Evidence-based guidelines for

European Association of Urology Nurses

BEST PRACTICE IN UROLOGICAL HEALTH CARE

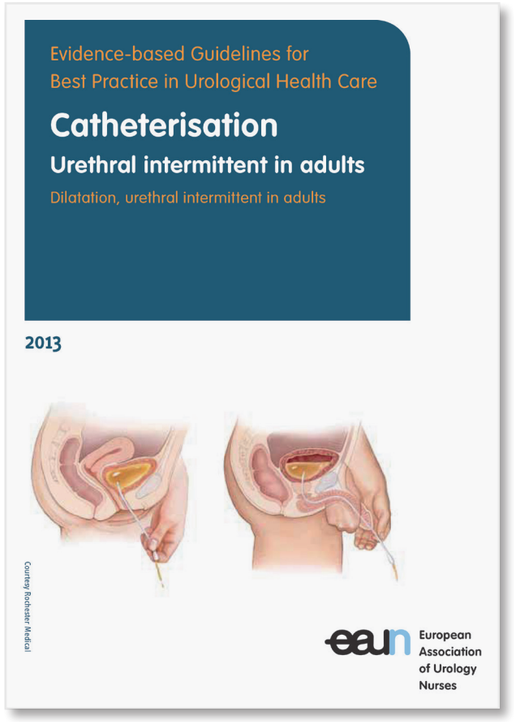
An edited summary of the **European Association of Urology Nurses** evidence-based guideline on

Intermittent Urethral Catheterisation in Adults

Supported by an unrestricted educational grant from Wellspect HealthCare

Purpose of this document

The European Association of Urology Nurses (EAUN) aims to foster excellence in urological nursing throughout Europe. An important part of achieving this goal is the publication of evidence-based guidelines for best practice in various aspects of urological health. The full set of guidelines on intermittent catheterisation, from which this summary is drawn, are based on best available evidence and aim to improve current practice through a standard and reliable protocol.



> To foster excellence in urological nursing throughout Europe.

The full text of the guidelines can be accessed through the EAUN website at www.eaun.uroweb.org. Hard copies of the full guidelines can be ordered by email (eaun@uroweb.org).

The authors of the full guidelines are: Susanne Vahr, Hanny Cobussen-Boekhorst, Janet Eikenboom, Veronika Geng, Sharon Holroyd, Mary Lester, Ian Pearce and Cel Vandewinkel.

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Original EAUN guideline co-sponsors Coloplast & Hollister Incorporated. While the content is intended to be consistent with the original document this edited summary is not sponsored or endorsed by the original EAUN guideline co-sponsors Coloplast or Hollister Incorporated.

All figures used in this summary correspond with the figure numbers in the original guidance document. A complete reference list can be found on page 60 of the original guideline document.

FOREWORD

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The release of this EAUN edited summary is a very important step in implementing the EAUN guideline on "Catheterisation: Urethral Intermittent in Adults" in clinical practice. Effective strategies to implement clinical guidelines have multiple components: healthcare professionals, patients and stakeholders must be aware of the existence of the guideline, and the guideline must be easy to understand and easy to use. Nurses already have easy access to the EAUN guideline through national urology societies and through EAUN but this edited summary also provides an easy to use option. The EAUN guideline has been accepted by the National Guideline Clearinghouse (U.S.), which enhances the knowledge of the guideline outside Europe.

The aim of the guideline is to provide evidence-based guidance for nurses and patients performing intermittent catheterisation, to prevent unintended harm, such as catheter-related infection, and to enhance adherence to self-intermittent catheterisation. Improvement in self-care and independence has a great impact on health-related quality of life but there is limited evidence about patient-related outcomes. Since the release of the guideline in 2013 a validated questionnaire has been developed, the 24-item Intermittent Self-Catheterisation Questionnaire (ISC-Q), which evaluates aspects of quality of life specific to the needs of individuals performing ISC.

Also there is still limited evidence to support one catheter product over another, as new data regarding urinary tract infection has not been published.

With the publication of this guideline summary, we hope even more nurses and nursing students will be guided to make informed decisions regarding the care of patients performing intermittent catheterisation.

Table of Contents

Introduction

Although there is considerable literature on intermittent catheters, evidence-based guidance on the topic has been limited. In the full EAUN guidelines on intermittent catheterisation there are illustrations, references and annotated procedures to help nurses identify problem areas and to carry out effective patient care.

Who should use these guidelines

The guidelines are intended for nurses and other healthcare professionals who are involved in the procedure of intermittent catheterisation (IC) and have already acquired competence in this field. Users should assess the evidence-based recommendations made in this document and incorporate them into their clinical practice. However, decisions regarding care should be made on a case-by-case basis using clinical judgement, evidence-based knowledge and expertise: the guidelines should be used within the context of existing local policies and protocols.

The guidelines are intended to assist the procedure in adults only.

Summary of guidelines

This summary reflects all the main recommendations of the original guidelines. It was created by summarising into a concise form all the main guidance points and recommendations of the original. All of the evidence-based recommendations are highlighted.

> "This summary reflects all the main recommendations of the original guidelines."

The system used by the EAUN to grade the evidence and the strength of the recommendations is summarised on page 16.

