



Clinical guideline for the use of a catheter maintenance solution

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Type of document	Guidance
Target audience	All clinical staff within CCWC
Document purpose	This guideline is to be used by Competent Practitioners employed by Cheshire and Wirral Partnership NHS Foundation Trust (CWP), in identifying the causes of catheter blockage or leakage. The initial reaction to a blocked catheter must never be to unblock it with a catheter maintenance solution. This guideline will enable Competent Practitioners to decide on best evidence based practice when a catheter blocks. This document will also provide Competent Practitioners with guidance on how to administer a catheter maintenance solution using an aseptic technique should this be required. This guideline is intended for use in adult patients who have a long-term urethral or supra-pubic indwelling catheter in situ.

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CWP documents to be read in conjunction with	HR6 IC2 GR29 IC3 CP3 CC7 CC6 MP16 GR26 MH13	Trust-wide learning and development requirements including the training needs analysis (TNA) Hand decontamination policy and procedure Waste management policy Standard (universal) infection control precautions policy Health records policy Clinical guidelines for urethral indwelling catheterisation Clinical guidelines for supra-pubic catheterisation Non-medical prescribing policy Policy for the safe manual handling of people and loads Part IV and IVA - MHA - Consent to treatment
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Training requirements	Yes - Training requirements for this policy are in accordance with the CWP Training Needs Analysis (TNA)
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Financial resource implications	No
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Equality Impact Assessment (EIA)

Initial assessment	Yes/No	Comments
Does this document affect one group less or more favourably than another on the basis of:		
• Race	No	
• Ethnic origins (including gypsies and travellers)	No	

Initial assessment	Yes/No	Comments
<ul style="list-style-type: none"> Nationality Gender Culture Religion or belief Sexual orientation including lesbian, gay and bisexual people Age Disability - learning disabilities, physical disability, sensory impairment and mental health problems 	No	
Is there any evidence that some groups are affected differently?	No	
If you have identified potential discrimination, are there any exceptions valid, legal and/or justifiable? N/A		
Is the impact of the document likely to be negative?	No	
<ul style="list-style-type: none"> If so can the impact be avoided? What alternatives are there to achieving the document without the impact? Can we reduce the impact by taking different action? 	N/A	
Where an adverse or negative impact on equality group(s) has been identified during the initial screening process a full EIA assessment should be conducted.		

If you have identified a potential discriminatory impact of this procedural document, please refer it to the human resource department together with any suggestions as to the action required to avoid / reduce this impact.

For advice in respect of answering the above questions, please contact the human resource department.

Was a full impact assessment required?	No	
What is the level of impact?	Low	

Monitoring compliance with the processes outlined within this document

Please state how this document will be monitored. If the document is linked to the NHSLA accreditation process, please complete the monitoring section below.	Auditing the number of patients with a catheter in situ, catheter. Auditing the number of Competent Practitioners attending the CWP catheterisation study day and number of staff competent to catheterise. Auditing catheter care training attendance provided to private and social care providers. Continence Advisory Service by the Continence Lead
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Document change history

Changes made with rationale and impact on practice
1.

External references

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1. Introduction

This guideline is to be used by registered nurses or assistant practitioners employed by CWP, in the appropriate use of catheter maintenance solutions. This guideline will enable registered nurses to decide on best evidence based practice when a catheter leaks or blocks. This document will also provide registered nurses or assistant practitioners with guidance on how to administer a catheter maintenance solution using an aseptic technique should this be required.

This guideline is intended for use in **adult** patients who have a long-term urethral or supra-pubic indwelling catheter in situ.

2. Definitions

To provide guidance for registered nurses in:

- Caring out a catheter assessment and review;
- The identification if there is a clinical need for administering a catheter maintenance solution;
- The administration of a catheter maintenance solution using an aseptic technique;
- The training, teaching and support of the patient or assistant practitioner in the administration of catheter maintenance solutions;
- The delegation and supervision of administering catheter maintenance solutions to assistant practitioners, patients or carers.

