

CLINICAL SKILLS DEVELOPMENT WORKBOOK ON CATHETERISATION

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AIM & INTENDED LEARNING OUTCOMES

Aim

The aim of this clinical skill development workbook is to enhance your professional practice and contribute to the overall care of catheterised patients by helping you to;

- a) Care for a child with an indwelling catheter
- b) Minimize, prevent/ manage catheter related problems
- c) Where appropriate to perform safe, effective male or female catheterisation in children.

This workbook is to be used in conjunction with the Trust guidelines for the Management of catheters in the hospital setting

Intended Learning Outcomes

At the end of working through this workbook you should be able to:

- Recall key facts about the normal urinary tract.
- Summarise different options available for patients requiring urinary catheterisation and the reasons why.
- Demonstrate safe and effective management of indwelling catheters and the underlying rationale
- Explain main risks and common complications which can occur when patients use long-term urinary catheters.
- Identify how these problems may be prevented or managed in practice.
- Have a good working knowledge of the different catheters and drainage equipment available and its correct and safe usage
- Understand the importance of accurate and comprehensive documentation and discharge planning

INTRODUCTION

Urinary tract infections account for approximately 23% of all health care associated infections in adults. Approximately 8% of these are associated with the presence of an indwelling catheter. Of those who develop bacteriuria, 2 – 6% develop urinary tract infection, of which 1 – 4% develop bacteraemia with a mortality rate of 15 -30%.

The risk of infection is associated with the method and duration of catheterisation, quality of catheter care and susceptibility of the host. It is essential therefore, that careful assessment is made of the need for catheterisation and that the most appropriate equipment is selected, used and managed safely to minimise the risk to patients.

In the absence of data relating to children it is prudent to assume similar if not greater infection risks than with adults.

The main principles guiding catheterisation and catheter management are therefore associated with minimising infection risk and maximising comfort, dignity and concordance. These are as follows;

- 1) Only catheterise when all other methods of management are not appropriate.
- 2) Select most appropriate method and equipment for catheterisation depending on purpose and length of time catheterisation is needed.
- 3) Continuously review need for catheter and remove it at the earliest opportunity
- 4) Catheterisation should only be performed by trained and competent personnel. It is the responsibility of staff undertaking the procedure and staff caring for catheters to ensure they have the knowledge and skills for safe and effective management.

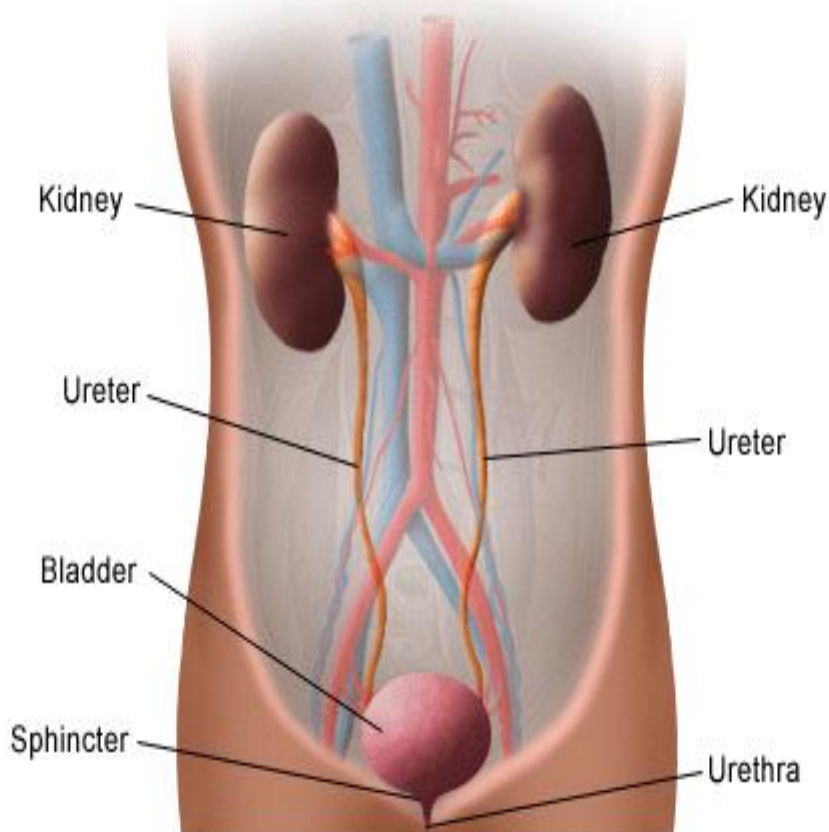
This workbook is designed for all staff caring for catheters and is a comprehensive training programme. The workbook and exercises should be completed alongside practical assessment of ability to care for a child with a catheter. It must also be completed as part of training and assessment of insertion of catheters.

Assessment and practical observation of both, management of catheters and catheterisation, is provided by members of the urology /continence team, clinical skills team or designated trained ward staff.

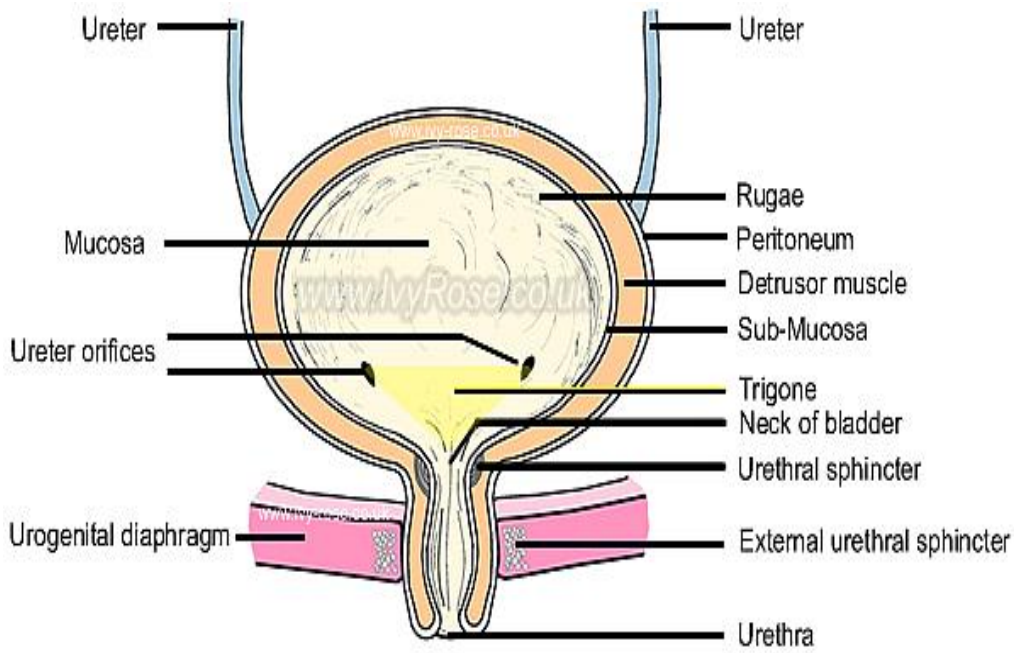
THE NORMAL URINARY TRACT

The bladder is composed of two main parts: the body within which urine collects and the neck, a funnel-shaped extension of the body, which connects with the urethra. The smooth muscle of the bladder is called the detrusor muscle and when contracted it can increase the pressure in the bladder to 40 to 60 mmHg. On the posterior wall of the bladder, immediately above the bladder neck, is a small triangular area called the trigone. At the lowermost apex of the trigone the bladder opens through the bladder neck into the posterior urethra. The two ureters, coming from the kidneys, enter the trigone at the uppermost angles of the trigone. The muscle in the area of the bladder neck forms the internal sphincter. Beyond the posterior urethra, the urethra passes through a circular layer of muscle - the external sphincter - which is under voluntary control. In anatomy books the bladder is usually depicted in its full state, with a very obvious cavity. However, it is important to remember that the bladder is a collapsible muscular sac and when empty the mucous membrane lining falls into folds except in the area of the trigone. The female urethra is about 4 cm long. The male urethra is about five times as long (20 cm) and is surrounded at the bladder end by the prostate gland.