Limitations

Throughout Europe there is great variation in the education and competence of nurses in urology, therefore, one set of guidelines is unlikely to meet all requirements. However, it is hoped that everyone involved in IC may gain some benefit from the guidelines and from this summary.

Indications, contraindications and alternatives for intermittent catheterisation

Indications for intermittent catheterisation (IC)

IC should only be performed in the presence of a residual volume of urine and symptoms or complications arising from the residual volume. IC should not be used simply to resolve post-micturition residual volume. Incomplete bladder emptying is generally due to one of three categories of lower urinary tract dysfunction:

- Detrusor dysfunction: an underactive or atonic detrusor which fails to contract with sufficient duration or magnitude to completely empty the bladder.
- Bladder outlet obstruction: most common causes are prostatic enlargement, high bladder neck or urethral stenosis (in women). In men, urethral strictures may obstruct bladder outflow and are often found following instrumentation such as radical prostatectomy.
- Following surgery: surgery to restore continence can impair bladder emptying, and anaesthetic technique may result in acute urinary retention. Procedures for reducing stress urinary incontinence introduce a degree of obstruction to the bladder outlet, while procedures for resolving urgency urinary incontinence aim to reduce intravesical pressure and increase functional bladder capacity. Both of these can impair the ability of the bladder to empty, possibly leading to residual volume.

Contraindications to intermittent catheterisation

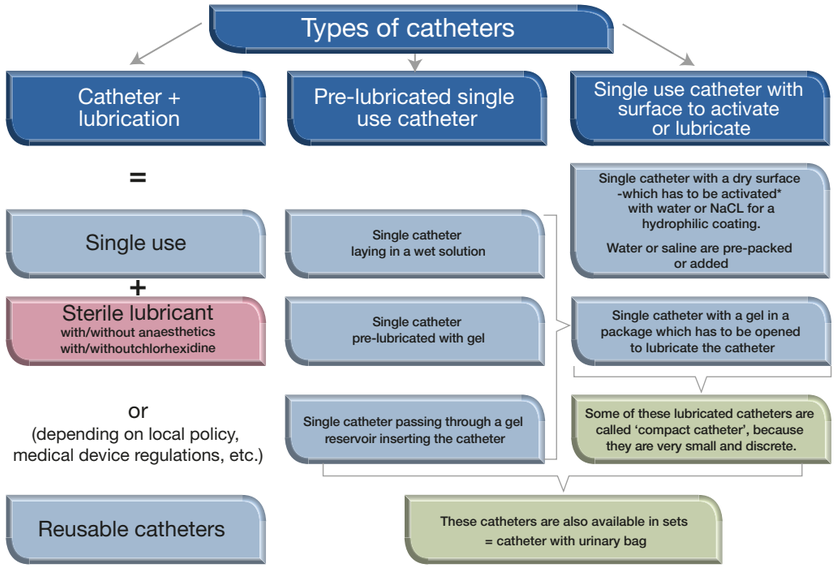
There are few contraindications to IC. High intravesical pressure is an absolute contraindication and poor manual dexterity in the absence of an appropriately trained caregiver or attendant is a relative contraindication.

Alternatives to intermittent catheterisation

Alternatives to intermittent catheterisation are suprapubic and urethral indwelling catheterisation. Suprapubic and intermittent catheterisation have advantages over urethral indwelling catheters if catheterisation is only needed for a few days[1] or in cases of symptomatic UTI.[2,3] Male external catheter drainage systems can be used in patients with voiding problems but without symptoms, complications or residue.[2, 4]

Catheter material, types of catheter and equipment

The choice of catheter should take into account patient preference, limitations or disabilities, cost-benefit, cost-effectiveness, ease of use and storage issues. The patient should be given guidance on selecting the best product for their needs, recognising that their needs may change over time.[5]



*Activation time (sec) as per manufacturer's instructions

Table 1. Types of catheter

Type	Description	Advantages / disadvantages	Recommendations
Single-use without coating	Can be used with lubricants. Often used in hospital with catheter sets.	Considered, but with little evidence, to cause increase in urethral irritation, poor patient satisfaction, increased bacteriuria and long-term complications.[6]	Assess the patients and their individual circumstances for IC before choosing type of catheter, tip and aids. *Level 4, grade C*
Single-use with coating or gel	Hydrophilic coatings, ready-to-use solutions, gel surface or gel in wrapping.	Intended to reduce friction[7] aid insertion and reduce risk of urethral mucosal irritation.[8]	Choose lubricant or type of coating based on comprehensive patient assessment and reasons for IC. *Level 4, grade C*
Reusable	Usually silicone, latex, glass or stainless steel. Uncoated.	Cheaper per use than single-use catheters.[6] Concerns over efficacy of cleansing when used in home-setting.[9-11]	Make sure self-catheterising patient knows which catheters can be re-used in home setting. *Level 4, grade C* Make sure patients know how to clean and store reusable catheters. *Level 4, Grade C*

Clinicians should base decisions on type of catheter and technique using clinical judgement and in conjunction with the patient. Choice of catheter and technique is covered in the next section.

