

## Review

# British Association of Urological Surgeons suprapubic catheter practice guidelines – revised

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### Aims

To report the updated and revised British Association of Urological Surgeons (BAUS) guideline on indications, safe insertion and subsequent care of suprapubic catheters (SPCs).

### Methods

The existing BAUS guideline on the insertion of SPCs was reviewed and has been updated in light of both activity and outcome data published since the original guideline was written. A systematic review of all new data from 2010 onwards was carried out. This updated guideline is largely evidence-based but, where evidence was lacking, is based on the consensus of expert opinion from members of the BAUS Section of Female, Neurological and Urodynamic Urology.

### Results

Suprapubic catheterization is widely used and generally considered a safe procedure. There is, however, a small risk of serious complications including bowel injury. The BAUS has produced an updated consensus statement on SPC use with the aim of minimizing risks and establishing best practice. Areas for future research and development are also highlighted. This review has been commissioned and approved by the BAUS and the Section of Female, Neurological and Urodynamic Urology.

### Conclusions

While SPC insertion is generally regarded as a safe procedure, the risk of serious morbidity and death must always be considered and outlined to patients. These revised guidelines should assist in minimizing the morbidity associated with SPC usage.

### Keywords

guidelines, catheter, suprapubic, safety, bowel injury, cystotomy

## Introduction

The suprapubic catheter (SPC) is commonly used for both emergency and long-term bladder drainage, with 6706 SPC insertions recorded in the UK between April 2017 and March 2018 [1]. In all, 25% of SPC insertions are performed in an emergency setting [2], commonly using a trocar kit. Elective SPC insertion can be performed in an outpatient setting, in a radiology suite or in theatre, as a cystoscopic, ultrasonography-guided or open technique.

The National Patient Safety Agency (NPSA) brought the risks of SPC insertion to the attention of the NHS in 2009, reporting three deaths and seven cases of severe harm from SPC insertion over a 4-year period [3], with inadvertent bowel injury being an important cause of morbidity and mortality. Data published

before the NPSA report suggested the risk of bowel injury was 2.4–2.7% [4,5]. Shortly afterwards, the BAUS published guidelines for safe SPC insertion [6]. Subsequent studies have reported a lower rate of bowel injury of 0–0.2% [7–12], suggesting a significant impact from the original BAUS guideline. We present an update to the BAUS guideline in light of these new data. This update will concentrate mostly on clarifying points of technique and the technological changes since the previous report.

## Methods

A systematic and easily reproducible review strategy was employed. The databases of MEDLINE, CINAHL, EMBASE, PubMed and the Cochrane library were used to search for papers relating to suprapubic catheterization since the

publication of the initial guidelines in 2010. The search terms used were: suprapubic; cystostomy; catheter; complications; and bowel (with the Boolean operators AND, OR).

The initial search identified 21 new papers relevant for further analysis. After review by two of the authors, 16 were deemed suitable for inclusion. Five papers were excluded, including four case reports with rare complications and one registry-based study deemed to be irrelevant, reporting on a country where SPC practice differs from that in the UK. For each of the papers cited, the recommendation drawn from the paper and level of evidence assigned to the paper can be found in Appendix S1.

This updated guideline is largely evidence-based but, where evidence was lacking, is based on the consensus of expert opinion from members of the BAUS Section of Female, Neurological and Urodynamic Urology. New recommendations are highlighted within the text. For those recommendations based on evidence, the level of evidence is shown, e.g. level of evidence 2 (LE2).

## Indications for SPC Use

- Acute urinary retention in the emergency setting if urethral catheterization is difficult or dangerous [13].
- Chronic urinary retention in the elective setting. Here, the systematic review shows there is some low-quality evidence to say that use of an SPC offers reduced episodes of bacteriuria and pain when compared to urethral catheterization [14]. Use of an SPC is usually preferable to urethral catheterization in patients where long-term bladder drainage is required to reduce the risk of, or avoid urethral damage.
- Neurological disease, such as multiple sclerosis or stroke [15–17], where long-term bladder drainage is required. In patients who lack urethral sensation or are confused, an SPC will avoid the risk of urethral trauma.
- Urinary incontinence. Where urine soiling is causing incontinence-associated dermatitis or nursing care difficulties.
- Postoperative care. An SPC is used in a variety of procedures including pelvic surgery, procedures for stress incontinence and colorectal surgery [18–21].
- Urethral trauma, in cases where fluoroscopically guided urethral catheterization has failed or is not accessible.
- Palliation. An SPC is used to increase comfort and simplify care.
- Urodynamic assessment. Here an SPC is used in cases where a urethral catheter cannot be used.