Front View of Urinary Tract



ANATOMY OF THE BLADDER



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Nervous innervation of the bladder

The activation and co-ordination of the bladder and sphincter region are controlled through the three sets of peripheral nerves.

1 The sacral parasympathetic nerves

These nerves supply the pelvic nerve which comprises of sensory (afferent) nerves that carry impulses towards the central nervous system, and motor (efferent) nerves that carry impulses away from the central nervous system. The sensory fibres supply the detrusor and the bladder neck area and as the bladder stretches, signals are sent to the sacral segment of the spinal cord (S2 –S4) .From here they are transmitted in the ascending ventral columns of the cord to the higher centres of the brain. When these nerves are stimulated during micturition they bring about the contraction of the detrusor and the funnelling effect of the bladder that initiates voiding.

2 The sympathetic nerves

Sympathetic nerves also consist of motor and sensory fibres originating in a different region of the spinal column (T1-T2). It is thought that these nerves influence the inhibition cycle in the bladder and sensory nerve fibres relay impulses in response to painful stimuli such as over-distension, spasm, inflammation or stones.

3 The somatic motor and sensory nerves

These supply the wall of the urethra and the pelvic floor primarily from S3 (but also to some degree S4 and S2) becoming the pudendal nerve which carries both motor and sensory fibres. The pudendal nerve is derived from the sacral plexus.

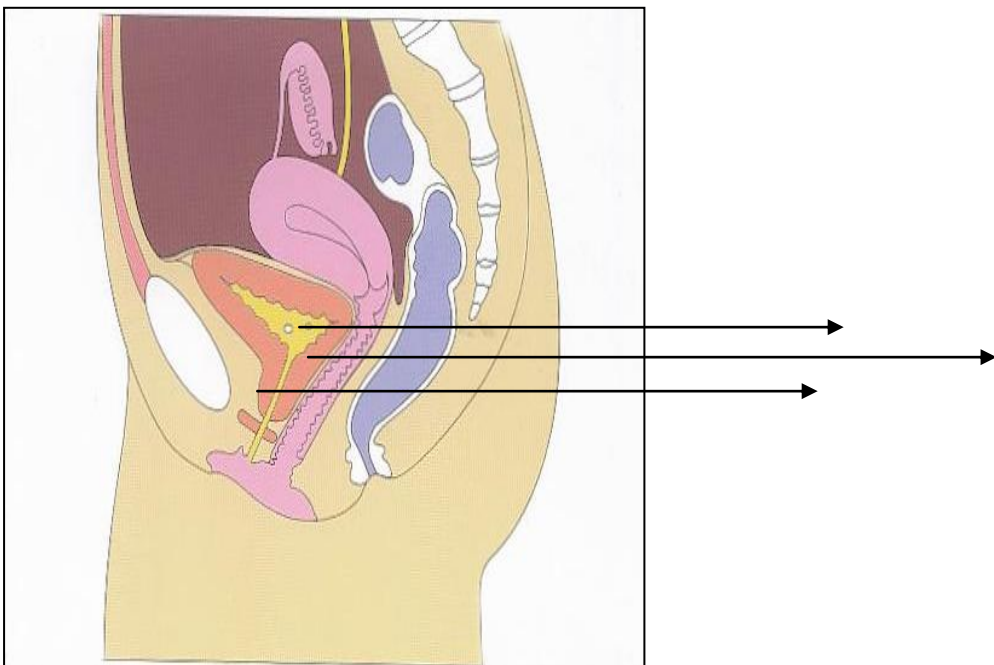
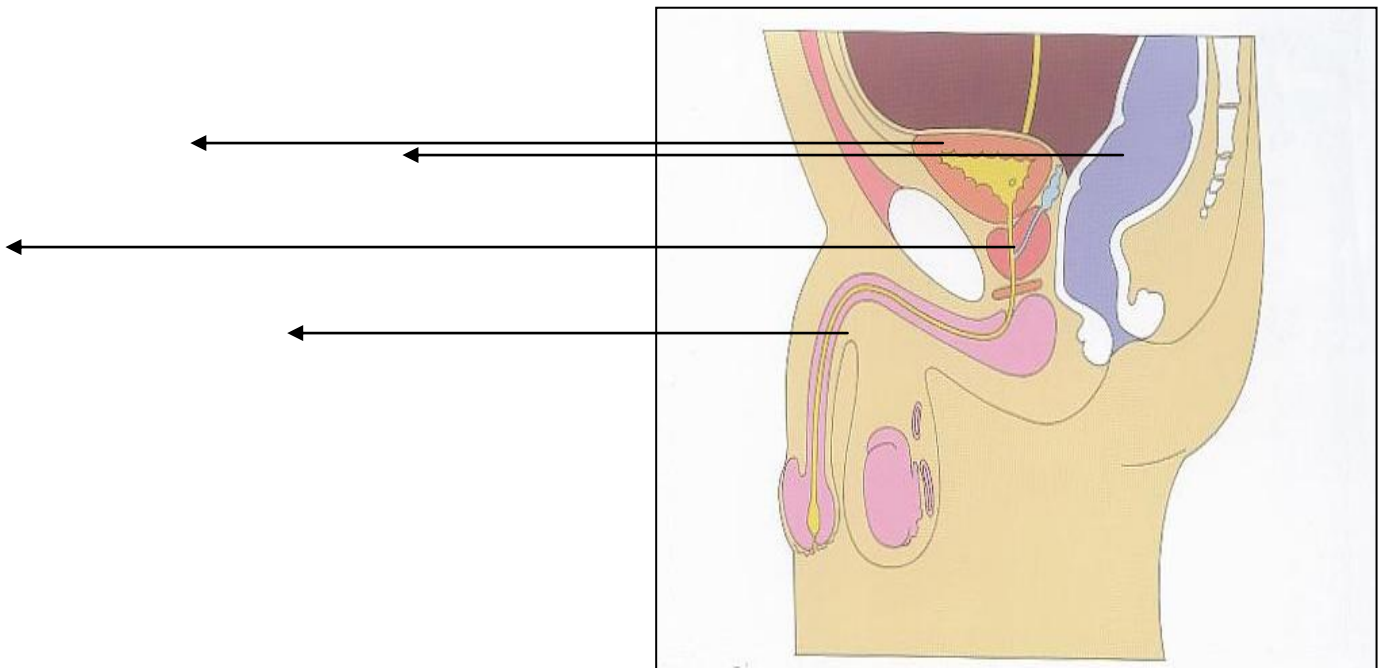
The bladder normally fills at a rate of 1 ml per minute from each ureter but this can be increased with kidney disease, increased fluid intake or pharmacology.