Diameter size and length

Intermittent catheters are available in male and female lengths, around 40cm and 7 to 22cm respectively. Some sterile, single-use catheters are available in smaller compact sizes to allow for more discreet carriage and use.

The external diameter is measured in millimetres (Charrière scale: Ch, CH), or the circumference can be used (French scale: F, FR, FG) and sizes range from 6 to 24: typical female adult sizes are 10 to 14, male are 12 to 14. Larger sizes can be used to treat strictures.[12] Sizes are coloured in the same way as connectors (below).

Table 2. Standard catheter connector colour chart

Cathetersize	8	10	12	14	16	18	20
Colour	Blue	Black	White	Green	Orange	Red	Yellow
Tube diameter, mm	2.7	3.3	4	4.7	5.3	6	6.7

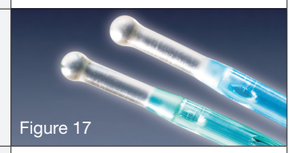
Catheter materials

Catheters are made from a variety of materials which aim to strike a balance between medical safety, functionality, efficiency, patient comfort and environmental performance. There is a trend away from the use of polyvinyl chloride (PVC) and phthalate components[13] (used as plasticisers) for patient safety and environmental reasons.

Catheter tips

There are a variety of catheter tips which have been designed to be helpful in various situations and with different types of patient.

Table 3. Catheter tips

Name	Description	Useful for...	
Nelaton	Standard catheter. Soft rounded tip, flexible, straight proximal end. Two lateral drainage eyes.	General use.	
Tiemann / Coudé	Slightly curved tapered tip. Up to three drainage holes.	Particularly useful with narrow urethral passage or prostatic obstruction. Angle tip for directional stability. More rigid tip allows insertion through obstructed areas.	
Ergothan	Flexible rounded.	Easy passage irrespective of configuration, tortuosity or degree of obstruction. Flexibility can cause lack of control for some patients.	Figure 16 
IQ-Cath	Pointed. Squeezable with bendy end. Tip ends in a ball.	Useful in obstruction and dilatation. Ball prevents catheter being caught in urethra.	 Figure 17
Mercier	Rounded, concave, angular tip (30° to 45°). Two sets of opposing drainage eyes. Silicone coated.	Angle helps introduction into membranous or prostatic urethra. Silicone coat aids smooth catheterisation. Useful for removal of large blood clots and sediment.	 Figure 18

Catheter connectors

Catheter connectors generally have standardised colours which indicate size, but not all manufacturers use the colour coding: check packaging and connector for confirmation of size. See opposite.

When a catheter is used to irrigate or instil the bladder a Luer Lock catheter system is connected to a syringe either by the pre-installed connector (a) or using an adaptor attached to the catheter (b).

Figure 1. Catheter connection systems

a. Pre-installed connector [figure 20]

b. Adaptor [figure 21]

Catheter systems, complete sets

Catheter complete sets contain a catheter, a drainage or reservoir bag and a lubricant or activator if the catheter is hydrophilic. Most catheters are also available as systems where the catheter is already connected to a urinary bag. Both are particularly useful where facilities are restricted or limited and for wheelchair users or patients who need to catheterise from a seated or prone position.

> “Catheter complete sets contain a catheter, a drainage or reservoir bag and a lubricant or activator.”

Catheter sleeves and insertion aids

Catheters are usually supplied with a plastic sleeve or grip to enable the user to insert the catheter without touching it. The grip may partially (a) or completely (b) cover the catheter.

Figure 2. Catheter sleeves

a. Partial sleeve/grip [figure 4]

b. Complete coverage [figure 5]

c. Male catheter for no-touch use. [figure 2] LoFric (courtesy of Wellspect HealthCare)

Insertion aids are also available.

Procedures for intermittent catheterisation

Choice of technique

Choice of technique will depend on the setting, who will carry out the catheterisation and local policies:

- Operating theatres: sterile technique.
- Hospital setting: aseptic/no-touch technique is recommended to avoid cross-contamination.[6]
- Community setting: clean/no-touch is safe and effective and does not increase the risk of symptomatic urinary tract infection.

Appendices B – E and G in the original guidelines provide detail on how to insert catheters (i) aseptic by an HCP (ii) no-touch by an HCP and (iii) self-catheterisation. In this summary, Appendices B to E have been condensed into one chart – see Appendix 1.

Recommendations
Verbal consent should be obtained from the patient before starting the procedure. *Level 4, grade C*
Observe local protocol on procedure for IC. *Level 4, grade C*
Observe protocols for the principles of the aseptic procedures.[14] *Level 4, grade C*
Use a sterile catheter to prevent cross-contamination in clinical, rehabilitative and long-term care settings. *Level 4, grade C*
Check for lidocaine and chlorhexidine intolerance if using a lubricant containing lidocaine or chlorhexidine. *Level 4, grade C*
Use a sterile single-use packet of lubricant jelly, when inserting a non-coated urethral catheter. *Level 4, grade C*
Instil 10ml of lubricating gel in male, 6ml in female patients[15] when inserting a non-coated urethral catheter. *Level 4, grade C*
Routine use of antiseptic lubricants for inserting the catheter is not necessary. *Level 4, grade C*
Perform IC after micturition if it is indicated in a patient who is able to void. *Level 4, grade C*
Use a voiding diary to investigate the fluid intake and output in the patient. *Level 4, grade*