To provide guidance for assistant practitioners in:

- The administration of a catheter maintenance solution using an aseptic technique;
- Supporting the patient in administering a catheter maintenance solutions.

3. Qualification and training

This guidance applies to all clinical staff employed by CWP:

- Registered nurses who are currently registered with the Nursing and Midwifery Council (NMC);
- Assistant practitioners who have completed an recognised assistant practitioners course.

In order to maintain knowledge and skills the registered nurse and assistant practitioner should attend a catheterisation update study day every three years.

A registered nurse who can demonstrate competence to this professional level may delegate those procedures to assistant practitioners, carers or patients as appropriate. However, it is the registered nurse's responsibility to ensure that the assistant practitioners, patient / carer competencies are assessed and reviewed.

4. Catheter leakage and blockage

Long-term catheterisation is rarely completely free of complications. The most common problems are catheter blockage and leakage. Catheter leakage does not necessarily indicate catheter blockage.

A catheter may leak for a number of reasons (Nazarko, 2008):

- Kinked tubing / poorly supported drainage bag;
- Overfull drainage bag;
- Bladder spasm;
- Bladder stones;
- Wrong length / Charriere of catheter;
- Over / under inflated catheter balloon;
- Constipation;
- Low fluid intake;
- Blood / debris;
- Encrustation;
- Urinary Tract Infection (UTI).

Refer to [appendix 2](#) for possible solutions for the above causes of catheter leakage.

Recurrent blockage is a commonly experienced problem, which occurs in around 40-50% of long term catheters. (Getliffe, 2002) There are several factors that could contribute to catheter blockage: (Rew, 2005):

- Constipation;
- Kinked tubing;
- The mucosa of the bladder can get drawn into the eyes of the catheter by a build up of suction within the catheter;
- Debris;
- Bladder stones are formed by the same process that leads to catheter encrustation and many people who have encrusted catheters, also have bladder stones. (Nazarko, 2008);
- Encrustations.

Nearly half of all individuals with an indwelling catheter will experience problems with catheter blockage due to encrustation. Encrustation is caused by micro-organisms in the urine which produce an enzyme. This enzyme breaks down urea to form ammonia which results in the urine becoming alkaline. Under these conditions, mineral salts such as calcium phosphate and magnesium ammonium phosphate (struvite) are deposited onto the catheter surface causing encrustation (Rew, 2005) (Mathur, 2006). Several studies identified an association between high urinary pH (alkaline) and encrustation and blocking but there is no evidence that monitoring urinary pH can be used to predict blocking (Rigby, 2004).

5. Management of catheter blockage

When a catheter blocks a full assessment of the client's catheter history must be completed (NICE, 2012) (please see [appendix 1](#) "Management of Catheter Leakage or Blockage"), to include:

- Fluid intake;
- Suspected bladder spasms or stones;
- Constipation;
- Kinked tube;
- Urinary tract infection;
- How often have the catheters been changed;
- Type and size of catheter, balloon size;
- Colour, smell, appearance of urine;
- Encrustation on the outside and / or inside of the catheter tip.

Record the cause of at least 3 catheter blockages in order to establish the reason for the blockage. (Wilson, 2009) This will enable the registered nurse to develop an individualised programme of catheter management. (NICE, 2012).

If it is suspected that a catheter is encrusted, rub with thumb and forefinger across the catheter. If it feels gritty, it is encrusted. On removal encrustation can often be seen around the balloon and tip of an encrusted catheter. To see the extent of encrustation on the inside of the removed catheter, the catheter can be cut longitudinally (Nazarko, 2008).

To minimise the risk of blockages, encrustations and catheter-associated infections for patients with a long-term indwelling urinary catheter NICE (2012) recommends:

- Document catheter blockages;
- Develop a patient-specific care regime;
- Increasing fluid intake;
- Consider approaches such as changing the catheter more frequently to avert a future clinical crisis.