As the bladder fills with urine the pressure rises within it. Superimposed on these pressure changes are periodic acute increases in pressure lasting from a few seconds to more than a minute these micturition reflexes start when sensory receptors in the bladder wall, and especially the posterior urethra, detect the degree of stretch in the bladder wall and send signals to the spinal cord. These signals are conducted back to the bladder where they cause a further reflex contraction of the detrusor muscle. This cycle is repeated again and again until the bladder is strongly contracted. If the higher centres in the brain prevent micturition, the bladder pressure returns to its basal tone. However, as the bladder becomes more and more full, micturition reflexes occur with increasing frequency and strength. When a convenient time for micturition occurs, the higher centres relax the external urinary sphincter, and the urine is expelled by the contracted detrusor.

EXERCISE 1

DRAW THE BLADDER AND KIDNEYS AND EXPLAIN HOW THE BLADDER WORKS

LABEL THE DIAGRAMS OF THE MALE AND FEMALE ANATOMY



URINARY CATHETERISATION : OPTIONS AVAILABLE

Catheters may be inserted into the bladder via

- a) the urethra (urethral catheterisation) this can be intermittent or indwelling
- b) through a small incision in the anterior abdominal wall (suprapubic catheterisation)
- c) a stoma e.g. ureterostomy, vesicostomy or through the umbilicus via a Mitrofanoff stoma.

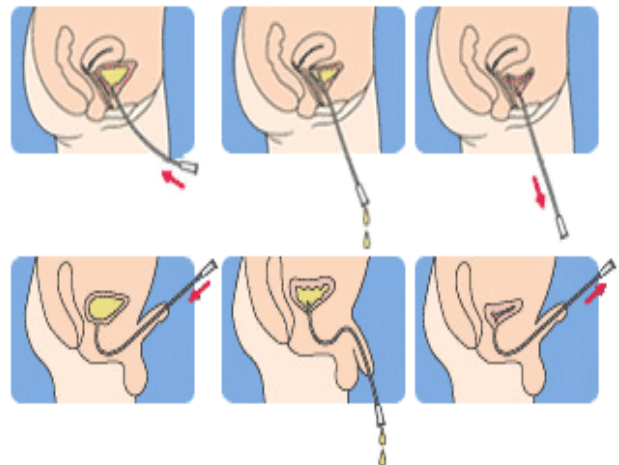
• Urethral Catheterisation- Intermittent

Urethral catheters may be inserted each time the bladder requires emptying and then removed following completion of drainage. Research evidence associates this method with the least number of complications and lowest risk of infection. (Lindhall et al, 2007).The only complication is minor trauma which can result in haematuria.

For some children however for instance those in wheelchairs, with dexterity problems or who experience unacceptable sensitivity or discomfort (mainly boys) it may not be a suitable option.

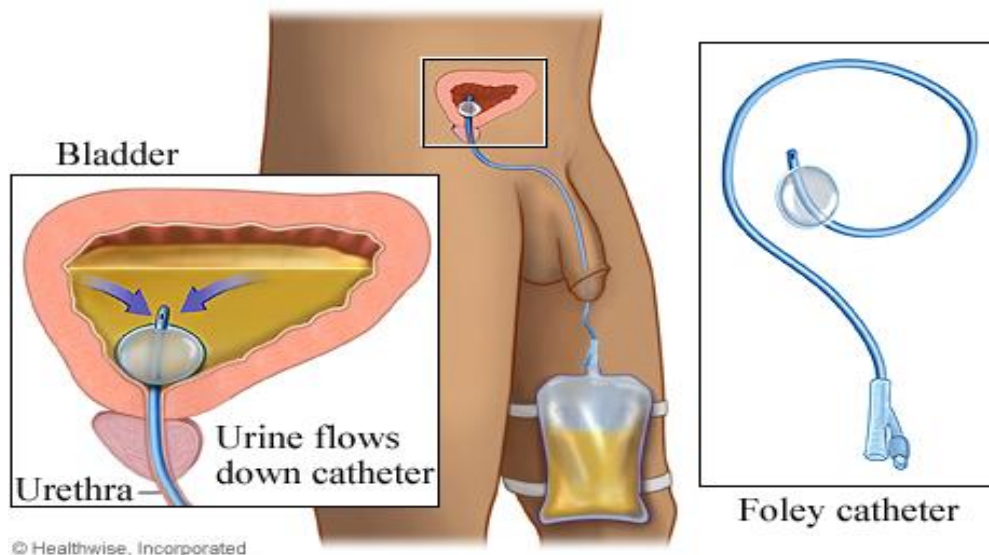
Intermittent catheterisation is a clean procedure for children, parents and carers in the community, however, carers undertaking the procedure are required to wear non – sterile gloves. For hospital staff, due to the risks of hospital acquired infection, it is always a sterile procedure. Procedural guidelines for intermittent catheterisation are within the Trust Guidelines for management of urethral catheters.

1. Intermittent catheterisation



2) Indwelling Catheterisation,

This is where a Foley (ballooned catheter) is inserted into the bladder via the urethra. The catheter is left in situ retained by inflating a balloon at the catheter tip with the correct volume of sterile water. A drainage system can then be selected and connected to the end of the catheter. The bladder can be drained using this type of catheter either intermittently by either putting on a catheter valve which can be open and shut or continuously by attaching a drainage bag to allow free drainage. The choice of drainage option depends on medical reason for catheter and will be advised by medical staff.



If continuous drainage is not necessary the use of a catheter valve will

- allow greater freedom
- encourage normal activity of the bladder
- avoid contact with urine therefore reducing risk of infection

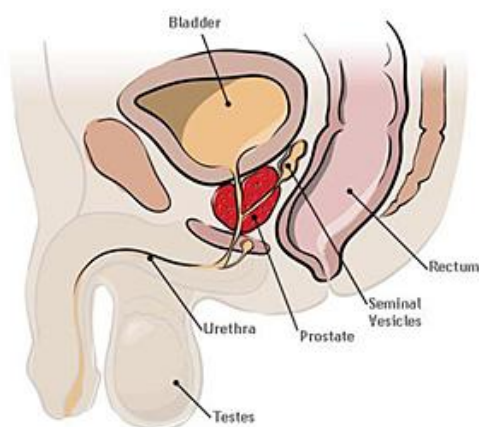
Male urethral catheterisation

This can be undertaken by male or female staff provided appropriate training and assessment has been completed.

