British Association of Urological Surgeons (BAUS) and Nurses (BAUN) Consensus Document: Management of the Complications of Long Term Indwelling Catheters

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Abstract

Complications of long-term indwelling catheters include catheter-associated urinary tract infections (CAUTI), purple urine bag syndrome, catheter blockages, bladder spasms (causing pain and urinary leakage), loss of bladder capacity, urethral erosion ("catheter hypospadias")/dilatation of bladder outlet and chronic inflammation, (metaplasia and cancer risk). We aim to look at best evidence and expert opinion to provide advice in the form of a consensus statement lead by Female, Neurological and Urodynamic Urology (FNUU) section of the British Association of Urological Surgeons (BAUS) in conjunction with the British Association of Urological Nurses (BAUN).

Keywords

Catheter, suprapubic catheter, catheter associated urinary tract infection, bypassing, catheter spasm

Introduction

The management of the complications of long-term indwelling catheters falls into the remit of every urologist and urology nurse specialist. The primary purpose of this document is to share best practice in order to minimise the frequency, severity and impact of these problems. We have also produced a set of recommendations and a catheter trouble shooting table to help guide management when these complications occur.

A long-term catheter is one that can stay in for more than 28 days, although for many patients, it is intended to be permanent. It is commonly used for patients who are unable to empty their bladder or store urine effectively and safely. It can also be used to manage incontinence and for those with poor mobility. 3.8% of people over 65 years in care homes in the UK use long -term catheters [1] and there are about 90,000 long-term catheter users in the U K [2]. Side effects or complications are not uncommon but there is a lack of meaningful data. The complications that will be addressed in this document are:

- Catheter-associated urinary tract infections (CAUTI)
- Purple urine bag syndrome
- Catheter Blockages
- Bladder spasms (causing pain and urinary leakage)
- Loss of bladder capacity

- Urethral erosion (“catheter hypospadias”) and dilatation of bladder outlet
- Chronic Inflammation, metaplasia and cancer risk

Methods

This consensus statement has been devised by BAUS FNUU Executive Committee (who are an elected group of urologists with an interest in the field of female urology, neurourology, urodynamics and reconstruction of the urinary tract) in conjunction with BAUN Trustees (who are a collective of nurses appointed by BAUN members, who represent experience and expertise in the field of urological nursing).

Following FNUU Executive Committee discussion, a literature search was performed to identify contemporary data in the published peer-reviewed literature using the MEDLINE database, relevant to the current best standard of management for the management of long term catheter complications. The terms and phrases used included ‘urinary catheter’, ‘catheter blockage’, ‘catheter combined with overactive bladder’ , ‘catheter associated urinary tract infection’, ‘ purple urinary bags syndrome’, ’suprapubic catheter’. References from relevant sections of contemporary national and international guidelines produced by NICE, European Association of Urology (EAU) and European Association of Urological Nurses (EAUN) were also screened. Where clinical evidence was lacking consensus expert opinion was achieved from core members of the group.

The document then underwent 3 rounds of review by a FNUU Section Executive Committee members as well as representatives from the BAUN executive committee. The document was then reviewed by the whole BAUN Trustee group as expert reviewers and a separate experienced urologist and comments fed back to a further review with the FNUU committee. It was then distributed to all BAUS FNUU membership for widespread scrutiny and further comments to help refine the guidance into a consensus statement. This revised document was rediscussed at the FNUU Executive Committee and consensus meetings on 22nd October 2020, and then presented at the annual BAUS meeting on 11th November 2020. BAUS Council and BAUN Trustees made final comments and reviewed in January 2021. The methodology is summarised in Figure 1.

Where possible, the statement is based on published evidence and reference to existing guidelines. However, where there is a lack of published evidence, this statement is based on expert opinion.