6. Catheter maintenance solutions

The need for frequent catheter changes to avoid catheter blockage may be unacceptable to some patients and carers. (Getliffe, 2002) In these circumstances the use of catheter maintenance solutions could be considered in order to try to extend the life of the catheter. The following catheter maintenance solutions may be used as per Continence Prescribing Formulary (CAS, 2012):

Sodium Chloride 0.9% (Saline) (<i>Optiflo S, Bard</i>)	Neutral solution, pH 7, recommended for flushing of debris and small blood clots)
Solution G (<i>Optiflo G, Bard</i>)	Citric acid 3.2%, pH 4, intended to dissolve crystals
Solution R (<i>Optiflo R, Bard</i>)	Stronger citric acid 6%, pH 2, intended to dissolve more persistent crystals

Catheter maintenance solutions were originally introduced to prevent or reduce the occurrence of catheter associated infections. In recent years the usage has been primarily aimed at minimising the effects of the recurrent encrustation and blockage. (Hagen, 2010)

The instillation of any solution into a urinary catheter carries with it certain potential risks. In order to administer the solution, the drainage bag will need to be disconnected from the catheter; this could increase the risk for urinary tract infection (NICE, 2012).

Catheter maintenance solutions must be administered according to manufacturer's guidelines. The bladder mucosa plays an important role in the defence against urinary tract infections. During the instillation minimal physical force should be used as this will reduce the risk of damage to the bladder mucosa. Both neutral and acidic solutions can cause chemical irritation to the bladder wall (Getliffe, 2002).

Catheter maintenance solutions come in volumes of 50 or 100 ml. Studies using a model of the catheterised bladder have shown that an instillation of 50 ml of solution G is as effective as 100 ml at reducing encrustation. Other studies have shown that using 2 subsequent instillations can be more effective in reducing encrustation. Using 2 subsequent instillations might increase the risk for introducing infection by the necessity of disconnecting the catheter twice in order to give them (Getliffe, 2002) (Rew, 2005).

There is no clear evidence of how often a catheter maintenance solution should be administered for it to be effective in keeping the catheter patent. The frequency of the instillation of the catheter maintenance solutions will depend on the clinical judgement of the registered nurse, taking into consideration how often the catheter blocks and the extra risk of introducing infection.

Catheter maintenance solutions must NOT be used to unblock a blocked catheter. A blocked catheter should be replaced.

A recent Cochrane review (Hagen, 2010) and NICE guidelines (2012) concluded there is insufficient evidence to guide clinical practice regarding all aspects of using catheter maintenance solutions for long-term indwelling catheters. Therefore we do not know whether catheter maintenance solutions convey any benefit or harm to patients. Neither do we know, therefore, whether the associated costs are justified.

7. Patient consent and information

Prior to administering a catheter maintenance solution the consent of the patient must be verbally obtained and documented following a full explanation of the procedure and potential complications.

It is the registered nurse or assistant practitioner's responsibility to assess, and teach the patient and / or his carer on hand decontamination (see [hand decontamination policy and procedure](#)) if the procedure of administering a catheter maintenance solution is delegated to the patient / carer.

8. Equipment required

To prescribe the most cost-effective catheter maintenance solution, please refer to the most up to date continence prescribing formulary. It is the registered nurse and assistant practitioner's responsibility to use the products that are available in the continence prescribing formulary, unless they are contra-indicated for the patient. If you are prescribing outside this formulary the reason should be documented.

The equipment for the administering of catheter maintenance solution is listed in the related procedure set in section 9 "Procedure- administering catheter maintenance solution" in this guidance.

9. Procedure – administering catheter maintenance solution

Equipment:	
<ul style="list-style-type: none"> • Disposable non-sterile gloves (2 pairs); • Disposable plastic apron; • Sterile, single use catheter maintenance solution at room temperature; • New sterile drainage system, i.e. leg / night bag, catheter valve; • Nursing procedure sheet or towel. 	