Potential problems include:

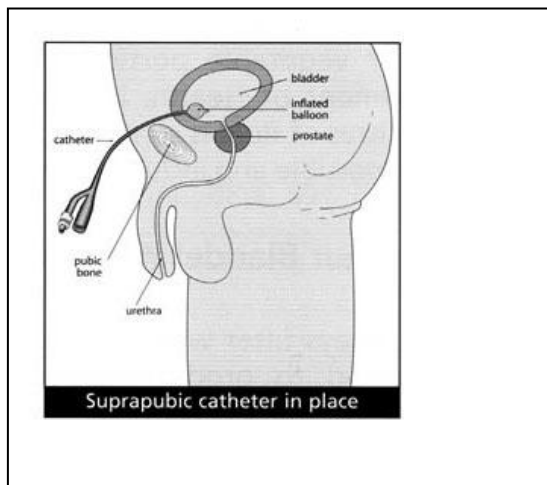
- Sensitivity when inserting catheter. Use of anaesthetic gel can help reduce discomfort
- Stricture formation- pre-coated catheters should be used to prevent incidence
- Urethral trauma on insertion or removal of catheter

See Trust guidelines for stepped procedure for indwelling urethral catheterisation



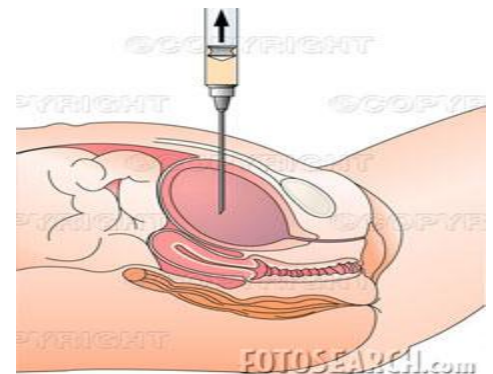
3) Suprapubic Catheterisation

Suprapubic catheters can be inserted under local or general anaesthetic (GA) however they are always inserted under a GA with children. They may be attached to a drainage bag for continuous drainage or may be used with a valve for intermittent bladder emptying.



Supra pubic catheterisation carries less risk of infection for long term use than an indwelling urethral catheter. It is also more comfortable and less restrictive and therefore is often the choice for children requiring longer term bladder drainage. It can be used short term for Urodynamics, following Hypospadias or urethral surgery using a non- ballooned catheter such as a Cystofix however generally a Foley catheter is the catheter of choice for suprapubic drainage.

Samples of urine are sometimes collected from a supra pubic aspiration when a child is acutely ill using a needle



Complications of suprapubic catheterisation

Complications of suprapubic catheters are minimal:

- Over-granulation of catheter site- causes yellow discharge around site is often confused with infection
- Catheter blockage/ leaking around site
- Tube displacement due to balloon deflation or being pulled out accidentally.

Suprapubic catheters can be changed in the community by parents/children or in hospital. Sometimes entonox or sedation can be used if necessary and occasionally it may require a general anaesthetic if particularly problematic.

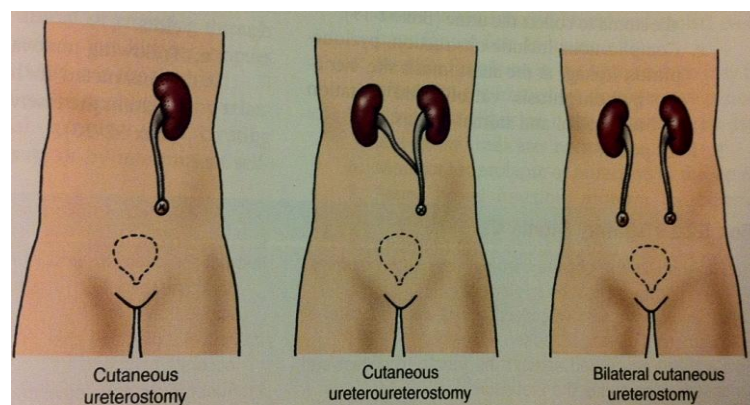
URINARY STOMAS (Ureterostomy, Vesicostomy and Mitrofanoff)

1) Ureterosomy –

This is a method of diverting the flow of urine away from the bladder via the ureters by creating an opening (stoma) onto the surface of the abdomen. The more common types of ureterostomy are:

- 1) Single ureterostomy this procedure brings one ureter to the surface on the abdomen
- 2) Transuretero ureterostomy this procedure brings both ureters to the skin surface on the abdomen through a single stoma
- 3) Bilateral ureterostomies this procedure brings both ureters to the skin surface on each side of the abdomen

The stoma will drain urine continuously either into the nappy (babies) or into a drainage bag (older children)



1

2

3



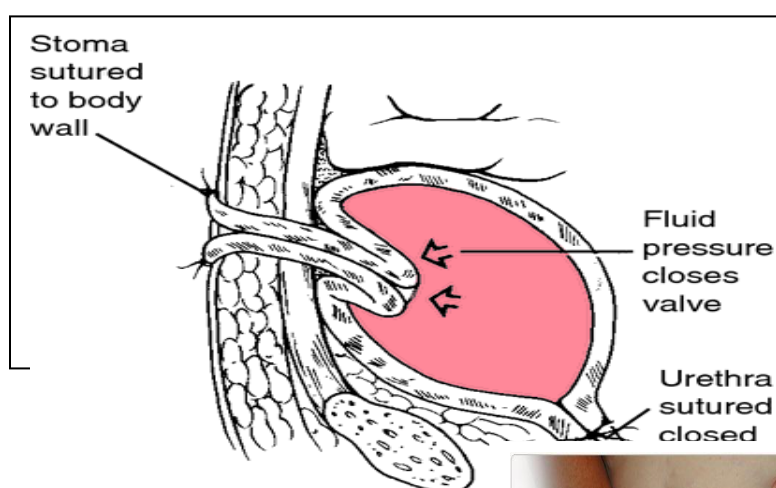
Complications

Irritation, soreness and infection of skin around the stoma site can be caused by direct contact with urine. This can cause drainage bags to leak and need frequent replacement. Appropriate barrier creams/skin treatments may be used to resolve this problem.

Narrowing (stenosis) of stoma could cause obstruction of urine flow from the kidney. Daily catheterisation of the stoma is usually carried out using a short intermittent catheter to ensure the stoma remains patent. The procedure is the same as that for intermittent catheterisation.

2) Vesicostomy –

This is a surgically created connection from the anterior bladder wall to the skin surface on the lower abdomen for children who are unable to void in the usual way due to problems such as: Congenital defect, Spinal cord injury or defect, renal problems / voiding dysfunction
If the child /parent are unable or unwilling to carry out urethral catheterisation, then a vesicostomy may be chosen as a temporary or permanent option. Urine will drain continuously from the vesicostomy into a nappy (babies) or into a drainage bag (older children)
Intermittent catheterisation of the stoma is again usually necessary at least daily with an intermittent catheter to ensure the bladder is completely emptied of urine to prevent stasis and infection. This will also ensure the stoma remains patent and prevent obstruction of the flow of urine.



Complications

- Irritation, soreness and infection of the skin around the stoma site due to direct contact with urine. This can cause drainage bags to leak and need frequent replacement. Appropriate barrier cream/skin treatments may be used to resolve this problem. If skin is severely affected, a Foley(balloon) catheter may be temporarily inserted into the vesicostomy with a closed drainage system attached to allow drainage of the bladder and prevent direct contact of skin with urine until the problem is resolved

3) Mitrofanoff Stoma

This is a channel constructed from the appendix, or small intestine which connects the bladder to the surface of the skin behind the umbilicus. It is tunnelled into the bladder in an anti – reflux manner to create a “valve” to prevent leakage of urine up and out of the channel. An intermittent catheter can then be passed through the channel into the bladder every three or four hours or when the bladder is full. Children are usually able to do this without help but may need support / supervision depending on age and ability. Regular emptying of the bladder this way will ensure that all urine and mucous is removed to prevent urine infections, protect the kidneys and achieve dryness. The procedure is similar to that of intermittent urethral catheter except that the catheter is passed down the Mitrofanoff channel rather than the urethral opening. (See Guidelines for Catheterisation of Mitrofanoff stoma). It is most commonly used when intermittent catheterisation is impractical or impossible however it is major surgery and requires the child and parents to be motivated and compliant to manage aftercare and potential complications.