Table 4. Recommended procedure for intermittent catheterisation

Choice of package

Catheter packages	
Complete set or standard catheter	Complete sets require manual dexterity to activate the lubricant which may be difficult for some patients. They are more expensive than standard intermittent catheters which may be an issue in some countries.
Leak-proof urine collection bag	These are particularly useful where catheterisation may have to be managed while lying on a bed, while travelling or in a confined space. May be useful for patients with limited dexterity or mobility.
Lubrication or hydrophilic coating	If using a non-coated catheter, lubricant must be instilled into the urethra, not on the catheter as the lubricant may be wiped off at the entrance to the urethra. A local anaesthetic jelly may be needed for those with urethral sensation, but lidocaine gels are contraindicated in patients with known sensitivity or who have damaged or bleeding urethral membranes.[15] Hydrophilic coatings reduce the risk of urethral trauma, and there is possibly a lower incidence of catheter bypass and urethral irritation.[16] A study including patients with neurogenic bladder dysfunction found fewer complications (UTI, haematuria and pain) with hydrophilic catheters.[17] Possible drawbacks with hydrophilic catheters include: • Discomfort on withdrawal if the IC process is extended, due to the urethral wall absorbing fluid from the coating, leading to the catheter sticking to the wall.[8, 18] • Handling difficulties due to the slippery surface.[19] However, most studies show that patients prefer single-use coated catheters for convenience, discretion, comfort, QoL and reduction in UTI.[19-22]

Table 5. Catheter packages

Meatal cleansing

Evidence for cleansing techniques is limited to studies using indwelling catheters,[23-25] which showed that water was as safe as antiseptic for preparation of the periurethral area, outside of the operating theatre setting.

Problems

Constipation: may cause pressure preventing drainage from the catheter.[26, 27] Maintain regular bowel function with high-fibre and high-fluid intake.[28]

Pregnancy: due to changes in the length of the urethra during the course of pregnancy, some women may have to find alternative positions and catheters.[29]

Difficulties with insertion: in neurogenic patients, the catheter may on occasion not pass the sphincter due to dyssynergia. Advise the patient to take a deep breath or change position. Sometimes holding the catheter against the sphincter leads to relaxation after a short while. If the problem only occurs with a full bladder, catheterise at shorter intervals.

Principles of management of nursing intervention

General points

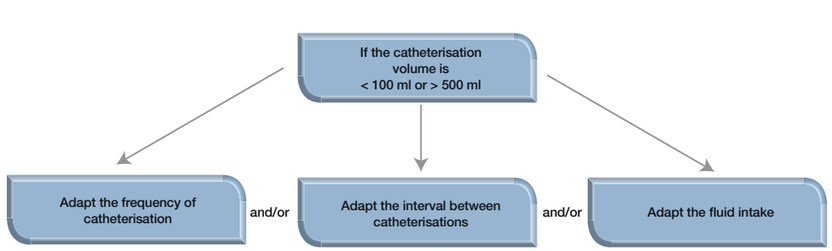
Recommendation
Observe local policy before starting catheterisation. *Level 4, grade C*
Be aware that IC is a medical order. *Level 4, grade C*
Assess patients and their individual circumstances for IC before choosing type of catheter, tip and aids. *Level 4, grade C*
Be aware that the patient's privacy is paramount in all locations.[30, 31] *Level 4, grade C*

Table 6. General principles

Frequency of catheterisation

When initiating IC, observe bladder emptying and residual volume (including retention) to measure the urine volume drained and to determine frequency of IC.[32] A voiding diary can be helpful.

In adults, a general rule is to catheterise frequently enough to avoid residual urine of greater than 500ml. However, guidance can also be based on bladder volume, detrusor pressures on filling, presence of reflux and renal function.[6] If the patient cannot pass urine independently, they will usually require IC 4 to 6 times daily to ensure a bladder volume of 300 to 500ml.[32, 33] Excess fluid intake increases the risk of over-distension of the bladder and overflow incontinence.[34]



Recommendation
Assess the fluid intake of the patient if urine output is >3L/day or if there is a need to catheterise >6 times/day. Level 4, grade C
Assess the fluid intake of the patient if urine output is >500ml per catheterisation. Level 4, grade C
Assess the frequency of IC if urine output is >500ml per catheterisation. Level 4, grade C
Assess the need for adjustment for anticholinergic medication in patients with post-voiding residual (PVR) urine and overactive bladder (OAB) and frequent need for catheterisation. Level 4, grade C
IC before bed-time is recommended to help reduce nocturia. Level 4, grade C
Use ultrasound to measure residual urine volume after spontaneous bladder emptying. Level 4, grade C
In cases of PVR urine, IC once daily is recommended to prevent CAUTI. Level 4, grade C

Table 7. Frequency of catheterisation

Patients and caregivers

Patients and caregivers need to be assessed with regard to:

- General health status
- Knowledge of the urinary tract[35]
- Ability to understand the information
- Ability to perform the skill
- Compliance
- Need for psychological support
- Motivation and emotional readiness
- Availability to perform the procedure[30, 36]