Best Practice Catheter Care

Alternatives to long-term catheterisation should always be considered, such as intermittent self-catheterisation for patients unable to empty their bladder and pads or external collection devices when incontinence cannot be treated. However, some patients will require or will choose to have a catheter for their long-term bladder management. Recommendations from NICE are as follows **"Catheterisation should be used only after considering alternative methods of management. The person's clinical need for catheterisation should be reviewed regularly and the urinary catheter removed as soon as possible. The need for catheterisation, as well as details about insertion, changes and care should be documented" [3] .**

Assessment of patient needs for an indwelling catheter should involve the varying competencies of the multidisciplinary team and ideally be headed by the specialist nurse. Patient consent, information giving and on-going support are crucial to ensure compliance and understanding. "Ensure patients, relatives and carers are given information regarding the reason for the catheter and the plan for review and removal. If discharged with a catheter, the patient should be given written information and shown how to: manage the catheter and drainage system; minimise the risk of urinary tract infection; and obtain additional supplies suitable for individual needs" [4].

Healthcare professionals involved in catheter management need comprehensive understanding of appropriate catheter products and associated equipment. Understanding of both urethral and suprapubic catheters is vital to aid patients' compliance. Comprehensive troubleshooting skills are required by healthcare professionals in order to manage successfully the problems caused by long term catheters. These include but are not limited to bladder spasm, bypassing of urine, catheter blockages, haematuria and recognising anatomical defects i.e. paraphimosis and urethral erosion. Good fluid intake, avoidance of constipation and catheter hygiene are essential parts of catheter care best practice. The European Association of Urological Nurses evidence-based guidelines for best practice in the use of indwelling catheters in adults [5] provide more detailed advice.

The use of a catheter passport is recommended. It has been developed to ensure catheterised service users receive the optimum standard of care by improving communication between hospital, community and the service user. The Passport should be issued to service users after insertion of a urinary catheter. It can be downloaded from the following website: (https://improvement.nhs.uk/documents/5119/Catheter_passport_v4.pdf)

BAUS RECOMMENDATION 1: Catheterisation should be used only after considering alternative methods of management. The person's clinical need for catheterisation should be reviewed regularly and the urinary catheter removed as soon as possible. All patients should have a catheter passport.

Which Catheter?

The standard indwelling Foley catheter has an eye hole for drainage below the balloon. A Tiemann or Coude catheter, which has a bent tip, can be useful for difficult catheterisation in men. Open-ended catheters may provide advantages in terms of drainage and also facilitate changing over a guide-wire when needed; however they can also be more traumatic for catheter changes.

Catheter balloons are filled with 10ml sterile water, although some manufacturers provide a 10% glycerine solution intended to prevent the gradual deflation of the balloon by osmosis; however, there is a lack of evidence for its efficacy. There is no evidence that larger balloon volumes prevent catheter expulsion and they may cause damage, particularly in the female.

Catheter size is enumerated by the Charriere (Ch) or French Gauge (F); the gauge is 3 times the external diameter in millimetres. Catheters are available in sizes 6-30 (even numbers only). However catheters greater than size 16 are not usually recommended for long-term urethral use because of the risk of urethral damage. Suprapubic catheters(SPC) can be of any size, which may be useful to improve drainage. Catheters for men are 41-45cm in length and female catheters are 25cm, although some women may be more comfortable with the longer male catheters. Mistakingly inserting a female length urethral catheter into a male urethra can cause damage if the balloon is not inflated into the bladder. For that reason some hospitals do not have female length catheters in stock. Male length catheters tend to be used for SPCs, but some slimmer patients find the shorter female catheters more comfortable.

Long-term catheters (maximum 12 weeks duration) should be either made of silicone, coated latex or coated silicon (with hydrogel), but pure latex catheters are only suitable for short-term use. Silicon catheters have a larger lumen (for the same gauge) compared to the coated catheters. Hydrogel coated latex catheters are softer and have a less rigid balloon when it is deflated so some patient find them more comfortable particularly for SPC changes. The Cochrane library published a review in 2012 and concluded there was little evidence available to recommend one catheter as being better than another [6].

Route Urethral or Suprapubic?

Catheters can be placed via the urethra or trans-abdominally (suprapubic catheter, SPC).