Complications

The channel is surgically made and therefore is susceptible to narrowing (stenosis) making it difficult to insert a catheter. If this occurs advice must be sought immediately especially if the child has also had a bladder augmentation as there can be a risk of bladder perforation if it cannot be drained

It is also possible the channel can kink causing intermittent problems with catheterisation. If this is problematic medical advice should be sought and surgical revision maybe required.

A) List the reasons for catheterisation

B) Identify the different types of catheterisation and when they are used

C) Discuss the possible complications of each type of catheterisation

ASSOCIATED COMPLICATIONS OF CATHETERISATION AND CATHETER CARE

1) Urinary Tract Infection

The association between catheterisation and the risk of urinary tract infection has long been recognised. It is vital that nurses are able to minimise, diagnose and manage UTI's within their practice.

A dirty catheter introduced into the bladder can cause infection and inflammation and may even cause death by the infection spreading upwards to the kidneys. Hence every effort must be made to prevent the entrance into the bladder of any bacteria.

Almost all patients with an indwelling catheter will have positive urinalysis but may be asymptomatic.

Urinary tract infections can result from;

- bacteria from the patients' colonic flora which contaminate the urethra or perineum
- the migration of an organism during catheterisation or caring for the catheter
- Poor hygiene.

- Cross infection with bacteria from the infected urinary tract of another patient. In this situation the bacteria may be transmitted by contaminated equipment or by the hands of nurses or doctors.

Catheter-related urinary tract infection not only makes people unwell but can also cause their death. 25% of septicaemia in hospital patients originates from urinary tract infection (.Sleigh and Timbury (1998) Moreover, almost all patients with an indwelling catheter develop infection.

The Public Health Laboratory Service (1997) report highlights that cross infection can occur when emptying urine bags if there is inadequate hand washing, wearing the same gloves from patient to patient and allowing the drainage tap to be in contact with the ground. Also it was highlighted that staff often thought that hand washing was unnecessary if gloves were worn. Good technique is essential when emptying urine bags (see trust guidelines for emptying a catheter bag)

Although prolonged drainage by supra – pubic catheters is inevitably associated with bacteria and colonisation, evidence suggests that onset of infection may be delayed in comparison with the urethral route (presumably because of the lower density of bacteria on the abdominal skin). Nevertheless, the risk of developing bacteruria from any urinary indwelling catheter increases at a rate of 5% per day for each day the catheter remains in situ. Therefore intermittent catheterisation carries the least risk of developing infection and should be the first choice wherever possible and practical.

EXERCISE 2

How Do Infections Develop?

Infection and the Formation of Bio films

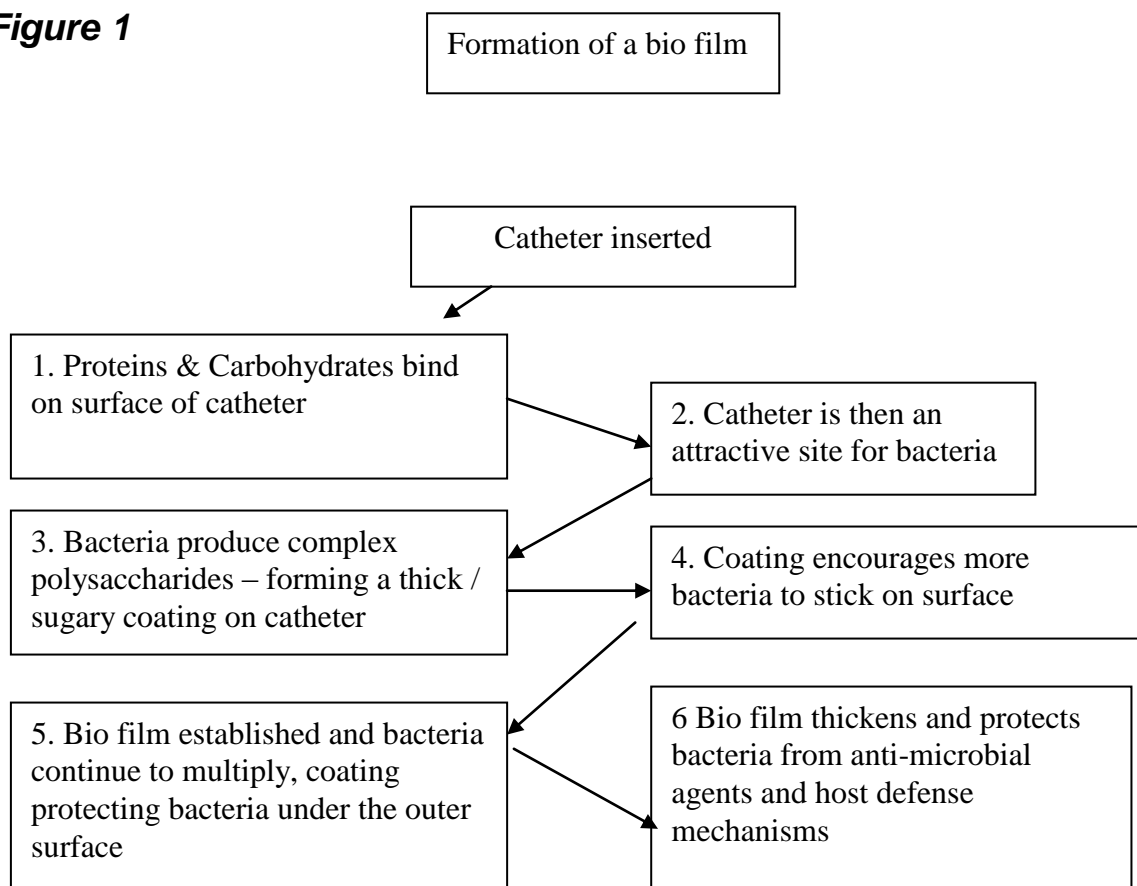
Bio film formation is a phenomenon of great significance for patients with indwelling catheters. A bio film is defined as "a collection of micro organisms and their extracellular products bound to a solid (living or inanimate) surface" (Mulhall, 1991). *Figure 1 outlines the stages of biofilm formation.*

Research related to bio films has shown that, in nearly all cases, bacteria prefer to grow on surfaces rather than aqueous environments. This applies not only to urinary catheters but also to urine collection devices and equipment such as intravenous catheters, cardiac pacemakers and endo tracheal tubes (Mulhall,1991).Thus creating a thick polysaccharide coating , also called a glycocalyx ,into which the bacterial cells are embedded.

Many different microorganisms may attach to the same surface and replicate. Each of their glycocalyx will differ. This has implications for the control and elimination of the bacteria as the different coatings respond to different methods/ agents of control and sensitivity to antibacterial agents.

Urease-producing organisms such as *Proteus mirabilis* result in encrustation, catheter blockages and stones and are formed from fossilised bacterial colonies.