Comment	Recommendation
Some elderly patients may have limited knowledge of their own bodies.[37] Caregivers may be fearful of damaging the urinary tract.[19] Basic knowledge of the anatomy and function of the urinary tract is important.[35]	Assess whether the patient / caregiver has a basic understanding of the anatomy and function of the urinary system.[38] *Level 4, grade C*
Patients with reduced cognitive function can perform IC but may need specific training, written materials and pictograms. The patient should be asked to repeat the training skills to ensure understanding. A caregiver or healthcare provider should accompany these patients.	Assess the patient's general health, dexterity, motivation, understanding and availability to undergo IC.[36] *Level 4, grade C*
	Ensure that the patient or caregiver has a clear understanding of the patient's relevant urological condition and why they require IC.[39] *Level 4, grade C*
Lack of motor skills (especially in neurological patients), fine motor skills and sensory skills may cause difficulties when learning IC. Sometimes a caregiver or healthcare professional may be needed to perform IC.	Use a checklist to predict ability for IC, especially in neurological patients.[40] *Level 4, grade B*
Women may need a mirror to find the urethra.[37, 41] Special devices have been developed to aid insertion. The procedure must be made as easy as possible to improve motivation.	Investigate the need for special hand devices and the motivation of the patient.[37] *Level 4, grade B*
Convenience and speed of use are important factors in fitting IC into daily living.[21]	Recommend catheter material that is most suitable for the patient's lifestyle.[21] *Level 3, grade B*
Counsel the patient about possible alteration in their relationship as a result of the caregiver performing such an intimate procedure, prior to obtaining consent.[42-44]	Obtain informed consent to agree with the patient the choice of caregiver to carry out IC.[42] *Level 4, grade C*
Many factors affect compliance including knowledge of the procedure and body, complexity of the procedure, physical impairments, psychological factors, availability of materials, timing of the training.[30, 37] Patient organisations can help improve compliance.	Provide patients with contact details of available patient organisations or peer support to enhance compliance. *Level 4, grade C*
Patients may have difficulty in memorising the procedure or lack the organisational skills. Good support can help patients overcome initial resistance.[30]	Offer support to patients or caregivers to help them overcome initial resistance to IC.[30] *Level 4, grade B*
Patients may be shocked and embarrassed and it is important to investigate their needs and desires.[43]	Investigate the needs and desires of the patient.[43] *Level 4, grade B*
Recognising and responding to the patient's emotional reaction can improve motivation, compliance and well-being. A positive attitude can help alleviate their concerns.[30]	Allow the caregiver and patient to express any psychological issues they may have concerning IC. *Level 4, grade C*
A Medical Travel Document provides information on the products carried by the patient should there be queries from customs officials.	Advise patients to take a Medical Travel Document when travelling abroad.*Level 4, grade C*

Table 8. Management of patients and caregivers

> “Teaching may be carried out at home or in hospital but privacy is paramount.”

Education of patients and caregivers

Education needs to be provided both for the patient and the caregiver who need to be counselled regarding:

- Potential benefits and difficulties with IC
- Knowledge and skills required to perform the procedure
- Commitment required to perform IC regularly
- Potential lifestyle adjustments.

Teaching may be carried out at home or in hospital but privacy is paramount whatever the location.[30, 31] Provide praise, encouragement, feedback and reassurance to the patient or caregiver.[30]

If a caregiver is to be involved, the wishes of both should be considered and it is important that neither feels coerced into performing a procedure with which they feel uncomfortable.[45] Respect for cultural and religious beliefs needs to be taken into account.[46]

Patients will need a verbal explanation of the procedure, practical instruction and written information, preferably in plain language.[43]

Education
Ensure that the healthcare professional is proficient in skills and teaching of IC. *Level 4, grade C*
IC should be taught by an appropriately experienced nurse. *Level 4, grade* C
Individualise teaching for the patient and caregiver.[41] *Level 4, grade C*
Use consistent teaching methods and modelling of desired behaviour to increase patient and caregiver practical skills and satisfaction. *Level 4, grade C*
Develop a relationship and environment that encourages and supports the patient towards self-management of long-term bladder conditions.[30] *Level 4, grade B*
Encourage the patient or caregiver to handle the equipment first and talk through the procedure before demonstrating the technique. *Level 4, grade C*
Empower the patient or caregiver to take an active role in catheter management.[43] *Level 4, grade C*
Educate the patient or caregiver in the safe moving and handling of the patient.[31] *Level 4, grade C*
Provide verbal explanation of IC and sufficient time for practical instruction of the procedure to the patient or caregiver. *Level 4, grade C*
Ensure that all verbal information is reinforced with written information to help the patient and caregiver learn the procedure. *Level 4, grade C*

Table 9. Education of patients and caregivers

On-going support and follow-up

Comment	Recommendations
Integrating IC into daily life can be difficult and patient and caregiver may require support and follow-up. Research suggests only half of IC patients receive this.[43] An early review to assess performance can help with any difficulties.[36, 37, 46, 47]	Provide on-going social support by consultation or telephone to improve QoL and prevent complications.[29, 45, 48] *Level 4, grade C*
Fears of negative effects of IC and lack of self-efficacy persist over time and can have a negative impact on long-term adherence (page 39)	Assess adherence in patients by keeping a registration of catheterisation practice, IC cessation and other relevant information.[37] *Level 4, grade C*
Home visits by community nurses may be helpful in solving problems and improving compliance.[49]	On-going support should be available for patients and relatives for the period of the catheterisation. *Level 4, grade C*