There is insufficient evidence to suggest that SPC carries a reduced risk of catheter-associated urinary tract infection, stone formation, loss of capacity or chronic inflammation. Although some patients find SPC more comfortable and bladder spasms may be reduced, others can experience significant suprapubic pain, even when the catheter has been correctly sited.

The suprapubic route can prevent the development of urethral erosions, including traumatic hypospadias, especially in patients with impaired sensation (e.g. neuropathic bladders), impaired mobility or impaired cognition. Gradual dilatation of the bladder outlet is a common problem in women using long-term urethral catheters, and although spontaneous expulsion of SPC is described, this is much less likely than with urethral catheters.

Use of urethral catheters in males or females affects sexual function so the suprapubic route may also be preferred for that reason.

Catheter blockages contribute to bypassing and pain and may require frequent catheter changes. While SPC are potentially just as prone to blocking as urethral catheters, the suprapubic route allows larger bore catheters to be used (e.g. 20Ch or higher) and this may reduce the risk of blocking and associated bypassing. However, urethral incontinence may still be problematic for patients with a suprapubic catheter.

There is a small but definite risk of bowel injury (less than 1%) occurring during SPC insertion but this is increased in patients with a history of lower abdominal surgery [7]. Difficulties may also arise in patients whose bladder cannot be filled adequately or who are obese. A full description of best practice in the insertion and management of SPC may be found in the BAUS SPC guidelines [7].

Commonly, patients report discharge around the SPC exit site. This is usually harmless and does not require treatment. Swabs are not helpful and antibiotics are not needed. This is best managed with gauze dressings, if needed. Over granulation of the suprapubic site can be treated with topical silver nitrate application.

BAUS RECOMMENDATION 2: The suprapubic route for catheterisation should be used if safe to do so to prevent urethral injury.

Catheter-associated UTI

Catheter Associated UTI (CAUTI) is one of the leading causes of secondary care acquired sepsis and admission to hospital.

Definition

There is no universally accepted definition of catheter associated UTI (CAUTI) but most commonly accepted definition is based on meeting three criteria provided by the European Association of Urology [8].

1. UTI occurring in a patient who had an indwelling urinary catheter in place within the 48-hour period preceding the UTI;
2. Symptoms of CAUTI, defined as fever or suprapubic tenderness or costovertebral angle tenderness, altered mental status, malaise or lethargy with no other identified cause and acute haematuria;
3. Positive urine culture, defined as microbial growth of > 10^3 CFU/mL of one or more bacterial species in a single catheter urine specimen.

CAUTI are by definition symptomatic and are not the same as asymptomatic bacteriuria.

The CSU sample must be a non-touch, aseptic technique and must be taken from the sampling port on the drainage bag. Do not obtain a CSU from a drainage bag even immediately after changing it.

Investigation and Prevention

Studies suggest that as many as 70% of all CAUTIs are preventable with current evidence-based strategies. The following are recommended:

- Patients with recurrent CAUTI need investigation (eg US and cystoscopy). Recurrent UTI in non-catheterised patients is defined as repeated UTI with a frequency of 2 or more UTIs in the last 6 months or 3 or more UTIs in the last 12 months [9]. There is no recognised definition for recurrent CAUTI. Where possible, a closed drainage system is preferable – patients with pre-connected sealed junctions less likely to have UTI than those with catheters without similar junctions [10].
- There is currently an NIHR trial ongoing to assess the role of catheter washout solutions. Success with aminoglycoside instillation has been reported with an ongoing major study [11].

- Antibiotic treatment is not recommended for asymptomatic bacteriuria.
- Routine antibiotic prophylaxis to prevent CAUTI in patients with indwelling catheters is not recommended but may be appropriate in some cases. When changing catheters in patients with a long-term indwelling urinary catheter, do not offer antibiotic prophylaxis routinely but only consider antibiotic prophylaxis for patients who have a history of symptomatic urinary tract infection after catheter change or experience trauma during catheterisation.

In 2018, NICE published comprehensive guidelines on CAUTI which can be accessed www.nice.org.uk/guidance/ng113 [12]; the above advice incorporates the key recommendations.

