Catheter application in the care home

Introduction

Continence is one of the fundamentals of nursing care and maintaining continence can significantly increase a resident's quality of life (Royal College of Nursing (RCN), 2019). Many people may need the support of continence products, such as catheters, to help them manage their everyday activities. Throughout the United Kingdom (UK) there has been rapid expansion in residential and nursing home care for older people, with a corresponding reduction in long-term hospital care (British Geriatric Society (BGS), 2018). Many of the residents are likely to have some degree of urinary incontinence or dysfunction possibly requiring either an intermittent urinary catheter or an indwelling catheter (BGS, 2018). Urinary incontinence in these settings should not be viewed as inevitable

Urinary Catheters

Urinary catheterisation is an invasive clinical procedure that involves the insertion of a flexible tube (catheter) into the bladder to empty urine (Hill and Mitchell, 2018), this may be on an intermittent basis to simply drain the bladder when full, or more long term where it will drain into a drainage bag and remains in place until it is no longer needed. Catheters can provide an effective way of draining the bladder, for both short and long-term purposes (RCN, 2019). A urinary catheter is usually used when people have difficulty urinating naturally or are unaware that they are passing urine, such as urinary incontinence. NHS England (2018) estimates that 14 million people are living with bladder problems, roughly equivalent to the size of the over-60 population in the UK. A urinary catheter can also be used to empty the bladder before or after surgery, and to help perform certain tests (Hill and Mitchell, 2018). When resident s are very unwell catheters are used to support fluid balance monitoring where health

professionals measure the intake and output of fluid. Sometimes, if a resident is incontinent and has wounds, such as pressure ulcers, moisture lesions, or other fragile skin around the lower body, an indwelling catheter may be used as a last resort to allow time for the healing skin to recover, reducing the risk of further skin breakdown and potential development of infection caused by urine contamination (Hill and Mitchell, 2018). Catheterisation can be considered for residents who are agitated and/or cognitively impaired following a full risk assessment or when significant residual volume of urine is identified (RCN, 2019).

Catheters must be inserted by a health professional, who will have been trained and assessed as competent to undertake the task and manage catheter care (RCN, 2019). The National Institute for Health and Care Excellence (NICE) (2017) recommends all catheterisations carried out by healthcare workers should be aseptic procedures. It is important to remember that inserting a catheter causes discomfort, therefore anaesthetic gel may be used to reduce pain.

Types of urinary catheter

The two main types of urinary catheter are intermittent urinary catheters and indwelling urinary catheters.

Intermittent Urinary Catheters

Intermittent urinary catheters are temporarily inserted into the bladder via the urethral passage and removed once the bladder is empty (Hill and Mitchell, 2018). It is important to recognise that intermittent catheters do not have a balloon to hold them

in place. The sterile catheter may be pre-lubricated (depending on the branding as many different types are available), to reduce the risk of any discomfort when inserted.

One end of the catheter is either left open-ended to allow drainage into a toilet or attached to a bag to collect the urine, however it's important to recognise that some have integral drainage facilities. The other end is guided through the urethra until it enters the bladder and urine starts to flow. When the flow of urine stops, the catheter can be removed. This may be repeated several times a day, and a new intermittent urinary catheter must be used each time the bladder is drained. It's important to note that urine flow can be intermittent as the catheter is slowly withdrawn.

Intermittent catheter types

The number of catheter types and designs has increased with the advancement of new technology. The two key designs of catheters used for intermittent bladder drainage are coated and uncoated.

Non-coated

Non-coated catheters are no longer a common choice in the UK. They are available as latex, silicone or PVC catheters. However, there are countries in the world that still use reusable IC products. If a non-coated catheter is chosen by the nurse, non-coated latex catheters require separate external gel lubrication before insertion, and catheters with a coating that provides the lubrication when water is applied. Uncoated red rubber catheters (which are very rare these days) are not appropriate for anyone with latex sensitivities and the flexibility of a red rubber catheter can make it difficult to insert (Newman, 2017). Non-coated catheters may either be discarded after use or washed,

or disinfected if reusable, and re-used for up to one week; these methods are commonly referred to as sterile non-coated catheterisation and clean non-coated catheterisation, respectively. Although clean non-coated catheterisation used to be the most common method of intermittent self-catheterisation on both sides of the Atlantic, it has recently fallen out of favour in preference for hydrophilic and gel reservoir catheters (Birmingham et al, 2013).

