# Suprapubic catheters: indications and complications

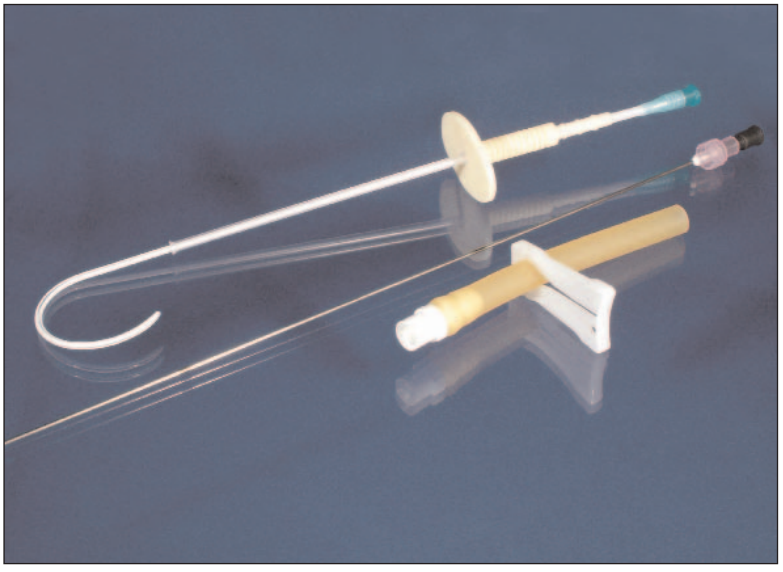
***Although considered a simple and easy procedure suprapubic catheterization is not without complications and these are likely to be under-reported. This article reviews the various techniques, indications, contraindications, complications and offers guidelines for performing suprapubic cystostomy.***

The developments of the various techniques for suprapubic catheterization reflect the ongoing attempts to develop safer methods with fewer complications. The oldest method (which some consider still the safest) is open suprapubic cystostomy. The advantages of this technique are that there is direct exposure of the bladder and consequently there is a decreased risk of inadvertent visceral injury.

## Techniques

The Bonanno™ technique (Becton Dickinson and Company, Oxford, UK) uses a smaller calibre catheter which incorporates a needle for puncture within the lumen (*Figure 1*). It is perceived to be safer and less traumatic because of the smaller calibre of the puncture, but the smaller width makes blockage more common. This, therefore, should only be used as a temporary or short-term measure. The Lawrence Add-a-cath™ kit (Femcare, Nottingham, UK) has a trocar and a covering plastic sheath (*Figure 2*). Upon removal of the trocar the catheter is introduced through the plastic sheath and after balloon inflation the plastic can be stripped away completely. The advantage is that a long-term 16 or 18 F catheter may be placed and this does not require sutures as the balloon is self-retaining.

***Figure 1. Bonanno™ catheter kit (Becton Dickinson and Company, Oxford, UK).***



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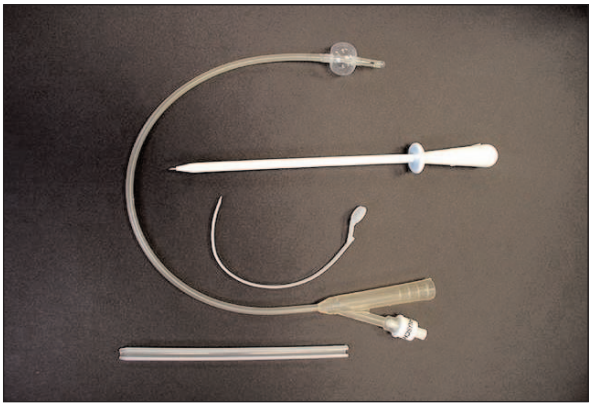

***Figure 2. Add-a-cath™ kit (Femcare Ltd, Nottingham, UK).***

Urethral sounds and retrograde bougies have been used in order to localize the suprapubic stab incision so that puncture of intestine is less likely. The authors' own preferred method involves the use of a retrograde bougie, as illustrated in *Figure 3*. Fluoroscopically-guided suprapubic catheter insertion has been described (Lee et al, 1993) as has ultrasonic guidance in the emergency setting (Aguilera et al, 2004). Lawrentschuk et al (2003) used a flexible cystoscope to fill the bladder and guide the puncture site, and they have further refined this technique by using intraoperative ultrasound to ensure a clear window devoid of intervening bowel to the bladder.