Treatment

In most cases CAUTI will require antibiotic therapy. However, given the almost universal presence of asymptomatic bacteriuria in the presence of a catheter antibiotics should only be started where there is clear evidence of symptomatic infection. Where there is evidence of sepsis or life-threatening infection, prompt effective antibiotic treatment should be given as soon as possible. In such patients, therapy should not be delayed but urine and/or blood samples for culture should, if possible, be obtained prior to treatment.

The treatment of CAUTI should be along the lines of treatment for other complicated UTI. Optimal duration of treatment has not been systematically studied. However, for general guidance, it is recommended that treatment be continued for 7 days in cases where symptoms are primarily restricted to the lower urinary tract and 14 days in cases with fever, bacteraemia, organ impairment or sepsis.

There is no evidence that silver coated catheters or antibiotic coated catheters confer any protection against urinary tract infections in patients with long-term catheters and therefore the use of such catheters is not recommended. Although there is some ongoing research into antibiotic eluting catheters, these are still in the trial phase.

When UTI treatment is required, consider removing or changing the catheter if it has been in place for more than 7 days [12], but do not delay antibiotic treatment. Ideally catheter change should be performed during the antibiotic course.

BAUS RECOMMENDATION 3: Antibiotic treatment is not recommended for asymptomatic bacteriuria

BAUS RECOMMENDATION 4: CAUTI should be treated as a complicated UTI and the catheter should be changed following the establishment of antibiotic therapy.

BAUS RECOMMENDATION 5: Patients with recurrent CAUTI need investigation

Purple Urine Bag Syndrome (PUBS)

PUBS is an uncommon condition with purple discoloration of the urine within the catheter drainage system.

It is most commonly seen in patients who are catheterised and constipated. The purple colour is thought to be derived from metabolites of tryptophan which can be found in high levels in the gut of constipated patients metabolised by gut bacteria. Also thought to contribute is recurrent urinary tract infections with bacteria containing sulphatase and phosphatase enzymes results in the formation of pigments; indirubin (red) and indigo (blue), the mixture of which turns the urine purple, most commonly Providencia stuartti and rettgeri, Proteus mirabilis, Pseudomonas auruginosa, Klebsiella pneumoniae, Escherichia coli, Morganella, and citrobacter species, Enterococci, and Group B Streptococci

Although treatment of underlying symptomatic UTI may be useful initially, ongoing treatment of asymptomatic bacteruria is usually not appropriate. Management should be directed at good catheter care and control of constipation [13]. Patients should be reassured that the problem is not harmful and can be treated conservatively.

BAUS RECOMMENDATION 6: Management of PUBS should be directed at good catheter care and control of constipation. Although treatment of underlying symptomatic UTI may be useful initially ongoing treatment of asymptomatic bacteriuria is usually not appropriate

Catheter Blockage

Catheter blockage is common and can be a medical emergency. In addition to causing distress to the patient and caregivers it can lead to urosepsis [14].

In patients with spinal cord injury (SCI) most frequently at or above T6, there is a risk of autonomic dysreflexia. This is a potentially dangerous condition in which a painful stimulus causes a rapid and potentially fatal rise in blood pressure, usually associated with bradycardia. A blocked catheter is a common trigger for this condition and this diagnosis must be considered in at-risk patients with signs of dysreflexia. Immediate catheter exchange is required to alleviate the bladder distension.

Catheter blockage can occur because of the catheter tip embedding in the back of the bladder: the siphon effect of fluid in the catheter tube produces suction at the catheter tip pulling the bladder mucosa into the catheter eyeholes and occluding them [15]. This can partly be alleviated by raising the drainage bag, thus reducing the negative pressure. Tipless catheter designs are also available to try and mitigate this problem; these include catheters with a terminal drainage hole flush with the balloon, drainage holes above the balloon and catheters with drainage holes positioned between two balloons. High-level evidence for the efficacy of these designs has not been published.