## Recommendations

- Clinicians contemplating SPC placement should always consider each individual patient and whether an SPC

would offer benefit over other forms of bladder drainage (intermittent catheterization, urethral catheter, pads).

- Before offering an SPC, clinicians should consider if they have access to equipment and trained staff that will enable a safe procedure to be carried out.
- NEW. Clinicians must consider individual risk factors for bowel injury when planning SPC insertion and mitigate for these risks where possible.
- All patients must be warned of the risk of all complications, including bowel injury.

## Contraindications

The list of contraindications below is not exhaustive and each case should be considered individually. Widely accepted contraindications include:

- Carcinoma of the bladder (or undiagnosed haematuria).
- Uncorrected bleeding disorder or anticoagulation treatment.
- Abdominal wall sepsis.
- Presence of a subcutaneous vascular graft in the suprapubic region, in order to avoid the rare but catastrophic report of graft rupture [22].

## Pre-Catheterization Assessment and Consent

The indication for suprapubic catheterization should be discussed with the patient and alternatives considered. Patients with urinary retention can be considered for long-term urethral catheterization or intermittent self-catheterization. Patients with incontinence may be considered for other forms of containment, such as incontinence pads or convene sheath. The risks and benefits of each approach will vary between patients, and counselling should be individualized to the patient's needs. Provision of a patient information leaflet [23] is recommended. The risks of SPC insertion include:

- Bleeding.
- Pain.
- Infection.
- Risks of long-term catheterization (spasms, recurrent infection, blockages, stones) to be covered in patients requiring long-term catheterization.
- Persistent urethral incontinence.
- Damage to bowel, requiring laparotomy. This can be life-threatening, especially in frail patients.
- Suprapubic site infection.

Clinicians must establish any history of contraindication to SPC insertion, including bleeding disorders or anticoagulation treatment, bladder cancer (known or suspected) and vascular grafts. The risk of autonomic dysreflexia needs to be considered in neuropathic patients with spinal cord lesion above T6; general anaesthesia should be considered in at-risk patients.

Clinicians should also ascertain any risk factors for bowel injury. The following are accepted risk factors for bowel injury during SPC insertion (expert opinion):

- Previous lower abdominal surgery, including laparoscopic surgery, where the bladder has been mobilized.
- Inability to distend the bladder sufficiently.

Suprapubic catheter placement should only be performed by clinicians who are trained and confident to perform the procedure. Aspiration as a method of bladder decompression can be used as a temporizing measure when specialist personnel or equipment are not available. In the absence of a clear evidence base, the authors recommend a 21-G needle, inserted one finger breadth above the pubic symphysis in the vertical plane, with urine aspirated until the patient is comfortable.

## Method of Suprapubic Catheter Insertion

Emergency SPC insertion is commonly performed in patients with acute urinary retention not amenable to urethral catheterization and in patients with urethral trauma. Insertion of a SPC using a trocar kit may be considered providing there are no contraindications to SPC insertion, no risk factors for bowel injury, and the bladder is fully distended and palpable. Palpation, percussion and portable bladder scanners will help determine if the bladder is sufficiently full.

Where the bladder cannot reliably be palpated, ultrasonography guidance should be considered. Ultrasound examination in the hands of a trained practitioner can facilitate identification of the bladder and, critically, a safe pathway into the bladder that avoids entry into the peritoneal cavity. This allows placement of the SPC using a Seldinger technique.