## Current use of suprapubic catheterization

Suprapubic catheters are used in acute urinary retention, post transurethral resection of prostate, and after gynaecological and general surgical procedures. They are also used as a long-term measure in patients with bladder outflow obstruction and neuropathic bladder. The reasons for their use include a lower rate of urethral stricture formation, decreased rates of bacteriuria

and urinary sepsis secondary to ascending infection, easier management, prevention of penile pressure necrosis, reduced interference with sexual function and a higher acceptability by the patient. Long-term suprapubic catheterization is generally well tolerated with a good level of satisfaction and patients reporting that it had actually improved their quality of life (Sheriff et al, 1998).

## Complications of suprapubic catheter insertion

There are many pitfalls of closed suprapubic cystostomy as a result of the proximity of the bladder, the peritoneum and its contents. The true incidence of complications associated with suprapubic catheter insertion is difficult to assess as there are few series dealing with this in the literature. Flock et al (1978) reported on their experience with 244 patients and reported a complication rate of only 1.6% with no deaths. Only two of their cases (0.8%) were complicated by bowel injury. One case developed a vesicocolic fistula managed conservatively while the other case underwent laparotomy for urinary extravasation and was noted to have two well-healed antimesenteric perforations in the ileum.

Sheriff et al (1998) reported on 185 suprapubic catheters inserted under cystoscopic guidance and had a 2.7% incidence of small bowel injury. There were five cases of small bowel injury with one death and three patients' injuries resolving with a conservative approach. Injuries to adjacent viscera such as the rectum, vagina and uterus have been described following suprapubic puncture (Stine et al, 1988).

## Discussion

In view of the hazards of suprapubic catheters, the indication for their use must be appropriate and their insertion the safest possible under the circumstances. If the patient has lower abdominal surgical scars then closed suprapubic cystostomy is relatively contraindicated because there may be loops of small bowel hanging in the pelvis anterior to the bladder. Previous pelvic radiotherapy may cause small bowel loops to lie in the pelvis and may also cause the bladder to have become small and contracted, making suprapubic cystostomy more difficult.

In the case of haematuria it is advisable to ensure that the patient does not have a bladder tumour. Inserting a suprapubic catheter in a patient with a bladder tumour will facilitate cutaneous spread of disease. Not every suprapubic mass is a bladder: haematoma from a ruptured aneurysm, a collection secondary to perforated viscus or an ovarian mass may simulate a suprapubic mass. If any doubt exists then appropriate imaging should be performed to confirm the presence of a bladder before suprapubic puncture. Urethral injury often occurs with pelvic trauma and urinary diversion by way of a suprapubic catheter is needed. Again one needs to be careful because the bladder is often displaced as a result of pelvic haematoma and urethral disruption. The presence of a neobladder is an absolute contraindication to suprapubic catheterization (*Table 1*).