Another common cause of blockage is a build-up of luminal debris and/or encrustation. Various factors can contribute to this, including low urine output, kinking or compression of tubing and bacterial colonisation. Urease-producing bacteria (e.g. Proteus mirabilis, Pseudomonas aeruginosa, Staphylococcus aureus, Klebsiella) can lead to encrustation with the formation of a crystalline biofilm [16]. Treatment and prevention involves identifying and addressing these problems where possible, although bacterial colonisation and biofilm production cannot be prevented. Antibiotic prophylaxis is not recommended. While there is at best low level evidence to confirm the efficacy for the use of Methenamine Hippurate [17] , D mannose , cranberry products, acidification of urine [18] and minimising excess dietary calcium [19,20] some health care professionals and patients report improvement.

Management Strategies

Health care professionals need to trouble shoot with patients when they are experiencing recurrent catheter problems such as blockages. Table 1 provides a trouble-shooting aid adapted from the EAUN guidelines [5].

A variety of techniques can be employed to minimise the risk of catheter blockages.

- Ensure good urine output at least 2 litres a day.
- Ensure good diet and optimisation of bowel management.
- Minimise mechanical blockage by regular drainage bag emptying and the ensuring no kinks in the tubing.
- The vacuum effect of urine in the drainage tubing can suck the mucosa into the eye of the catheter if the bag is placed too low and repositioning of the drainage bag and slight elevation may help.
- Consider bladder washouts or catheter maintenance solutions.

- With recurrent blockage, ensure that bladder stones have been excluded by appropriate investigation.
- Minimise bacterial colonisation to decrease debris formation by using a closed catheter system and optimising catheter changes.
- The use of a catheter valve for clip and release will minimise blockage from catheter tip embedding in the bladder wall.

Manual bladder irrigation

This involves manually flushing a urinary catheter with fluid using a catheter-tipped syringe. This is commonly used for clearing clot retention and mucus build-up[5, 21], but can also be effective in reducing the build-up of debris. Repeated flushing and aspiration of the bladder using a 60ml bladder syringe can help to agitate the debris within the bladder and ensure it is removed. The type of fluid is probably not important and sterilised water (e.g. tap water that has been boiled and then thoroughly cooled) or saline can be used. Flushes are repeated until the draw-back fluid is clear. It is good practice to document the fluid infused and withdrawn [22]. An aseptic technique should be used and the procedure should by undertaken by a suitably trained person.

Commercial products are available that infuse a relatively small volume of fluid into the bladder (see below). These contain a variety of additive that may help to reduce crystallisation and debris within the catheter lumen. However, such treatment may not be sufficient to clear large volumes of debris from the bladder.

If the catheter blockage cannot be resolved then the catheter should be replaced.

Catheter maintenance solutions

Catheter maintenance solutions are generally used for prevention rather than removal of existing encrustation. A variety of catheter maintenance solutions can be used to prevent catheter blockages and extend the life of the catheter. These include [5, 21].

- 0.9% sodium chloride
- Citric acid solutions such Suby G (citrate) & Solutio R
- Antimicrobial solutions (Chlorhexidine 1:5000 Polyhexamide 0.02)

A cochrane review by [23] found insufficient evidence to determine whether prophylactic catheter maintenance solution policies were beneficial or harmful for patients with long-term catheters. There are ongoing trials to evaluate the efficacy of this technique to prevent catheter blockages [24].

Catheter Types and Changes

There are many types of Foley catheters available. The EAUN guidelines [5] recommend a 100% silicone catheter for patients who have a latex allergy and for those who experience frequent catheter blockages.

The length of time a catheter remains in situ has significant effect on bacteriuria and encrustation. Hence, regular catheter changes are required to reduce the risk of blockages [25]. Clinical guidelines do not recommend a 'one-size-fits-all' routine schedule for catheter changes. It is recommended that the schedule should be individualised for each patient based on the length of time that a urinary catheter remains functional [5, 26]. The frequency of catheter changes will therefore vary but should not remain in situ beyond the manufacturer's recommended timeframe. This is thought to be one of the main reasons for catheter blockages.