A history of undergoing surgery should be determined from the clinical records, patient history and examination of the abdomen. In patients with lower abdominal surgery, there is a risk of abdominal adhesions and bowel interposition between the lower abdominal wall and the bladder. The risk of bowel injury is therefore significantly higher in such patients [24]. Clinicians should be aware that certain laparoscopic operations will also be associated with increased risk of bowel interposition; for example, laparoscopic radical prostatectomy entails the mobilization of the bladder away from the anterior abdominal wall; SPC insertion in such patients mandates the same precautions as those used after open surgery. Although there is a lack of evidence on the reliability of ultrasonography to detect this, ultrasonography is thought to be helpful in avoiding bowel injury in these circumstances [10,25].

The use of ultrasonography to identify interposed loops of bowel can be challenging. If used for this purpose it is important that the operator has the necessary training and

expertise to identify bowel loops. The ultrasonography should be performed synchronously with needle insertion to allow the track of the needle to be seen in real time.

Ultrasonography (or other imaging) performed separately (non-contemporaneously) to the SPC insertion is less reliable, although this conclusion is based on expert opinion only.

When planning elective SPC insertion the clinician should consider the use of a cystoscopy to aid safe insertion. This will allow adequate bladder distension and visual confirmation of entry to the bladder at a desired point, but does not ensure there is no bowel loop between skin and bladder.

Alternatively, open cystotomy may also be considered in patients requiring SPC insertion where trocar techniques are deemed unsuitable or high risk (for example, if ultrasonography identifies interposing bowel loops), or for patients undergoing a concurrent open abdominal procedure. While this does not completely avoid the risk of bowel injury, the risks are likely to be reduced. However, open cystotomy has a higher incidence of other morbidity, including wound infection or pain, and is likely to entail a longer hospital stay.

## Recommendations

- Ultrasonography guidance should be used in those in whom the bladder cannot be readily palpated.
- Ultrasonography may also be used in patients with lower abdominal scarring (LE2).
- NEW. Ultrasonography should be performed by a suitably trained practitioner and at the same time as SPC placement.
- Open cystotomy can also be considered to mitigate the risk of bowel injury.
- Appropriate consent, aided by the provision of written information, is required.

## Technique

In rare cases where SPC is not feasible or possible, aspiration with a 21-G needle is a suitable temporizing procedure and can be performed by most medics under guidance without the need for prior training.

An SPC can be placed using approximately 20 mL of local anaesthesia, infiltrated along the whole of the proposed SPC track. An example of local anaesthesia use would be 10 mL 1% lidocaine with 10 mL 0.5% levobupivacaine, mixed to give short- and longer-acting analgesia.

Although antibiotics are not required routinely, prophylaxis should be considered in patients with potential colonization (recent UTI or instrumentation such as multiple failed catheter attempts) or comorbidities that would increase

infection risk. Antibiotic choice should be guided by cultures and local guidelines.

Anticoagulation including antiplatelet medication should, as a general rule, be discontinued. Local guidelines should be followed on this.

The bladder should be adequately filled to allow safe SPC insertion. A volume of at least 300 mL is recommended to raise the dome to 5 cm above the pubic symphysis [26]; distension with larger volumes of fluid should increase the margin of safety for the procedure, as the ‘target’ area for entry into the bladder will be larger. Usually a distended bladder can be palpated, but must be confirmed by aspiration or ultrasonography. Cystoscopy can be used to ensure adequate bladder distention and to facilitate a satisfactory catheter entry point.

There has been no formal evaluation of the relative safety of the various SPC insertion techniques, although the following are in common use:

- Modified trocar systems using Seldinger principle. A guide to this technique is available from the National Institute of Health and Care Excellence [27]. This facilitates ultrasonography guidance and may allow a more controlled insertion, but there is, as yet, no published evidence of improved safety.
- Trocar systems without Seldinger principle. These are also used but have largely been superseded by Seldinger kits in the UK in recent years.
- Urethral sounds (e.g. Lowsley retractor, Haygroves sound). Inserted via the urethra, the instrument is curved to allow the tip to press the bladder wall against the anterior abdominal wall. The operator then cuts down onto the instrument and attaches the catheter to its tip before withdrawing the instrument, drawing the catheter into the bladder [7]. This has the advantage of allowing a larger-bore catheter to be deployed if desired, but does not guard against bowel injury.