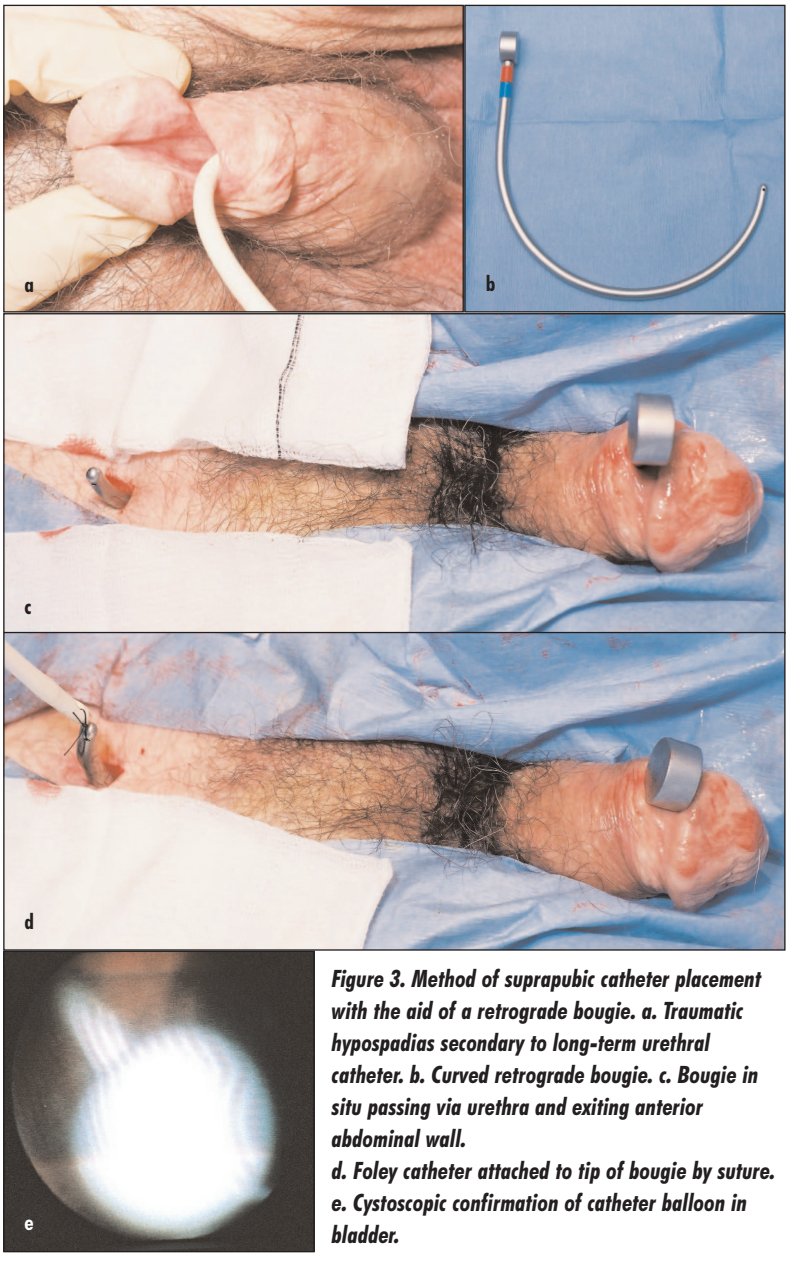


***Figure 3. Method of suprapubic catheter placement with the aid of a retrograde bougie. a. Traumatic hypospadias secondary to long-term urethral catheter. b. Curved retrograde bougie. c. Bougie in situ passing via urethra and exiting anterior abdominal wall. d. Foley catheter attached to tip of bougie by suture. e. Cystoscopic confirmation of catheter balloon in bladder.***

**Table 1. Contraindications to suprapubic catheterization**

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| Bladder tumour |
| Neobladder |
| Lower abdominal surgery |
| Pelvic irradiation |
| Non-palpable bladder |
| Unfamiliarity with procedure |