Emerging Technology to Minimise Catheter Blockages

Using the antimicrobial solution triclosan as a fluid for inflation of catheter balloons has been reported to extend catheter life significantly. The reduction of pain during changing the catheter and the reduction of incrustation, although not statistically significant, led to an improvement in the quality of life of these patients [27]. Commercially available disposable ultrasound devices ("Surface Acoustic Technology") are available that are designed to reduce biofilm by generating and propagating low frequency low intensity ultrasonic energy throughout the catheter. Some studies report a reduction in catheter blockages and infections, although evidence is limited and not conclusive [28].

BAUS RECOMMENDATION 7: Health care professionals should ensure that, in consultation with the patient, all the multifactorial elements contributing to catheter blockages are identified and troubleshooted systematically.

Bladder Spasm, Pain and Bypassing

Bladder spasm is often described by patients with indwelling catheters presenting as pain, discomfort or bypassing. Although it can be caused by catheter blockage it can also occur because of detrusor contractions. If the latter is the cause this needs to be addressed rather than increasing the frequency of catheter changes.

Preventing constipation with a high fibre diet, good fluid intake and good bowel care may be helpful. Using a smaller catheter may increase the risk of blockages due to smaller lumen and there is no clear evidence that it reduces pain and spasms.

Anticholinergic medication can be given either orally or transdermally and has been shown to reduce catheter associated pain [29,30]. Mirabegron has been shown to work well for detrusor overactivity in the non-catheterised patients and it is a reasonable alternative or adjunct to anticholinergic medication.

For severe cases refractory to conservative and medical treatment intravesical botulinum toxin can relieve symptoms [31,32].

BAUS RECOMMENDATION 8: The use of anticholinergic medication can reduce catheter associated pain and bypassing

BAUS RECOMMENDATION 9: Intravesical botulinum toxin can be useful for severe catheter spasm and bypassing

Loss of Bladder Capacity

Bladders left permanently on free drainage may develop loss of compliance and reduced capacity over time [33].This is particularly important for those that have other options for future bladder management such as those who may be able to do intermittent catheterisation or those who may have their catheter removed after definitive surgery. Use of catheter valve will help to prevent loss of capacity and there is some evidence that using a catheter valve with a two- to four-hourly release has been associated with reduced catheter blockage [34].

The use of a catheter valve allows the bladder to fill and empty. Ideally patients should be managed as physiologically as possible with valve clipped off regularly during the day and free drainage at night. This might not be appropriate for patients such as those with severe cognitive impairment, small or limited bladder capacity, poor manual dexterity or poor compliance with risk of renal impairment.

BAUS RECOMMENDATION 10: Use catheter valves for bladder cycling where possible

Urethral Erosion ("catheter hypospadias") and Dilatation of Bladder Outlet

Over a prolonged period, an indwelling urethral catheter can cause pressure necrosis of the urethral tissues, allowing the catheter to erode through the tissues of the penis ("catheter hypospadias") or perineum. This commonly occurs where the method of securing the catheter is inappropriate and causes undue tension or pressure. It can also happen in patients who are seated for prolonged periods, those with impaired perineal sensation or patients with impaired cognition or arousal. Neuropathic patients, especially those who are confined to a wheelchair, are particularly at risk.

Urethral erosion is best mitigated with good nursing care and attention to catheter pressure areas. A suprapubic catheter avoids the risk and is preferred in at-risk patients where feasible.

In women, long-term urethral catheterisation is associated with gradual dilatation of the bladder neck. Over time, this can lead to catheter bypassing and expulsion of the catheter with the balloon inflated. Neuropathic patients may be at increased risk of this problem. It is recommended that women requiring long-term catheter drainage have a SPC rather than urethral where possible in order to reduce the risk of this complication.

The use of larger balloon sizes (eg 20ml or 30ml) to reduce the risk of catheter expulsion is controversial. While a larger catheter balloon is theoretically less easy to expel, the larger balloon may also cause more stimulation and therefore spasms and expulsion of a larger balloon could theoretically exacerbate the problem.