The clinician should use the method in which they are trained and with which they feel comfortable.

Whichever method is used, the catheter should ideally be inserted through the avascular midline of the rectus sheath above the pubic symphysis. This location may not be possible or suitable in cases of lower abdominal surgery or altered anatomy, and clinical judgement should be used. In obese patients, it is preferable to avoid insertion of the catheter within a skin fold due to risk of infection and difficult catheter changes, although this is not always possible. A catheter size of at least 16 Ch should be used.

In cases where the distended bladder cannot be readily palpated and ultrasonography is either unavailable or fails to confirm a distended bladder free of overlying bowel loops, an

open approach is recommended. This can be performed via a small suprapubic incision, taking care to mobilize any interposing bowel away from the catheter track.

No evidence is available as to whether to use a suture to secure the catheter to the skin. All authors vary in their clinical practice and thus suture placement is optional.

## Recommendations

- In rare cases where SPC placement is not possible or feasible, aspiration with a 21-G needle is an accepted temporizing measure (LE3).
- General anaesthesia should be considered for use in patients at risk of autonomic dysreflexia or those in whom the bladder cannot be easily filled to 300 mL (LE3).
- Antibiotic prophylaxis should be considered in at-risk patients (LE3).
- The method of SPC insertion is a matter of individual preference but practitioners must be adequately trained and must evaluate the risks of bowel injury in each case (LE3).
- A closed technique may be used where there is no history of lower abdominal scarring and urine can be aspirated from an adequately distended bladder (LE3).
- Where the bladder cannot be palpated, ultrasonography guidance may be used as an adjunct to closed insertion. Cystoscopy can also be used to facilitate bladder filling and optimize catheter position (LE3).
- If the bladder cannot be adequately filled or there is lower abdominal scarring, an ultrasonography-guided insertion can be performed by a practitioner who is adequately trained. Alternatively, an open cystotomy technique should be used (LE3).

## Complications

Haematuria after insertion will usually stop spontaneously. Management of rare cases of significant postoperative bleeding may be facilitated by insertion of a urethral catheter to aid irrigation, and traction on the SPC may tamponade the track.

Misplacement of a catheter, where the catheter balloon fails to reach or stay in the bladder so that it lies in the abdominal wall, should be evident at the time of insertion and requires catheter re-insertion. Passage of the catheter tip into the urethra may present with blood at the meatus or with retention. This should be treated by emptying the balloon and withdrawing the catheter into the bladder, ideally performed with local anaesthesia cystoscopy to confirm correct placement.

Analysis of the rates of bowel injury prior to the NPSA alert and the publication of the original BAUS guidelines suggests a historical bowel injury risk of approximately 2.5% [4,5].

Studies published subsequent to the NPSA alert and BAUS guideline publication suggest a bowel injury rate of 0–0.2% [7–12,28]. Caution must be exercised when drawing conclusions from the comparison of these different studies, as differences in populations and methodology will introduce bias. Accepting the limitations of interpretation of the available data, changes in working practice since the NPSA and BAUS publications may have contributed to an improvement in bowel injury rates

Although rare, bowel injury can lead to serious morbidity and even death [29]. The presentation may be subtle, particularly in patients with significant comorbidities (as is not unusual in this patient cohort), and clinicians should have a low index of suspicion postoperatively in a patient who complains of significant pain, fever or non-specific symptoms. Careful postoperative examination is recommended to ensure no signs of peritonism. If suspected, CT imaging should be obtained urgently (if available in a timely manner); a laparotomy may be required. The authors recommend provision of written guidance for patients (and carers) with instructions for prompt re-referral and review if there is persistent pain, generalized abdominal pain, vomiting or systemic symptoms. Clinicians should also be alert to the possibility of late presentation, including at the time of first catheter exchange [30].

Wound infection should be treated with antibiotics, either oral or parenteral, depending on the presentation. Mucus discharge around the catheter tract or granuloma formation are common longer-term problems that can be treated conservatively. Antibiotic treatment in the absence of cellulitis is not recommended. Hygiene at the SPC site is helpful and granulomas can be cauterized with a silver nitrate stick.