Table 10. Recommendations for support and follow-up

Documentation

Allowing for local policy, the following data should be collected and documented once a patient starts catheterisation:

- Reasons for catheterisation
- Residual volume
- Frequency
- Date and time of catheterisation
- Catheter type, tip, length and size
- Problems negotiated during the procedure

Recommendations
Complete a voiding diary for all intermittent catheterisation patients to assess bladder emptying. *Level 4, grade C*
Offer patients an individualised care plan based on the above criteria, bearing in mind the patient’s and caregiver’s lifestyles and the impact this will have on the patient’s QoL.[50] *Level 4, grade C*

Table 11. Recommendations for documentation

Complications associated with the use of intermittent catheterisation

Catheter associated urinary tract infection, CAUTI, is the most common complication of intermittent catheterisation,[39, 51] although the true incidence and prevalence are difficult to determine.

A recent Cochrane review failed to determine any significant difference in the rate of CAUTI between various IC techniques.[51] EAU guidelines suggest that an aseptic technique would be the best compromise between UTI incidence, practicality and economic viability.[52, 53]

Type	Frequency	Recommendation	Comment
Infections			
Factors that increase the risk of infection in IC are low frequency of IC,[54-59] bladder over-distension,[17] female gender,[54, 60] poor fluid intake,[54] non-hydrophilic coating of catheter,[20, 54] poor technique[39] and poor education.[57-61]			
CAUTI	80% of patients have at least one UTI over a 5 year period.[63]	Only symptomatic UTI should be treated[2] *Level 4, grade C*	No significant difference in incidence between various IC techniques.[51] EAU guidelines recommend aseptic technique: sterile catheter, disinfect or clean genitals, disinfecting lubricant.[52,53]
CAUTI with pyelonephritis	Risk: 5%[64]		
Epididymo-orchitis	Incidence: 3 to 12% short term, 40% long term.[64-66]	Treat with standard antibiotic according to local protocols. *Level 4, grade C*	
Urethritis	Occurs in 1 to 18%.		Data lacking on incidence and risk.
Prostatitis	Incidence: 18 to 31%.[67, 68]	Treat as per local protocols with prostate-penetrating antibiotic and suprapubic catheterisation.[67, 68] *Level 2b, grade B*	
Trauma			
Long-term urethral bleeding	Up to 30% of patients.[64, 66]	Use a hydrophilic or gel reservoir for IC. *Level 4, grade C*	Hydrophilic coating significantly reduces risk of microscopic haematuria[69, 70] Lubrication of device or externally applied reduces risk of trauma.[71]
False passage	Not known.	Administer antibiotics and use indwelling catheter for several weeks.[72]	
Urethral stricture	Prevalence: 5% in men only.[68]	Take common sense measures: gentle insertion, use lubrication.	Insufficient data to support recommendations.
Meatal stenosis	Rare.[68, 73]	Use indwelling catheter for 7 to 10 days and antibiotic therapy. Consider laparotomy for persistent leaks.	Tends to occur in augmented bladders along anastamotic site.
Bladder perforation	Rare.[74]	Use indwelling catheter for 7 to 10 days and antibiotic therapy. Consider laparotomy for persistent leaks.	Tends to occur in augmented bladders along anastamotic site.
Miscellaneous			
Catheter knotting	Very rare.[75, 76]	Attempt evacuation with flexible endoscope; use endoscopic or open extraction under anaesthesia if this fails.	
Bladder calculus		Take more aggressive measures to clear mucus from the bladder.[77]	Long-term IC increases risk.[78, 79] Pubic hair[80, 81] and mucus may act as a nidus for stone formation.
Pain and discomfort		Ensure appropriate training of person carrying out catheterisation.	Pain can result from bladder spasm or UTI. Severe pain on insertion of the catheter has significant impact on QoL.[82]

Table 12. Complications associated with intermittent catheterisation

Prevention of infection

Bacteriuria is acquired at the rate of around 1 to 3% per catheterisation, and is therefore universal by the end of the third week.[2]

Comment	Recommendation
Urinalysis	
The majority of patients practising IC routinely have chronic or recurring bacteria present in their urine.[3, 58]	Undertake urinalysis or take a specimen of urine for culture if a patient has symptoms suggesting UTI.[2] *Level 4, grade C*
Fluid intake	
Drinking fluid dilutes urine and ensures a flushing effect. If less than 1200ml/day urine is produced, patients urinate less frequently, producing stagnation and distension, with a potential increase in the rate of infection.[34]	Encourage patients to drink enough fluid to maintain urine output of at least 1200ml/day.[34] *Level 4, grade C*
The amount of fluid needed varies with fluid loss, food intake, circulatory and renal status. Excess fluid intake increases the risk of over-distension and overflow incontinence.[34]	Fluid should be given at a rate of 25 to 35ml/kg/day. *Level 4, grade C*
Cranberries	
Administration of cranberry supplements does not appear to affect the incidence or risk of CAUTI.[65]	Do not recommend cranberry supplementation routinely to prevent or treat UTI.[83, 84] *Level 1b, grade A*
Hand hygiene	
Hand hygiene for health care professionals is important to minimise the risk of cross-infection. Patients who self-catheterise should disinfect or wash hands thoroughly with soap and water before catheterisation.[85]	Observe protocols on hand hygiene before catheterisation.[2, 86] *Level 1b, grade A*
Educate patients and caregivers in techniques of hand hygiene before discharge from hospital.	Educate patients and caregivers in techniques of hand hygiene before discharge from hospital. *Level 4, grade C*

