catheter (continued) | Rationale |
| Action | |
| When the catheter is removed, judge the length of catheter removed. | To act as a guide to the depth the new catheter has to be inserted. |
| Dispose of old catheter. | To remove old catheter from working area. |
| Replace sterile gloves. | To reduce risk of infection. |
| Clean the cystostomy site. | To reduce risk of infection. |
| Place new catheter into receiver or attach new sterile bag and place on sterile area. | When the catheter is inserted urine will drain into receiver or drainage bag. |
| Grip new catheter to be inserted at the distance judged when the old catheter was removed. | This is approximately the distance of the new catheter to be inserted. |
| Put a small amount of lubricating gel onto the surface of the cystostomy site. | To lubricate the cystostomy site and catheter tip to aid insertion. |
| Slowly introduce the catheter via the cystostomy channel into the bladder to the distance judged by the old catheter. | To replace the suprapubic catheter safely. |
| Start to inflate the catheter balloon. If using a prefilled syringe (10ml) instill 2.5-3ml. No resistance should be felt. | To inflate the catheter balloon safely. |
| Slowly pull the catheter back until it is felt against the bladder wall and inflate the catheter balloon completely. | To insert the catheter safely. |
| If resistance is felt, advance the catheter a little further. | To insert the catheter safely. |
| If using a prefilled catheter have a sterile syringe nearby in case the balloon has to be deflated. | There is little control when inflating a prefilled catheter. |
| Observe if urine is draining. | To check that the catheter is draining urine. |
| If no urine is flowing, apply gentle abdominal pressure. | The drainage eyes of the new catheter may be occluded with lubricating gel. |
| Secure drainage bag to limb in correct position using either Velcro straps or leg bag holder. | To maintain maximum drainage and patient comfort. |
| Ensure cystostomy site is clean and dry. | To prevent dampness, which may cause soreness or irritation to skin surface. |
| Apply sterile surface dressing if required. | Some patients have a surface dressing for cosmetic reasons. |
| Help the patient to dress and make him or her comfortable. | Patient is dignified and no longer exposed. |
| Dispose of all used equipment in line with local policy. | The treatment area is left clean, dry and safe. |
| Record all relevant details concerning recatheterisation including any problems encountered, details of catheter inserted, date when the catheter is due for change and any ongoing treatment or investigations. | To record actions undertaken and provide information on the procedure for future reference. |
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Suprapubic catheterisation is beneficial in patients where initial urethral catheterisation or recurrent recatheterisation is problematic. Patients may have received little information on the care and management of the catheter before discharge. Therefore if possible, catheter care and management should start before the catheter is inserted by explaining what a catheter is and how the drainage system is used. Teaching, training and patient information leaflets available in written, Braille or audiotape formats play an important part in educating patients or their partners and carers in management of the catheter and drainage system before discharge.

References

Teleflex Medical (2005) 100% All Silicone Foley Catheter with Pre-Filled Syringe Containing 10% Aqueous Glycerine Solution. Teleflex Medical, High Wycombe.