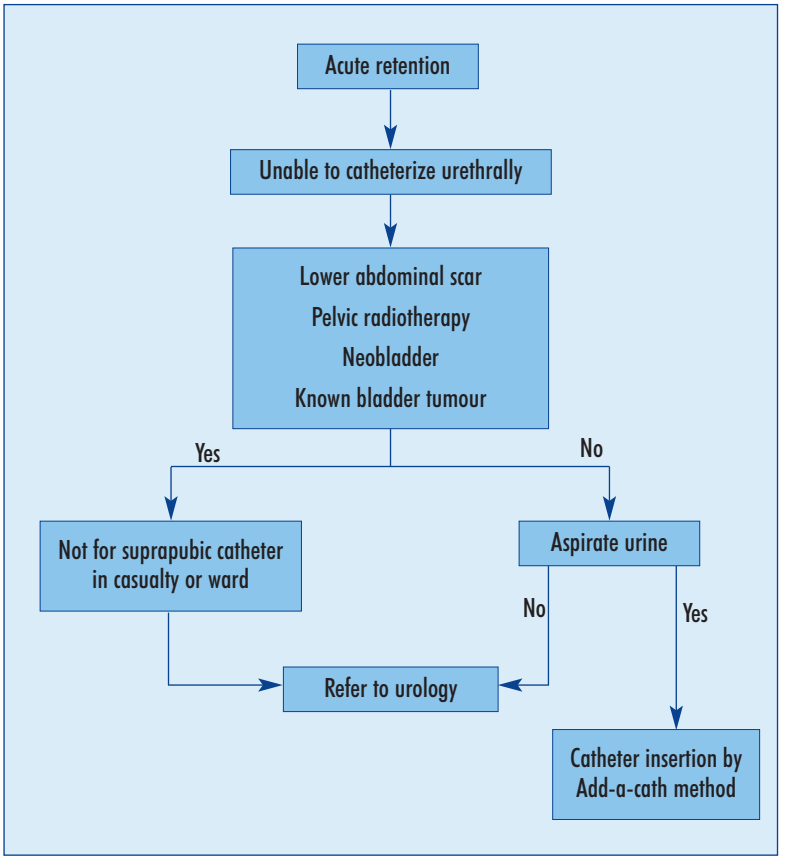


***Figure 4. Flow chart of emergent suprapubic catheter insertion.***

## KEY POINTS

- Suprapubic catheterization is not without risk and complications are under-reported.
- Suprapubic catheterization does have advantages over urethral catheterization, but these should be carefully considered in view of the complications that can occur.
- Suprapubic cystostomy should be made as safe as possible in the emergency setting and if there is any doubt then urological referral should be undertaken.
- In the elective setting a cystoscope should be used to inspect the bladder and fill it so that subsequent cystotomy may be made made directly onto a bougie or the light source of the scope under direct vision.
- If suprapubic catheterization is used then one should be aware of the potential complications which will lead to their earlier identification and treatment.

In the emergency setting when urethral catheterization is not possible it is imperative that the bladder is adequately distended and if possible this should be confirmed with a portable ultrasound and then aspiration of urine with a needle. Any lower abdominal surgical scars are a relative contraindication to proceeding further and suprapubic catheterization may then be performed with cystoscopic guidance or via an open cystostomy (*Figure 4*).

The authors recommend that elective suprapubic catheter insertion is done with the use of a flexible cystoscope. After filling the bladder with saline the light from the cystoscope should be visible transabdominally; from this point a needle should be used to aspirate urine and then catheterization performed with the Add-a-cath method. Alternatively, after filling the bladder a retrograde bougie should be passed as illustrated in *Figure 3*.

## Conclusions

The rationale for the use of suprapubic catheters should be considered and not undertaken lightly in view of the complications discussed. All efforts should be made to ensure that guidelines are instituted and, if required, the procedure is made as safe as possible. It is important to incorporate these cautions into the teaching of junior medical residents of all specialities. **BJHM**

Figure 1 *is reproduced courtesy of Becton Dickinson and Company, and* Figure 2 *is reproduced courtesy of Femcare Ltd.*

*Conflict of interest: none.*

Aguilera PA, Choi T, Durham BA (2004) Ultrasound-guided suprapubic cystostomy catheter placement in the emergency department. *J Emerg Med* **26:** 319–21

Flock WD, Litvak AS, McRoberts W (1978) Evaluation of closed suprapubic cystostomy. *Urology* **11:** 40–2

Lawrentschuk N, Lee D, Marriott P, Russell JM (2003) Suprapubic stab cystostomy: a safer technique. *Urology* **62:** 932–4

Lee MJ, Papanicolaou N, Nocks BN, Valdez JA, Yoder IC (1993) Fluoroscopically guided percutaneous suprapubic cystostomy for long term bladder drainage: an alternative to surgical cystostomy. *Radiology* **188:** 787–9

Sheriff MK, Foley S, McFarlane J, Nauth-Misir R, Craggs M, Shah PJ (1998) Long-term suprapubic catheterisation: clinical outcome and satisfaction survey. *Spinal Cord* **36:** 171–6

Stine RJ, Avila JA, Lemons MF, Sickorez GJ (1988) Diagnostic and therapeutic urologic procedures. *Emerg Med Clin North Am* **6:** 547–8