BAUS RECOMMENDATION 11: Do not inflate catheter balloon for those with long term catheters beyond 10 ml

Chronic Inflammation, Metaplasia and Potential Cancer Risk

Although the incidence of dysplasia is significantly higher in catheterised patients compared to the general population [35], the absolute risk of this complication is still very low and annual cystoscopic surveillance is not mandatory. However cystoscopy should be

considered in catheterised patients who report unexplained visible haematuria (even if it is related to catheter changes), recurrent urinary tract infections and those reporting new bladder symptoms. Cystoscopy may be difficult to interpret due to catheter reaction and biopsies may be necessary.

Metaplastic changes are usually not precursors to malignancy with the exception of **keratinising** squamous metaplasia, which requires long-term follow-up. Surveillance by annual cystoscopy and biopsy should be considered depending on the clinical scenario [36]. The risk of the development of carcinoma in patients with keratinising squamous metaplasia is estimated to be 21 to 42% with a latent period ranging from 4 to 28 years [37]. If dysplastic or neoplastic changes are detected, this should be discussed at the uro-oncology MDT.

BAUS RECOMMENDATION 12: Cystoscopy should be considered in catheterised patients who report unexplained visible haematuria even if it is related to catheter changes, recurrent urinary tract infections and those reporting new bladder symptoms.

BAUS RECOMMENDATION 13: Keratinising squamous metaplasia requires long term follow up, annual cystoscopy and biopsy usually required

Conclusion

Long term indwelling catheters should be only be used where there is not a better alternative for the patient. Complications need on-going input from health care professionals. This consensus group have produced the following recommendations.

BAUS Recommendation for the Management of the Complications of Long-Term Indwelling Catheters

1: Catheterisation should be used only after considering alternative methods of management. The person's clinical need for catheterisation should be reviewed regularly and the urinary catheter removed as soon as possible. All patients should have a catheter passport.

2: The suprapubic route for catheterisation should be used if safe to do so to prevent urethral injury.

3: Antibiotic treatment is not recommended for asymptomatic bacteriuria

4: Symptomatic CAUTI should be treated as a complicated UTI and the catheter should be changed.

5: Patients with recurrent symptomatic CAUTI need investigation

6: Management of PUBS should be directed at good catheter care and control of constipation. Although treatment of underlying symptomatic UTI may be useful initially ongoing treatment of asymptomatic bacteriuria is usually not appropriate

7: Health care professionals should ensure that in consultation with the patient all the multifactorial elements contributing to catheter blockages are identified and troubleshooted systematically

8: The use of anticholinergic medication can reduce catheter associated pain and bypassing

9: Intravesical botulinum toxin can be useful for severe catheter spasm and bypassing.

10: Use catheter valves for bladder cycling where possible

11: Do not inflate catheter balloon for those with long term catheters beyond 10 ml

12: Cystoscopy should be considered in catheterised patients who report unexplained visible haematuria even if it is related to catheter changes, recurrent urinary tract infections and those reporting new bladder symptoms.

13: Keratinising squamous metaplasia requires long term follow up. Consider annual cystoscopy and biopsy.

Abbreviations

BAUS British Association of Urological Surgeons

FNUU Female, Neurology and Urodynamic Urology

BAUN British Association of Urological Nurses

EAU European Association of Urology

EAUN European Association of Urological Nurses

UTI Urinary Tract Infection

CAUTI Catheter Associated Urinary Tract Infection

SPC suprapubic catheter

CSU catheter specimen urine

PUBS purple urine bag syndrome

SCI spinal cord injury

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Table 1: Troubleshooting Problems with Long Term Indwelling Catheters