Coated

Coated catheters are designed to improve catheter lubrication and ease of insertion, which may reduce trauma and urinary tract infections. The most common coating is a hydrophilic coating as there is evidence supporting single-use HC catheters' ability to prevent some of the most common catheter-associated complications (Newman, 2017), such as urethral trauma and catheter-associated urinary tract infection (CAUTI), however integrated systems are expensive. In addition, design changes include the integration of all needed equipment (such as catheter, water-based lubricant, and drainage receptacle/ bag) into a compact and user-friendly system (closed system). When the nurse supports and edcuates the resident there is an opportunity for patient choice and joint decision-making. It is important to ensure that the final choice should always rest with the patient, with the clinician offering appropriate choice, information and support. There are two possible advantages of hydrophilic coated catheters over uncoated ones are the reduction of urethral trauma (e.g., haematuria) and the incidence of symptomatic UTIs (Li et al, 2013). Currently, although there are trends in favour of hydrophilic coated catheters with respect to UTIs (Rognoni, & Tarricone, 2017) in the short term, there is little consensus on which type

of catheter is best. Four meta-analyses have been previously published investigating the impact of hydrophilic coated catheters (and other catheter types) on UTI rate and urethral trauma among patients practicing IC (Clark et al, 2015; Prieto et al, 2014; Bermingham et al, 2013; Li et al, 2013). Two meta-analyses concluded that hydrophilic coated catheters are associated with a risk reduction of UTI (Clark et al, 2015) and trauma as compared to non-hydrophilic catheters, while two others were inconclusive and unable to differentiate between catheter types or techniques (Prieto et al, 2014; Bermingham et al, 2013).

Intermittent Catheter Sizing

Catheter types are gender specific, acknowledging the anatomical differences in urethral length between men and women.

- Standard male catheter length is 16" (~40cm)
- Female catheters range in length from 6-12 inches in length.

Measurement Units

A catheter diameter is measured in French gauge units, similar to the size of indwelling urinary catheters. Sizes range from 6-12 French for children and 14-22 French for adults. The funnel end of the catheter is often colour coded to allow for easier size identification.

Indwelling Urinary Catheters

Indwelling urinary catheters are inserted in the same way as an intermittent catheter but remain in place for many days or weeks and are held in position by inflated balloon that rests inside the bladder (*Figure 1*). Inflation is typically by water, but can also be with glycerine based, or with antimicrobial solutions. These types of catheters are often

known as Foley catheters. Foley is the name of the clinician responsible for popularising these balloon retention catheters. Once the urinary catheter has been placed in the correct anatomical place, urine will pass into a tube connected to a collection bag, which can either be strapped to the inside of the leg or attached to a stand on the floor. The catheter must always be secured below the bladder so that gravity can support the urine to flow downwards to the collection bag. Keep the drainage bag below the level of the bladder and off the floor at all times to prevent back flow and infection risk. Most indwelling catheters need to be changed from once a month to once every 3 months, depending on manufacturer's instruction and if indicated for infection prevention and control purposes.

Figure 1. EDITOR - Please use Figure 1 from Hill, B. Michelle, M. (2018) BJN V27 Number 21-page 1234 doi: 10.12968/bjon.2018.27.21.1234.

Use of catheter Valves

Indwelling catheters are sometimes fitted with a valve. Catheter valves are normally changed every 5 to 7 days. The valve can be opened to allow urine to be drained for disposal and closed to allow the bladder to fill with urine until drainage is convenient. Valves have several benefits. Valves provides dignity as they are small and discreet, and they can also provide comfort as residents do not have to carry a full urine bag on their leg or on a catheter stand. Valves can help residents manage their bladder problem independently from others. Valves can encourage residents to keep mobile and encourages use of hands and dexterity; maintains the bladder's elasticity and capacity as the bladder is not made redundant by using an outside bag. Valves may

help reduce other complications such as catheter blockages and infections. If catheter bags are required at night-time, valves can be connected to leg-bags and two-litre night bags. This is useful if residents suffer from night-time bladder problems. The resident can leave the catheters valve's lever open to drain urine directly into a bag without having to wake up to use the toilet. If the resident cannot get to the toilet safely to empty valve you can use a valve and bag connected. Residents can turn the valve open at regular intervals to drain urine into the bag. This will still be beneficial to bladder health particularly if the resident is using a catheter long-term. Residents can use (if available, and if they chose to) bottles, bowls, small buckets or other containers to empty their bladder through the valve. They do not have to go to the toilet unless it is safe to do so.