## Recommendations

- Cellulitis and symptomatic UTIs should be treated with antibiotics (LE3).
- Clinical staff, patients and carers need to be alert for the signs and symptoms of visceral injury. Patients should receive written information that includes appropriate contact details (LE3).

## Long-Term Care

Suprapubic catheter changes should be performed at regular intervals, as stated by the manufacturer (often 10–12 weeks); however, this can be done more often in cases of recurrent blockages. Patients and carers can also be taught how to change the SPC as this can greatly increase independence. The first change does not need to be performed by the team who inserted the catheter. The first change should not be done until the tract has had time to ‘mature’ (at least

6 weeks). Filling the bladder with 100 mL saline before change can help identify correct replacement.

Loss of catheter tract can occur if the first change is done before the tract has ‘matured’. It can also occur if the balloon is inflated within the tract rather than the bladder. When changing the catheter this can be avoided by advancing the catheter fully. This does however risk the catheter tip passing into the urethra or even through the entire length of the urethra. Visual inspection of the perineum will alert clinicians to this, and slow inflation of the balloon with immediate repositioning if the patient experiences pain should be performed. Once the patient is catheterized, correct placement can be confirmed by slowly advancing and retracting the catheter 2 cm and feeling the balloon against the bladder wall.

Failure to reinsert the catheter should prompt immediate referral to the urology department as tract salvage may be possible in secondary care. The tract will be lost quickly, thus immediate referral is required.

Frequent catheter blockages can be managed by using a larger-bore catheter and regular bladder washouts performed by a district nurse or the patient themselves, providing they have had appropriate training. Dependent catheter bags can cause a significant siphoning effect which can cause increased bladder mucosa catheter reaction. The polypoid mucosa blocks the catheter eye holes and causes bypassing or blockages. Raising the level of the bag can reduce siphoning. Using the catheter valve and performing on clip and release for periods of time throughout the day also reduces this effect in appropriately selected patients.

In cases of recurrent blockages, clinicians should consider the possibility that bladder stones are present. These are not readily identified on abdominal plain radiograph and thus a cystoscopy or ultrasonography should be performed if this is suspected [31].

Catheter bypassing can be caused by either blockage (discussed above), low outlet resistance, or detrusor contractions. Detrusor contractions can be reduced using antimuscarinic medication, mirabegron or intravesical botulinum toxin injections [32]. Low bladder outlet resistance can be treated using vaginal slings or, occasionally, urethral closure. If the cause of the bypassing is unclear, urodynamic investigation may be of help.

The option of a catheter valve offers patients more freedom without a ‘bag’, however, should only be offered in motivated patients who will empty regularly and those who do not have high filling pressures due to poor compliance.

Bacteriuria will inevitably be present in any patient with an indwelling catheter and this should not be treated in the vast majority cases if the patients are not symptomatic. Exceptions

to this would include pregnant women and immunocompromised patients. Urine dipstick testing is unhelpful in the evaluation of suspected catheter-associated UTI and should be avoided. In cases of symptomatic infection, antibiotics should be given and consideration given to changing the catheter (possibly after a period of 24 h of antibiotics) if it has been *in situ* for more than 7 days. There is little evidence that prophylactic antibiotics are effective for reducing catheter-associated UTI [33].

## Recommendations

- SPC changes can be performed by anyone with appropriate training (including patients).
- Loss of tract or failure to re-catheterize should prompt immediate referral to secondary care
- Regular bypassing or blockages should prompt referral to the urology department.
- NEW. Cystoscopy or ultrasonography should be performed if frequent blockages are occurring
- NEW. Bypassing caused by detrusor contractions can be reduced using antimuscarinics, mirabegron or botulinum toxin injections (LE2).

## Training

Suprapubic catheterization should be performed in secondary care by staff trained and competent to undertake the procedure. Suprapubic catheter changes can be performed in the community by nursing staff, carers or patients given adequate training.