No.	Action	Rationale
1.	Explain the procedure to the patient Obtain consent and document on care plan.	To ensure that the patient understands the procedure and gives informed consent.
2.	Wash hands as per hand decontamination policy and procedure Put on apron and disposable non-sterile gloves	To minimise risk of cross infection. (NICE, 2012)
3.	Prepare working area.	To provide a clean working surface.
4.	Assist the patient into a suitable position. If the patient has a <i>urethral catheter</i> , place the disposable nursing procedure sheet or towel under the patient's buttock and thighs; cover genital area. If the patient has a <i>supra-pubic catheter</i> , place the disposable nursing procedure sheet or towel over the lower abdomen.	To maintain the patient's dignity and comfort. To ensure urine does not leak onto bed clothes.
5.	Empty leg / night bag	To minimise risk of spillage
6.	Remove gloves, wash hands and put on disposable non-sterile gloves as hand decontamination policy and procedure .	To minimise risk of cross infection (NICE, 2012)
7.	Remove the outer packaging from the catheter maintenance solution and the new leg / night bag or catheter valve.	
8.	Disconnect leg / night bag or catheter valve from catheter. Place leg / night bag or catheter valve in a receiver for disposal, while continuing to hold the catheter.	To prevent leakage of urine.
9.	Remove protective cap from the catheter maintenance solution, being careful not to touch the connecting end. Immediately insert into the end of the catheter.	To minimise risk of cross infection
10.	Instill the catheter maintenance solution as <i>per manufacturer's guidelines</i> .	To reduce the risk of damage to the bladder mucosa
11.	Disconnect the catheter maintenance solution from the catheter and dispose of the catheter maintenance solution, while continuing to hold the catheter.	To minimise risk of cross infection

No.	Action	Rationale
12.	Remove protective cap from the new sterile leg / night bag or catheter valve, without touching the connection. Then insert the leg / night bag or catheter valve into the end of the catheter.	To facilitate drainage of urine.
13.	Secure drainage system i.e. leg bag holder or straps if appropriate	To prevent tension on the catheter by weight or urine.
14.	Remove gloves, wash hands as per hand decontamination policy and procedure .	To minimise risk of cross infection. (NICE, 2012)
15.	Record procedure, including <ul style="list-style-type: none"> • Type of solution; • Rational for use of catheter maintenance solution; • Instilled amount of fluid; • Batch number; • Colour, odour, appearance of the urine; • Frequency and length of time of the catheter maintenance solution. 	To record and evaluate procedure.

10. Duties and responsibilities

10.1 Clinical Director

Clinical Director is responsible for development, implementation and review of approved documents, which fall within their remit. The clinical director will take a uniform approach towards the complex issues in this guidance. They will ensure training is implemented across CWP through their monthly managers meeting.

10.2 Continence Advisory Service

Continence Advisory Service is responsible for:

- Offering advice and support to registered nurses and assistant practitioners in all aspects of catheterisation;
- Ensuring the guideline is evidence based and reviewed on a 5-yearly basis or earlier if necessary;
- Providing evidence based education and training in catheter maintenance solution via the catheterisation study day;
- Auditing the implementation of the guideline.

10.3 Line managers

Line Managers have the responsibility to:

- Highlight the guidance to all clinical staff;
- Providing evidence that the guideline has been cascaded within their team or department;
- Where appropriate, ensuring the new guideline is effectively implemented;
- Ensuring that staff attend all training identified in respect of this guideline.

10.4 Clinical staff

It is the responsibility of clinical staff:

- Ensuring that the guidance contained herein is adhered to and followed;
- Complying with “The code: standards of conduct, performance and ethics for nurses and midwives” (NMC, 2008); with competency document for assistant practitioners;
- To attend an initial catheterisation study day and update their skills every 3 years, or sooner if required, by attending the catheterisation study day organised by CWP Continence Advisory Service;
- Reporting any accidents, incidents and near misses in relation to this processes and procedures contained herein via Datix-system.