Table 13. Measures to prevent infection

Patient quality of life

Intermittent catheterisation can have a huge impact on the physical, psychological and emotional well-being of the patient, their partners, caregivers and family.[43]

Quality of life (QoL) improves along with improvement of symptoms, independence, self-confidence, sleep patterns, sex life, and a reduction in incontinence, periurethral infection, febrile episodes, stones and renal deterioration. Quality of life is reduced when IC is difficult to perform or to integrate into daily life, is painful or time consuming, when family and social life is affected, or when there are feelings of worry, shock, fear or depression.[2, 37, 42, 43]

Sexuality and body image: there are few studies in this area but some case reports have reported negative effects.[37, 43]

Recommendations
Discuss sexuality and impact of IC as a part of patient assessment. If necessary, refer to a psychologist or sexologist. *Level 4, grade C*

Table 14. Management of QoL issues

Grading system used in these guidelines

The rating system used for these recommendations is a modified version of a 2011 system from the Oxford Centre for Evidence-based Medicine (OCBM).

Where there was low level evidence but it was thought that the information might be useful in practice, it has been ranked as Level 4 and Grade C. Qualitative studies were all graded Level 4. The guidelines were based on evidence whenever possible, but if not, then on best practice. Low level evidence cannot be regarded as an indication of the importance of the recommendation for daily practice (page 10).

Level of evidence

Level	Type of evidence
1a	Evidence obtained from meta-analysis of randomised trials.
1b	Evidence obtained from at least one randomised trial.
2a	Evidence obtained from one well-designed controlled study without randomisation.
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study.
3	Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies, and case reports.
4	Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities.

Grade of recommendation

Grade	Nature of recommendation
A	Based on clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomised trial.
B	Based on well-conducted clinical studies, but without randomised clinical trials.
C	Made despite the absence of directly applicable clinical studies of good quality.

Appendices in the main guidelines

Appendix

Procedures for catheterisation by a healthcare professional

Materials for catheterisation

Prepare a catheterisation pack according to the table and list below:

Patient type	Male	Female	Male	Female
Procedure type	Aseptic	Aseptic	No-touch	No-touch
Appendix in original	B	C	D	E
Common items	8 to 14			
Specific items	1 to 3	1 to 3	4 to 7	4 to 7

1. Catheterisation pack, containing at least:
   - *a. One sterile drape*
   - *b. One bowl with swabs*
   - *c. One pair of sterile gloves*
2. Sterile catheter. Selection of appropriate catheters: it is advisable to take a spare catheter in addition to the one you want, and one of a different or smaller size (non-coated, hydrophilic or pre-lubricated)
3. Sterile or anaesthetic lubricating jelly (syringe 10 to 20 ml)
4. Set with five swabs
5. No-touch catheter
6. Spare catheter of the same type
7. Catheter of a different or smaller size (hydrophilic or pre-lubricated)
8. Disposable towel
9. Disposable pad for bed protection
10. Container of sterile water (20ml) for hydrophilic catheter, if not pre-packed
11. Universal specimen container, if required
12. Cleansing solution 10ml disinfectant or sterile or non-sterile water and soap
13. Bactericidal alcohol hand disinfection and one pair of clean gloves
14. Catheter drainage bag or sterile receptacle for urine

Appendix

Procedure for catheterisation

The initial steps for catheterisation by a healthcare professional are common for males and females and for the aseptic and no-touch technique.