Figure 1



Minimising risk of infection

The following points should be observed in order to minimise infection risk

- Sterile technique when catheterising
- Effective hand washing before and after procedures and in between patients
- Use of a closed system – (see drainage system)
- Ensure drainage bags not in contact with floor
- Ensure wearing of non-sterile gloves when emptying and changing bag and changing of gloves between patients
- Use of catheter valves
- Changing catheter valves and bags every 5-7 days (D.O.H 2001) in accordance with trust policy

2) TISSUE DAMAGE / TRAUMA

Trauma may occur during catheterisation. The use of lubrication such as aqueous gel or coated catheters (intermittent only) may help to reduce trauma.

Trauma can also be caused by incorrect positioning and anchoring of the catheter. This can cause the bladder mucosa to be sucked into the catheter eye.

Experimental evidence suggests that a drainage bag positioned more than about 30 cm below the bladder can create enough negative pressure (i.e. suction) at the catheter's eyes to suck in the bladder submucosa and plug the eyes. Bags positioned 40 cm or more below the bladder can result in a negative pressure of at least 29 mmHg developing at the catheter's drainage eyes. If this level of suction is sustained for one and a quarter of an hour, haemorrhage will occur in the minor blood vessels in the bladder's submucosa and become a potential cause of catheter blockage.

Tissue damage and catheter blockages can occur from accidental traction exerted on the urethral catheters. This traction causes the catheter to bend, usually near the external urethral meatus in women. In men and boys any bending and blocking of the catheter usually occurs where the urethra leaves the upper end of the penis. In both sexes catheter traction is uncomfortable and can result in the development of pressure ulcers at the site of the bend and under the surface of the balloon pressing on the bladder neck and causing pressure damage.

Minimising trauma

- Position drainage bag correctly
- Anchor catheter securely
- Ensure no kinks or bends in catheter or drainage system

3) CATHETER BLOCKAGE

Infection debris and mucous can result in the blockage of catheters. These can be

A) Mechanical

- Constipation with the bowel pressing on the bladder/catheter
- Kinking/twisting or obstruction of the tubes or bags
- Forgetting to unclamp the catheter tubing
- Traction on the catheter - bag positioned too low drawing tissue into the eyes of the catheter or catheter not anchored correctly.

B) Physiological

- Infection with urease producing bacteria causing infection and encrustation
- Mucous production following bladder augmentation procedure.
- Blood clots following surgery to bladder / urinary tract

Indications of catheter blockage;

No urine drainage from catheter or bag
Abdominal distention
Abdominal pain
Leakage/bypassing of urine around the catheter

If blockage is suspected mechanical causes should be eliminated firstly. If the cause is physiological the catheter may require flushing. This is done as per Trust policy on flushing a catheter.

NOTE: In patients who have had bladder augmentation there is mucous production from the implanted bowel segment which increases the risk of blockage, infection and stone formation

EXERCISE 3

-Identify the potential risks of catheterisation

-Discuss your role in minimising these risks

SELECTION OF CATHETERS FOR CATHETERISATION

The person undertaking catheterisation is responsible for insuring that the most appropriate catheter is used for the individual patient. It is also important when caring for a catheterised patient that staff is familiar with the characteristics of the catheters used to ensure effective and safe care.

It is important to select the correct material, size and length of catheter and, if the catheter is indwelling, the correct method of retention.

Catheter Materials

Catheters are made from a variety of materials. Choice of material depends on the purpose for the catheterisation and the duration required i.e. if.

- 1) Intermittent
- 2) Short-term indwelling
- 3) Long-term indwelling

1) Intermittent

Intermittent catheters are designed to be inserted, drain urine and then be removed and discarded immediately. There are many varieties of catheters manufactured by a range of companies. Some catheters require lubrication before insertion but many are pre-lubricated or have coating which is activated by either adding water or releasing a solution into the catheter. Whichever catheter is selected, the procedure of intermittent catheterisation is a clean procedure at home, but must be performed in hospital setting as a sterile procedure. All catheters used in hospital must be single use only, although patients may sometimes re-use non-coated catheters at home.

Pre-coated i.e. hydrophilic and gel coated catheters may reduce trauma and potential urethral stricture and their use should therefore be promoted where possible in preference to non-coated catheters particularly for males (MDA 2000)

Intermittent catheters are semi-rigid and are not designed for indwelling use.

If the catheter has hydrophilic coating. It must not be in situ for any length of time (more than 10 minutes) as the coating will dry out and removal of the catheter will cause trauma

2) Short term indwelling -Latex- These are prone to encrustation and there is associated increases with the risk of trauma and discomfort.

- 94% latex – 6% chemicals – These are associated with increased irritation and reactions to chemicals and should, therefore, be avoided

- PTFE (Teflon) coated Latex – These have a smooth surface – reducing encrustation, discomfort and trauma. Last 4-6 weeks.

4) Long – term indwelling

- Biocath – hydrogel coated. Latex bonded with a hydrogel coating. Hydrogel surface is more resistant to bacterial colonisation and encrustation. Last 3 – 12 weeks
- All silicone- a latex free catheter that is suitable for patients with latex allergy (actual or potential). Catheter walls are thinner and internal diameter is equal to a higher gauge catheter

Wherever possible, choice of catheter material should consider.

-Potential risk of latex allergy - allergy (spinal cord injured patients and those with spina – bifida for example)

-Personal preference in order to increase compliance e.g. with intermittent catheters the slippery nature of a hydrophilic catheter may be prohibitive for some children with dexterity problems and a Nelaton catheter may therefore be best choice.

-Length of time catheter is required for

NOTE – The duration of use given for all catheters is approximate and depends on the individual patient

SIZE OF CATHETER

Catheter diameter

Catheter gauges are measured in Charriere (Ch) or French Gauge (Fg). There has to be a compromise regarding catheter diameter. The wider the catheter the better the drainage, but the greater is the risk of discomfort, urethral trauma and bladder spasms which may lead to bypassing / leakage and increased risk of infection. In general, the smallest gauge catheter possible for adequate drainage should be used for urethral catheterisation.

For Mitrofanoff stomas, the largest gauge possible is required, particularly following augmentation in order to effectively clear resulting debris and mucous.

Supra pubic catheters cause less discomfort and trauma therefore larger catheters may be used especially in instances where large amounts of debris are produced.

The table below gives guidance for the sizes of indwelling / intermittent catheter to be used for different age groups.