The use of ultrasonography should only be undertaken by personnel trained and confident in its use. The use of ultrasonography to detect interposed bowel loops in patients considered high-risk for bowel injury should be performed only by trained practitioners.

## Research

The authors believe that high-quality studies are needed in the following areas:

- Comparing the safety and efficacy of the different methods of insertion.
- The risks of visceral injury with and without the use of ultrasonography.
- The influence on bladder-filling volumes on the distance between the bladder reflection and the pubic symphysis.
- Catheter type and ease of change.
- Preventative treatments for recurrent catheter-associated UTI.

## Conflicts of Interest

None declared.

## References

- 1 Hospital Episode Statistics (HES) [Internet]. NHS Digital. Available at: <https://digital.nhs.uk/data-and-information/data-tools-and-services/data-services/hospital-episode-statistics>. Accessed January 2019
- 2 Khan A, Abrams P. Suprapubic catheter insertion is an outpatient procedure: cost savings resultant on closing an audit loop. *BJU Int* 2009; 103: 640–4
- 3 Lamont T, Harrison S, Panesar S, Surkitt-Parr M. Safer insertion of suprapubic catheters: summary of a safety report from the National Patient Safety Agency. *BMJ* 2011; 342: d924
- 4 Ahluwalia RS, Johal N, Kouriefs C, Kooiman G, Montgomery BSI, Plail RO. The surgical risk of suprapubic catheter insertion and long-term sequelae. *Ann R Coll Surg Engl* 2006; 88: 210–3
- 5 Sheriff MK, Foley S, McFarlane J, Nauth-Misir R, Craggs M, Shah PJ. Long-term suprapubic catheterisation: clinical outcome and satisfaction survey. *Spinal Cord* 1998; 36: 171–6
- 6 Harrison SCW, Lawrence WT, Morley R, Pearce I, Taylor J. British Association of Urological Surgeons' suprapubic catheter practice guidelines. *BJU Int* 2011; 107: 77–85
- 7 Edokpolo LU, Foster HE. Suprapubic cystostomy for neurogenic bladder using Lowsley retractor method: a procedure revisited. *Urology* 2011; 78: 1196–8
- 8 Jacob P, Rai BP, Todd AW. Suprapubic catheter insertion using an ultrasound-guided technique and literature review. *BJU Int* 2012; 110: 779–84
- 9 Goyal NK, Goel A, Sankhwar SN. Safe percutaneous suprapubic catheterisation. *Ann R Coll Surg Engl* 2012; 94: 597–600
- 10 Johnson S, Fiscus G, Sudakoff GS, O'Connor RC, Guralnick ML. The utility of abdominal ultrasound during percutaneous suprapubic catheter placement. *Can J Urol* 2013; 20: 6840–3
- 11 Zacharia SC, Sinha M, Matippa P, Krishnamoorthy V. An audit of suprapubic catheter insertion performed by a urological nurse specialist. *Indian J Urol* 2013; 29: 16–8
- 12 Cronin CG, Prakash P, Gervais DA et al. Imaging-guided suprapubic bladder tube insertion: experience in the care of 549 patients. *AJR Am J Roentgenol* 2011; 196: 182–8
- 13 Horgan AF, Prasad B, Waldron DJ, O'Sullivan DC. Acute urinary retention. Comparison of suprapubic and urethral catheterisation. *Br J Urol* 1992; 70: 149–51
- 14 Kidd EA, Stewart F, Kassis NC, Hom E, Omar MI. Urethral (indwelling or intermittent) or suprapubic routes for short-term catheterisation in hospitalised adults. *Cochrane Database Syst Rev* 2015; (12): CD004203
- 15 Feifer A, Corcos J. Contemporary role of suprapubic cystostomy in treatment of neuropathic bladder dysfunction in spinal cord injured patients. *Neurourol Urodyn* 2008; 27: 475–
- 16 Fowler CJ, Panicker JN, Drake M et al. A UK consensus on the management of the bladder in multiple sclerosis. *J Neurol Neurosurg Psychiatry* 2009; 80: 470–7
- 17 Mitsui T, Minami K, Furuno T, Morita H, Koyanagi T. Is suprapubic cystostomy an optimal urinary management in high quadriplegics? A comparative study of suprapubic cystostomy and clean intermittent catheterization. *Eur Urol* 2000; 38: 434–8
- 18 Bouchet-Doumenq C, Lefevre JH, Bennis M, Chafai N, Turet E, Parc Y. Management of postoperative bladder emptying after proctectomy in men for rectal cancer. A retrospective study of 190 consecutive patients. *Int J Colorectal Dis* 2016; 31: 511–8
- 19 Takase-Sanchez MM, Thompson JC, Hale DS, Heit MH. Suprapubic versus transurethral bladder drainage following reconstructive pelvic surgery: a comparison of patient satisfaction and quality of life. *Int Urogynecol J* 2017; 28: 721–8
- 20 Andersen JT, Heisterberg L, Hebjørn S et al. Suprapubic versus transurethral bladder drainage after colposuspension/vaginal repair. *Acta Obstet Gynecol Scand* 1985; 64: 139–43