Steps 1 to 15 are common to all four procedures: male or female aseptic technique and male or female no-touch technique	
Action	**Reason**
1. Check the indication and patient file for past problems, allergies etc.	To maintain patient safety.
2. Before the procedure, explain the process to the patient.	To gain consent and cooperation and to ensure the patient understand the procedure.
3. Undertake the procedure on the patient's bed or in clinical treatment area using screens or curtains.	To ensure patient privacy.
4. Assist the patient to get into a relaxed supine position of 30° if possible [for males only: with the legs extended to ensure the penis is accessible]. Do not expose the patient at this stage of the procedure.	To maintain patient dignity and comfort.
5. Hand hygiene using soap and water or bactericidal alcohol hand rub.	To reduce risk of infection.
6. Clean and prepare the trolley, placing all equipment required on the bottom shelf.	The top shelf acts as a clean working surface.
7. Take the trolley to the patient's bedside.	
8. Open the outer cover of the catheterisation pack and slide the pack onto the top shelf of the trolley [aseptic] or open the set with swabs [no-touch]	To prepare equipment.
9. Wet the swab with the cleansing solution.	To cleanse the genitals.
10. If using a coated catheter: a. That requires hydration, open the package, fill with sterile water, hang the package beside the patient or trolley and wait for the recommended time b. That is hydrophilic pre-lubricated, or ready-to-use catheter, open the package and hang the package beside the patient or trolley c. That has a lubricating bag, break it open, open the outer package and hang the package with the catheter inside beside the patient.	 To activate the outer coating. To activate the coating.
11. If using a non-coated catheter, open the catheter package and lubricating gel and put it on the sterile drape.	
12. Using an aseptic technique, connect the bag (if one is being used) to the catheter.	To reduce the risk of cross-infection.
13. Remove cover from the patient and position a disposable pad under the patient's buttocks and thighs.	To ensure urine does not leak onto the bed.
14. Hand hygiene using soap and water or bactericidal alcohol hand rub.	Hands may have become contaminated by handling the outer packs.
15. Put on clean gloves.	To reduce risk of cross-infection.

Continue with the appropriate column (Male or Female):

Male aseptic and no-touch	Female aseptic and no-touch	Reason
16. Lift the penis, and retract the foreskin using a gauze swab.	Spread the legs in a gynaecological position. Separate with one hand the labia and give traction upward with one hand.	To prevent infection.
17. Clean the glans penis with the wet swabs. Begin with the foreskin, the glans and then the urethral meatus at the end. Use a new swab for each part. Tweezers with swabs may also be used for cleaning.	Clean the labia majora exterior, then interior and finally the urethral meatus. Use one swab for each labia and meatus and wipe from the anterior to the posterior. Tweezers with swabs may also be used for cleaning.	To avoid wiping any bacteria towards the urethra.
18. Place the receptacle, if using one, between the patient's legs.	Same	
19. If using a non-coated catheter: a. Apply some gel to the meatus, insert the cone of the lubricant syringe in the meatus, then slowly instil 10ml of the gel into the urethra while holding the penis firmly below the glans with the thumb and fingers. Keep the syringe firmly onto the meatus to prevent the gel from leaking. b. Remove the syringe from the urethra and hold the penis upright and closed so that the gel remains within the urethra. Alternatively, use a penile clamp. c. If using anaesthetic, wait for recommended time (3 to 5 minutes).	If using a non-coated catheter: a. Apply lubrication to the meatus, insert the cone of the lubricant syringe in the meatus, then slowly instil 6ml of the gel into the urethra. b. Remove the nozzle from the urethra. c. If using anaesthetic, wait for recommended time (3 to 5 minutes).	To minimise urethral trauma. Use of a local anaesthetic minimises discomfort. To ensure maximal anaesthetic effect.
20. Replace existing gloves with a sterile pair.	Same	To prevent infection.
21. Take the catheter with one hand in the hand with the sterile glove. Hold only the plastic cover or the end of the catheter without touching the catheter [no-touch].	Same	
22. Insert the catheter into the meatus and gently advance it into the urethra until urine drains. Then insert the catheter a further 2cm, or up to the end of the catheter. [During insertion, hold the penis upright].	Same apart from mention of penis.	Advancing the catheter ensures that it is correctly positioned in the bladder. Lifting the penis straightens the urethra and facilitates catheterisation.

Appendix

Appendix

The following steps are common to male and female aseptic and no-touch techniques:

23. If no urine flows, gently apply pressure over the symphysis pubis area. Do not use force if there are difficulties inserting the catheter.	To prevent injuries to the urethra and bladder neck.
24. Make sure the urine collection bag is below the level of the bladder.	To assist flow of urine.
25. When the urine flow stops, withdraw the catheter very slowly, in centimetre steps. If the urine flow starts again during withdrawal, discontinue withdrawal and wait for the flow to stop before resuming catheter withdrawal.	To make sure the bladder is empty and minimise residual urine.
26. Discard the catheter.	
27. Male: clean the glans penis and reposition the foreskin if present. Female: clean the labia and meatus.	Retraction and constriction of the foreskin behind the glans penis may result in paraphimosis if this is not done.
28. Help the patient into a comfortable position and ensure that the skin and bed are dry.	If the area is left moist, secondary infection and skin irritation may occur.
29. Measure the amount of urine.	To establish bladder capacity for patients with previous history of urinary retention and to monitor renal function and fluid balance.
30. Take a urine specimen for laboratory examination, if required.	To rule out UTI.
31. Dispose of equipment in a plastic clinical waste bag and seal the bag before moving the trolley.	To prevent environmental contamination.
32. Record the information in the relevant documents. This should include: a. Reason for catheterisation b. Residual volume c. Date and time of catheterisation d. Catheter type and size e. Colour and odour of urine f. Problems negotiated during the procedure. g. Patient experience and any problems.	To provide a point of reference or comparison in the event of later queries.

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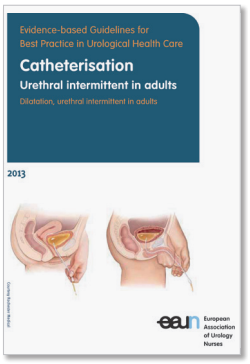

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