Problem	**Possible causes**	**Suggested action by healthcare professional**
Urinary tract infection introduced during catheterisation	Inadequate aseptic technique, poor urethral cleansing or contamination of the catheter tip	Manage and treat immediate symptoms. Healthcare professional to ensure correct technique for insertion of indwelling catheters
Urinary tract infection introduced via the drainage system	Inappropriate handling of equipment. Breaking of closed drainage system. Inadequate hand hygiene	Follow guidance as above Correct positioning of drainage bag. Maintain hand hygiene before and after manipulation.
Recurrent Catheter associated urinary tract infection (CAUTI)	Catheter colonisation inevitable after 4 weeks - maybe associated with stone formation, debris or poor catheter hygiene	Urine dipstick of CSU not recommended Prophylactic antibiotics usually ineffective Consider US/Cystoscopy to rule out stones and washout of debris
Urethral mucosa trauma	Incorrect size or positioning of catheter, poor insertion technique	Check the catheter size and recatheterised using the correct size. Healthcare

		professional to ensure correct technique applied. Meatus needs observation in males and female during daily hygiene to mitigate against trauma
	Creation of false passage as a result of catheter insertion technique	Remove catheter if not draining, possible cystoscopy required
Urethral erosion (catheter hypospadias)	Chronic tissue pressure from the catheter	Increased risk in patients with impaired sensation or cognition, best mitigated by observation of catheter position, fitting fixation appliances and careful hygiene and essential nursing care Consider suprapubic catheter
Paraphimosis	Failure to replace foreskin over glans penis after catheter insertion	Uncircumcised men will require foreskin retraction for insertion of catheter and foreskin replaced into natural position post catheterisation. Daily attention to genital hygiene is essential
Artificial Urinary Sphincter In Situ	Surgical treatment for incontinence	Deactivate the sphincter or ask for expert advise

Bladder spasm and pain	May be associated with stones or debris	Consider cystoscopy and/or US and remove debris or stones Consider bladder washouts or maintenance solutions Consider using anticholinergics, mirabegron or intravesical botulinum toxin
Inadequate drainage of urine	Kinked drainage tubing Blocked tubing e.g. blood clots or debris	Ensure free flow of urine. Ensure correct positioning of tubing to ensure drainage and mobility Investigate and troubleshoot reason for this, if visible haematuria may require medical advice/multi - disciplinary team discussion, consider irrigation or bladder washouts. Temporarily holding catheter bag above bladder can release suction effect (bladder mucosa/debris occludes catheter eyelets) Re-site the catheter Promote fluid intake to more than usual for the individual Avoid constipation, promote balanced diet to aid regular bowel movement and ensure patient mobilises as able as

	Incorrect placement of catheter	frequently as able
Leakage of urine around catheter (bypassing)	Poor drainage because of blocking of catheter lumen with debris, or catheter eyehole blockage form mucosal oedema	Ensure catheter and bag are well supported with straps, leg supports and sporrans designed for urinary catheters. Teach patient/carer to trouble shoot. Ensure drainage bag is below level of the patient's bladder. Encourage use of catheter valve and ensure patient educated in correct usage Consider anticholinergics, mirabegron or intravesical

	Bladder spasms / detrusor overactivity	botulinum toxin Follow manufacturers instructions for correct balloon size (no more, no less)
Catheter falls out (expulsion)	Incorrect filling of balloon Bladder neck dilatation in women occurs gradually possibly due to pressure but is an increased risk in neuropathic disease patients Catheter balloon may have deflated	Check correct amount of balloon water used. Regular expulsion requires assessment and possibility of suprapubic catheter. A larger urethral catheter or balloon size is not recommended Manufacturers fault with balloon or valve needs investigating. Check balloon condition if able to ensure

		catheter intact. Attempt replacement of suprapubic catheter as soon as possible before tract closes. Seek assistance if catheter cannot pass through the SP tract.
Inability to deflate balloon		Allow valve to spontaneously deflate when syringe attached Try adding 2ml of sterile water or air into the inflation channel. Alternatively use a syringe and needle to aspirate fluid from the inflation arm. Ask patient if possible to walk around as gravity may be of assistance. Seek experienced assistance. In a secondary care setting an ultrasound guided puncture of the catheter balloon in the bladder or if it has been dislodged into the prostatic urethra may be necessary.