GUIDE FOR CATHETER SELECTION

| Age | Intermittent catheter (Non ballooned) | Type of Indwelling catheter | Water to balloon |
|----------------------------|---------------------------------------|---|------------------|
| Neonate | 4-6 | Vygon vessical catheter size 4 or 6 | Taped in situ |
| Infant (< 1year) | 6 | 6Fr Foley Foley/Nelaton | 1.5ml |
| Infant (1-5 years) | 8-10 | Indwelling 8- 10Fr Foley Intermittent 8-10 Nelaton | 2-3ml |
| Child (5 years to puberty) | 12 | Indwelling 12Fr Foley Intermittent 12 Fr Nelaton | 5ml |
| Adolescent | 12-14 | Indwelling 12-14Fr Foley Intermittent 12 – 14 Fr Nelaton | 5ml |
| Mitrofanoff | 12 – 14 | Intermittent/ Indwelling 12 - 14 | |

Catheter length:

Catheters come in male, female and paediatric length and are approximately 45cm 25cm and 30cm respectively. The length of catheter used should depend on:

- The purpose it is being used for
- The type of catheterisation (suprapubic, indwelling, intermittent, Mitrofanoff or vesicostomy)
- It should ensure normal activities are restricted as little as possible. If a small or female child is catheterised with a male length catheter, the surplus tubing is more likely to kink and make it difficult to play and undertake normal activities. If a male adolescent is catheterised with a female length catheter, the balloon may inflate in the urethra and cause trauma. (Pomfret 1996)
- A child with a suprapubic catheter may be better off with a female length catheter as the tubing can be easily kinked and caught
- A Mitrofanoff stoma requires a longer length catheter (male length) irrespective of the sex and age of the child in order to drain the bladder effectively
- A vesicostomy requires a short catheter as it has direct access to the bladder

Balloon Inflation

Foley catheters all have a balloon to anchor them in situ. There are different sizes of balloon most commonly used are catheters with 5ml or 10ml capacity balloon. Balloons can be associated with bladder spasm, leakage and pressure damage to the bladder neck if the balloon is too large. Small balloons (5mls capacity) are recommended in paediatrics. In neonates, the bladder is too small to accommodate an inflated balloon so catheters should be taped in situ (Getliffe 1996a)

NOTE

Balloons should be inflated with sterile water as air, saline or tap water can affect drainage, cause irritation, increase the transfer of bacteria and cause crystal formation and therefore should not be used. In smaller children catheters with 5mls balloon capacity should be used but inflated with 3-5 mls sterile water depending on size of bladder / age of child. See table for Guide to catheter selection.

NOTE

Feeding tubes have previously been used as an alternative to a catheter. These should not be used as they are not licensed for use in the bladder raising the issues of Practitioner liability (Medical Advice Agency 2004/06) and there are several reported instances of feeding tubes becoming knotted in the bladder.(Foster et al 1992) Size 4 and 6 Nelaton (non – ballooned) catheters are available for use in smaller babies and neonates and have the same lumen as the equivalent feeding tube. These are licensed for bladder drainage and can be taped in situ negating the need to use feeding tubes. They can also be used for investigations such as micturating cysto – urethrograms (MCUG)

Storage of Catheters Incorrectly stored catheters / those past their sell date can harm patients. Latex catheters, for example, although normally very pliable, harden when they are old. If inserted after their expiry date they can slowly harden inside the patient, increasing the likelihood of bladder perforation (Lowthian 1998). Catheters should not be held together with elastic bands as this can block the filling channel and lead to difficulties deflating the balloon.

Exercise 4

Discuss which type, size and length of catheter you would select for the following scenarios and why?

- a) Mitrofanoff stoma on a 10yr old girl
- B) Indwelling urethral catheter on a 6yr old boy

Drainage Systems:

Once an indwelling catheter is inserted it is important to select the most appropriate drainage system to control or collect urine output. This may be in the form of bags or valves.

Drainage Bags:

If continuous drainage is required, the use of a closed sterile continuous drainage system should be used. In research carried out in adults, this has shown to reduce infection rates from 97% to between 8% and 15% (Garibaldi 1974 Kunin 1977). This system minimizes the number of times the system is broken into and therefore reduces the risk of infection.

- If the patient is ambulant a sterile leg bag correctly secured and supported should be used.
- The size required will depend on the size of the child – 350mls for a small child – 500mls for an adolescent.
- The length of tube chosen should also be dictated by the size of the child (i.e short tube is appropriate however in some cases a long - tubed bag may be appropriate)
- At night, an overnight drainage bag (2000mls) should be connected onto the leg bag. This can then be removed the next morning, leaving the leg bag in situ for daytime use, thereby maintaining a closed system
- .The leg bag should not be disconnected from the catheter unnecessarily.
- Night bags should not be re –used in the hospital setting but drainable bags can be washed out and re-used at home(Department of Health 2001)
- Catheter drainage bags should be positioned below the level of the bladder to prevent potential trauma and reflux. This should be no greater than 30 cm below bladder level as a suction effect can occur which can pull the bladder mucosa into the catheter eye. causing blockage of the catheter and trauma to the mucosa(Getliffe 2003)
- Night bags should be placed on a stand, avoiding contact with the floor (Department of Health 2001) to minimise risk of infection.

Emptying Drainage Bags

Since cross infection is most likely to occur during changing and emptying of drainage bags (Getliffe k, Dolman.M, 2003 and Roe 1993), the bags should be emptied often enough to maintain urine flow and to prevent reflux, i.e. when not more than 2/3 full but not unnecessarily (Department of Health 2003)

Emptying a catheter bag must be a clean procedure as the closed system is utilised to try and maintain a sterile environment. In emptying a catheter bag the closed system is broken and therefore increases the risk of introducing pathogens.). If the utmost care is taken and effective infection control measures are undertaken then this can limit the potential for pathogen introduction but not eliminate it, as merely having a urinary catheter insitu introduces risk of infection. The longer a catheter is insitu the higher the risk of urinary tract infection. Being vigilant in maintaining the closed system can limit the risk of urinary tract infection.

- Hands must be washed before bags are emptied, and non-sterile latex – free gloves applied
- A clean container should be used for each patient, avoiding contact between drainage tap and container
- The drainage should be cleaned before and after with tissue or alcohol wipe to avoid contamination
- Urine output should be accurately measured and recorded on fluid balance chart
- Urine should be disposed of in an appropriate place
- The container should be cleaned or disposed of along with gloves
- Hands must be washed after procedure

Nurses have a key role to play in maintaining the closed urinary drainage system . See guidelines for procedure for emptying catheter bags

Collecting Urine Samples from Catheters

Breaking the closed drainage system to obtain a urine sample increases the risk of repeated catheter-related infection. The use of drainage incorporating a sample port removes the need to break the closed system.

All catheter samples should be taken following an aseptic technique using a syringe and needle.

Samples should not be taken from the catheter bag

See guidelines for obtaining a catheter sample of urine

Removal of Urinary Catheters: While there is extensive literature on the type, maintenance and techniques for insertion of urinary catheters, limited attention has been given to the policies and procedures for their removal. Evidence suggests that the timing of catheter removal is a balance between avoiding infection (by early removal) and circumventing voiding dysfunction (by later removal)

No evidence exists to suggest that clamping prior to removal of catheter compared with free drainage has any beneficial effects or that there are any benefits between midnight or early morning catheter removal. These findings are based on an adult population. However, removing the catheter during the morning to ensure adequate urine is passed during daytime hours is advantageous to prevent re-catheterisation during the night-time.

Before catheter removal the water in the catheter balloon has to be drained, this balloon will have expanded and stretched at inflation. At deflation the balloon membrane collapses and deforms, resulting in surface changes to the deflated balloon, these changes can form the shape of creases, ridges or cuffing and all of these can cause discomfort to the patient on catheter removal and possible trauma of the urethra. Discomfort on initial micturition post removal is therefore common and, in children, can result in re-catheterisation

Manual syringe aspiration is the most common method used to deflate catheter balloons, where a syringe is attached to the deflation valve and pulled back until no more water is emitted.