Appendix 1 - Management of catheter leakage or blockage

Name		Date of Birth		NHS Number	
Causes of catheter leakage	Causes of catheter blockage	Flowchart if catheter blocks		Catheter Maintenance Solution - NOT to be used to unblock a catheter!	
<ul style="list-style-type: none"> - Kinked tubing / poorly supported drainage bag - Overfull drainage bag - Bladder spasm - Bladder stones - Wrong length / Ch of catheter - Over / under inflated catheter balloon - Constipation - low fluid intake - Blood / debris - Encrustation - Urinary Tract Infection (UTI) <p style="text-align: center;">▼</p>	<ul style="list-style-type: none"> - Kinked tubing - Constipation - Debris / blood clots - Bladder stones - Encrustation <p style="text-align: center;">▼</p>	<p>1st time</p> <ul style="list-style-type: none"> - Identify cause - Examine tip of catheter externally and internally by cutting the tip of the catheter longitudinally and record outcome - Re-catheterise <p>2nd time</p> <ul style="list-style-type: none"> - As above <p>3rd time</p> <ul style="list-style-type: none"> - As above - If identified the catheter blocks due to encrustation/debris/ blood clots, then: <ol style="list-style-type: none"> a) Calculate average life span of the previous catheters and arrange to reinsert a new catheter before it is expected to block b) Frequent catheter changes may be unacceptable to some patients. In these circumstances a catheter maintenance solution could be used to try to extend the life span of the catheter <p style="text-align: right;">▶</p>		<p>Sodium Chloride 0.9% (Saline) Neutral solution, recommended for flushing of debris and small blood clots</p> <p>Solution G Citric acid, intended to dissolve crystals</p> <p>Solution R Stronger citric acid intended to dissolve more persistent crystals</p> <p style="text-align: right;"><i>Please see Continence Prescribing Formulary</i></p>	

Appendix 2 – Possible causes and solutions for catheter leakage

Problem	Cause	Remedial action
Drainage systems	Kinks or traction in poorly supported drainage bag system	Straighten tubing. Check if patient is using the leg bag straps or leg bag holder correctly. Ensure drainage bag is below bladder level. When using a night bag, secure on a night bag stand. Ensure the length of the leg bag tube is tailored to fit the patient's leg.
	Overfull drainage bag	Empty drainage bag when 1 / 2 to 2 / 3 full
	Failure in non-return valve of the drainage bag	Replace the drainage bag, inform manufacturer and complete Datix-incident report form
Bladder problems	Bladder spasms	These can be caused by the catheter tip irritating the bladder muscle and cause the bladder to contract. Bladder spasms may cause lower abdominal cramping pain and urinary leakage and on occasions the bladder spasm is so strong the catheter is displaced or expelled. (Nazarko, 2008) Consider anti-cholinergic therapy or introducing intermittent catheterisation.
	Bladder stones	Discuss with GP the possibility of the presence of bladder stones.
	Clots and debris	If the patient's fluid intake is low the urine becomes concentrated and any debris from urothelial shredding or mucous in the bladder is less likely to be "flushed" from the bladder. Blood clots following trauma may form in the bladder blocking the catheter eyes. (Rew, 2005)
Catheter problems	Wrong Charriere size catheter used	For female patients use preferably Ch10- Ch12. For male patients use preferably Ch12-Ch14. For supra-pubic catheter use preferably CH16.(NICE, 2012)
	Wrong length of catheter used	Only use standard ("male") length catheters on male patients. Female length catheters and standard length catheters can be used on female patients. Standard length catheters should be used for supra-pubic catheters unless otherwise indicated by urologist.
	Over / under inflated balloon	Ensure catheter is inflated according to manufacturer's guidelines and documented in the patients care plan An under-inflated balloon can result in a tear-shaped balloon configuration with deflection of the catheter tip. An over-inflated balloon increases urine pooled in the bladder base with the associated risks of bladder spasms or bacteriuria. (Cochran S, 2007)
	Constipation	Constipation can cause pressure on the catheter that prevents the catheter from draining adequately. (Rew, 2005) Implement bowel management programme. Consider laxatives.
	Encrustation	Encrustations on the surface of the catheter can cause blockage and by-passing resulting in urinary leakage (Rew, 2005).