Safety

All catheters can have complications include; infection from germs enter the urinary tract, leaking due to poor attachment or a stretched seal, blockage (usually by encrustation by mineral salts), and bladder spasm. Encrustation by mineral salts, leading to catheter blockage. Crystalline deposits can form on the retention balloon, obstruct the eye holes and block the urine drainage channel. Bacterial infections make the urine alkaline, so that crystals form on the catheter surface. These obstruct the flow of urine so that the bladder steadily distends. This can become very painful. Urine retained within the bladder can either leak around or bypass the catheter causing incontinence, or it can flow back or 'reflux' to the kidneys, which can lead to serious kidney and bloodstream infections, pyelonephritis and septicaemia. About half of all long-term catheter users experience catheter encrustation and blockage at some time.

Sudden catheter blockage can be distressing. The chance of a resident developing these complications is reduced with intermittent catheterisation. If residents have capacity and have the dexterity to self-catheterise this is recommended (RCN, 2019).

Catheterisation should be used only after considering alternative methods of management. The person's clinical need for catheterisation should be reviewed regularly and the urinary catheter removed as soon as possible. The regulatory of review will depend on the catheter type and reason for catheterisation. Therefore it is important to read and use the manufacturer's product information and use clinical judgement. The need for catheterisation, as well as details about insertion, changes and care should be documented (NICE, 2014).

Potential complications

Long-term catheterisation is associated with several complications including: CAUTI from bacteria or fungi entering the urinary tract via the catheter. There they can multiply, causing an infection; tissue damage from trauma or inaccurate positioning of the catheter, and encrustations causing blockage and leakage of urine. Later complications can include bladder stones (British Geriatrics Society (2018). CAUTI's are one of the most common healthcare-associated infections that can occur with either a short-term or long-term catheter (NICE, 2014), with the symptoms being listed in Table 1. Therefore, it is important to routinely clean all parts of the catheter with soap and warm water to prevent infections.

- Fever
- Chills
- Headache

- Cloudy urine due to pus
- Burning of the urethra or genital area
- Leaking of urine out of the catheter
- Blood in the urine
- Foul-smelling urine
- Lower back pain, pressure or discomfort and achiness
- Unexplained fatigue
- Vomiting

Table 1. Symptoms of a UTI

CAUTI

CAUTI's are caused by bacteria or fungi entering the urinary tract via the catheter. It is thought that the micro-organisms reach the bladder by two possible routes: from urine in the drainage bag or via the space between the urethral mucosa and the catheter (Ostaszjiewicz and Paterson, 2012). According to the Centre for Disease Control and Prevention (DCCP) (2015) among UTIs acquired in the hospital, approximately 75% are associated with a urinary catheter, which is a tube inserted into the bladder through the urethra to drain urine. Between 15-25% of hospitalised patients receive urinary catheters during their hospital stay. The most important risk factor for developing a catheter-associated UTI (CAUTI) is prolonged use of the urinary catheter. Therefore, catheters should only be used for appropriate indications and should be removed as soon as they are no longer needed. It is essential to

minimise the use and duration of catheters especially those at a higher risk of CAUTI-related morbidity and mortality such as: the elderly, individuals with compromised immunity and women (RCN, 2019).

Residents who are more likely to be at risk of an associated catheterisation infection

The following examples are not comprehensive but can be used in the formation of risk assessment tools for nurses in clinical practice. Indwelling catheterisation may not be the best management for the resident; intermittent catheterisation or incontinence containment devices, such as pads, may be a better choice. The clinical decision making of the nurse and the multidisciplinary team should determine the best product for each individual resident. However, indwelling catheterisation may be the only option and the risks should be managed carefully. See table 2 for clinical considerations

- artificial heart valve
- heart defect
- Urinary infections post catheterisation – the urinary catheter and drainage system will become colonised by bacteria within 48 hours (the longer a catheter remains in situ the greater the risk)
- immuno-suppressed
- Organ transplant/s
- Poor bowel control/diarrhoea since having a catheter (high risk of infection)
- One kidney (risk of renal infection)

- A urinary infection since having a catheter (this indicates a high risk of further infection).