CATHETER CARE AND MAINTENANCE

Cleaning the catheter

Daily bathing or showering using soap and water is sufficient to ensure the catheter remains clean. There is no proven benefit to routine urethral / meatal cleansing or the use of antiseptic / antimicrobial solutions. (Saint & Lipse Classen et al 1991. D.O.H 2001)

Exercise 5

Discuss the different forms of catheter drainage system and when they can be used

Bladder Flush / washouts

To unblock and reduce encrustation of indwelling catheters, it may be necessary to flush the catheter. This can be done with cooled boiled water in the home situation or with sterile saline solution in hospital. The fluid should be instilled gently and not drawn back in a normal bladder as this may cause trauma to the bladder mucosa. (Getliffe.K Dolman M 2003). In some instances however, agitations of solutions instilled into the bladder may be appropriate e.g. following bladder augmentation. Repeated irrigation and agitation to washout the bladder frequently may necessary when the bladder is healed post surgery and can be required several times a day to clear the excessive mucous which may be produced. Washouts should be decreased gradually as the mucous production reduces, but current good practice advocates weekly washouts for life where the bladder has been augmented, as this is thought to decrease the risk of stone formation. There are also other manufactured catheter solutions designed for use with indwelling catheters. See guidelines for procedure for bladder flush / washout.

DISCHARGE HOME

PRIOR TO DISCHARGE

- Minimizing risk of infection should continue when the patient goes home. Patients / parents / carers should therefore undergo training on how to look after the catheter as soon as it is appropriate after insertion in readiness for discharge (Getliffe 2003). Drainage systems should be selected in conjunction with the child and parents, taking into account the dexterity of the child, in order to promote independence at home and in school.
- Teaching plans (available within the Trust) should be completed and patients / parents / carers given written information about the management of their catheter and drainage system.
- Documentation / information regarding catheter type, size, length and volume in the balloon are vital to ensure continuing care (Talja 1990). This information should be recorded in patient notes and passed on to the relevant professionals providing ongoing care.
- Referral should be made to the community nurses for continuing support prior to discharge.

ON DISCHARGE

- It is the responsibility of the hospital to provide the patient with enough supplies for 1 month and ensure access to appropriate ongoing supplies after this period.
- Patient / parent / carer should be given advice regarding the procedure, if the catheter falls out or does not drain.
- Effective communication and liaison are essential and it is good practice to ensure patient / parent / carers have ongoing community support. Contact numbers for community or specialist nurse should be given prior to discharge.
- Details of discharge, including equipment supplied must be passed to the urology nurse specialists / community nurses.

Exercise 6

Describe how you would arrange the discharge of a patient with an indwelling urethral catheter into the community

SUMMARY OF MAIN POINTS

Indwelling urinary catheters should be a last resort and used only when alternative methods of management have been considered

The need for catheterisation should be reviewed regularly and the catheter should be removed as soon as possible when clinically appropriate

Intermittent catheterisation should be used in preference to an indwelling catheter if clinically appropriate and a practical option for the patient

Catheterisation in hospital should be undertaken by healthcare personnel who are appropriately trained and competent to undertake such procedures or by the patient / parent / carer in certain circumstances

All catheterisation carried out by healthcare personnel should follow an aseptic technique according to Trust guidelines on catheterisation

Healthcare personnel must select the appropriate catheter required taking into account the patient's individual characteristics, suitable material etc.

Silicone catheters should be used in children unless specifically contra- indicated

Size of catheter and volume of balloon inflation is dependant on age and bladder capacity of patient. Catheter insertion, care and any changes should be documented for guidelines.

Indwelling catheters should be connected to a closed drainage system or catheter valve and linked to an overnight drainage system if appropriate

The connection between the catheter and the drainage system should not be broken except for good clinical reasons e.g. changing bags every 5 -7 days

Urinary drainage bags should be positioned below the level of the bladder and should not be in contact with the floor

Routine urethral / meatal cleansing (catheter toilet) has no proven benefit and daily bathing / showering is sufficient to clean the catheter.

REFLECTION ON LEARNING AND PRACTICE

This section is intended to help you reflect upon your learning. When completed, this document should be placed in your portfolio as evidence of your reflective practice. The purpose of this format is to encourage you to question what you have learnt and how you learnt it. It should also help you to consider any further knowledge you may require to consolidate theory to enhance clinical skills and practice.

What have been the benefits of completing this workbook?

How has it helped improve your skills/knowledge?

Which aspects of the workbook were particularly helpful?

How has the workbook helped develop your practice?

Has the workbook helped identify any other training/development needs?

References

Getliffe (1996a), Lowthian (1998), Wilson (1997) and Godfrey and Evans (2000) are some of the many authors who discuss correct techniques in catheter care. Ten of the key points to consider are

Aseptic technique, when inserting a catheter / changing bags on the system.

Balloon inflated with the correct volume of sterile water. Under filled balloons inflate irregularly and can irritate the bladder lining.

Catheters positioned so that there no kinks or traction.

Drainage bag at the correct height i.e. below the level of the patient's bladder but nor 30 cm or more below.

Empy bag into clean container, ensuring tap does not touch sides of container, floor or urine.

Facilitate early removal where possible.

Gloves (new pair) worn when handling catheter and drainage equipment.

Hands washed before gloves put on and after removal

Important to maintain catheter and drainage bag as a closed system

Document in patient's record all relevant details e.g. size and type of catheter and when inserted or changed.

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ON LINE SOURCES

<http://www.nice.org.uk/cat.asp?c=98511> .

<http://www.hta.ac.uk/project/1325.asp?src=alr>

NICE guidelines UTI in children (attached summary document)

Trainers Information & PRACTICE BASED LEARNING EXERCISES:

The following are examples taken from practice and other centres experiences with catheterisation and are tools to help practitioners think about how they feel and how they would manage problems in practice.

1. You have been asked to catheterise a 14 year old boy who is complaining of painful micturition. He has not passed urine for 10 hours, has only had 300ml in that time orally but has had an IVI for the last 4 hours.
 - What would you consider important at assessment?
 - How would you assess if he needed to be catheterised?
 - What would you do if you were uncertain he should be catheterised (remember the risks of having a catheter in place)
 - What type and size of catheter would you use?
 - Who could you call for help if you felt unsure about the procedure?
2. You have watched someone catheterise a 4 year old girl and they are looking for the urethral opening near to the clitoris and failing to catheterise the child. They have tried with a foley catheter and are about to try with the same catheter again. What would you do in this situation?
3. A child returns from theatre and has a urethral catheter in place. The catheter is not draining 3 hours post-op after draining a very small amount from theatre < 50ml. The child does not appear to be in pain or discomfort. What would you do
4. You are being supervised putting a catheter into a small child (boy). You have seen this skill and talked with your mentor / supervisor before undertaking the skill. What responsibility do you have when doing this and what dialogue should you be having with your supervisor?
5. You are watching a little baby boy being catheterised, you know that he has urine in his bladder. The person undertaking the catheterisation feels they are in the bladder but no urine has drained. What do you do?
6. A 15 year old girl comes into your ward with a history of abdominal pain and problems passing urine. You agree with the medical team she need to be catheterised but she refuses, how do you manage this situation? What other questions should you be asking her during her admission?
7. You are trying to catheterise a 10 year old boy with spina bifida, he normally catheterises himself but can due to being unwell. You are struggling to pass the catheter, what could be the cause and what would you do about this?