- 21 Branagan GW, Moran BJ. Published evidence favors the use of suprapubic catheters in pelvic colorectal surgery. *Dis Colon Rectum* 2002; 45: 1104–8
- 22 Jalil R, Mukundan C, Bhatti TS. An adverse event of suprapubic catheter SPC insertion. A call for updating the existing guidelines. *BMJ Case Rep* 2012; 2012: bcr2012007424
- 23 Suprapubic.pdf [Internet]. Available at: [https://www.baus.org.uk/\\_userfiles/pages/files/Patients/Leaflets/Suprapubic.pdf](https://www.baus.org.uk/_userfiles/pages/files/Patients/Leaflets/Suprapubic.pdf). Accessed January 2019
- 24 Okabayashi K, Ashrafian H, Zacharakis E et al. Adhesions after abdominal surgery: a systematic review of the incidence, distribution and severity. *Surg Today* 2014; 44: 405–20
- 25 Lee MJ, Papanicolaou N, Nocks BN, Valdez JA, Yoder IC. Fluoroscopically guided percutaneous suprapubic cystostomy for long-term bladder drainage: an alternative to surgical cystostomy. *Radiology* 1993; 188: 787
- 26 Albrecht K, Oelke M, Schultheiss D, Tröger HD. The relevance of urinary bladder filling in suprapubic bladder catheterization. *Urol Ausg A* 2004; 43: 178
- 27 Scath-system-for-suprapubic-catheterisation-pdf-63499293712069.pdf [Internet]. Available at: <https://www.nice.org.uk/advice/mib68/resources/scath-system-for-suprapubic-catheterisation-pdf-63499293712069>. Accessed August 2019
- 28 Hall S, Ahmed S, Reid S et al. A national UK audit of suprapubic catheter insertion practice and rate of bowel injury with comparison to a systematic review and meta-analysis of available research. *Neurourolog Urodyn* 2019; 38: 2194
- 29 Rapid Response Report – Supporting Info.pdf [Internet]. Available at: <https://irp-cdn.multiscreensite.com/4148aa48/files/uploaded/Rapid%20Response%20Report%20-%20Supporting%20Info.pdf>. Accessed March 2019
- 30 Stonier T, Simson N, Wilson E, Stergios KE. Bowel perforation presenting three months after suprapubic catheter insertion. *BMJ Case Rep*. 2017; 2017: bcr2017220791
- 31 Linsenmeyer MA, Linsenmeyer TA. Accuracy of bladder stone detection using abdominal X-ray after spinal cord injury. *J Spinal Cord Med* 2004; 27: 438–42
- 32 Young MJ, Osman NI, Phillips L et al. Another therapeutic role for intravesical botulinum toxin: patients with long-stay catheters and refractory bladder pain and catheter bypass leakage. *Eur Urol Focus* 2020; 6: 339–43
- 33 draft-guideline.pdf [Internet]. Available at: <https://www.nice.org.uk/guidance/ng113/documents/draft-guideline>. Accessed August 2019

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Abbreviations: SPC, suprapubic catheter; NPSA, National Patient Safety Agency.

## Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Appendix S1.** Evidence used for recommendations.