Table 2: Clinical Considerations (RCN, 2019)

Treatment

Residents with a CAUTI must be closely monitored to ensure that the infection is treated appropriately to reduce the risk of sepsis if unresolved (RCN, 2019). A full clinical assessment must be carried out if resident has symptoms indicating a CAUTI. If the resident has symptoms indicating a CAUTI or is not responding to current antibiotics, a catheter specimen of urine (CSU) should always be taken to determine the cause of infection. This should be obtained using an aseptic technique from the catheter sampling port (RCN, 2019). Antibiotics should only be prescribed for residents who are systemically unwell or where infection is suspected (RCN, 2019). An resident with such an infection that is colonised or resistant organism, such as Methicillin-resistant Staphylococcus aureus (MRSA) may require decolonisation (refer to local policy) and the catheter drainage system should be changed.

Asymptomatic colonisations

The term asymptomatic bacteriuria refers to isolation of bacteria in an appropriately collected urine specimen from an individual without symptoms of urinary tract infection (Fekete and Hooton, 2019). Asymptomatic bacteriuria is common, but most patients with asymptomatic bacteriuria have no adverse consequences and derive no benefit

from antibiotic therapy. With few exceptions, nonpregnant patients should not be screened or treated for asymptomatic bacteriuria. Asymptomatic bacteriuria in the few patient populations that may warrant screening and treatment is discussed in detail elsewhere. These populations include pregnant women and patients undergoing urologic procedures in which mucosal bleeding is anticipated (Fekete and Hooton, 2019). Nicolle (2016) also recognises that the paradigm for asymptomatic bacteriuria has shifted from being a harmful clinical finding requiring identification and treatment, to a benign observation requiring no management in most non-pregnant subjects and now, potentially, to being beneficial for some patients (Nicolle, 2016). The optimal management of bacteriuria for most populations is well characterised, although operational issues remain in implementing a “do not treat” approach for many patients. The potential role of asymptomatic bacteriuria as a strategy to prevent symptomatic infection in selected individuals is being investigated.

Catheters should be changed as soon as possible if a bacterial infection is suspected or has been confirmed and treated. Changing a catheter in a symptomatic person without providing cover can trigger more severe symptoms or sepsis. There is limited clinical evidence to support this, but expert opinion and best practice recommends the catheter should be changed immediately (if the resident is stable) or within 48 to 72 hours of commencing antibiotics (RCN, 2019). Encourage the resident to drink 2-3 litres of fluid a day (Dougherty and Lister, 2015).

Aseptic technique

It is important that the resident ’s body area is clean and that the use of sterile equipment is available when required i.e. urinary catheters and bags. Good hand

hygiene, hand washing and hand sanitisers are imperative to reduce and prevent the risk of cross infection (Loveday et al, 2014). Gloves and aprons should be changed between tasks and nurses performing catheterisation must be bare below the elbow. Its important to ensure that decontamination of dressing trolleys and/or trays occurs before use. Nurses must ensure they create a sterile field. Nurses must check all equipment's sterilisation dates as catheters, drainage bags and catheter bags have a shelf life of five years and pre-inflated catheters have a shelf-life of three years. The packaging for sterile items must be checked to see if they are intact, if not they should be discarded.

Prevention

As a nurse it is important to regularly review the residents clinical need for catheterisation and remove their urinary catheter if appropriate and as soon as possible (NICE, 2014), this is because he risk of developing a CAUTI increases with the length of time the catheter is insitu (Bernard et al., 2012). It is important to ensure training and competence of those preforming the procedure and those undertaking the aftercare (Dougherty and Lister, 2015). The nurse must provide adequate information to the resident and relatives (if appropriate and consented to) whenever possible on how to manage their own catheter (Prinjha et al., 2015). (see more in consent and capacity section). It is very important to ensure that aseptic conditions are followed when inserting a catheter (Dougherty and Lister, 2015). It is recommended that all healthcare professionals (and the resident themselves if self-catheterising), wash hands and use universal precautions when manipulating a person's catheter and wash hands again following the removal of gloves (NICE, 2014). All residents with an indwelling catheter require daily washing with warm soapy water in the genital area

and the urethral meatus (where the catheter enters the body) (British Geriatrics Society (2018). There is no evidence to suggest that antiseptic or antimicrobial agents found in soaps reduce the level of bacteriuria compared to routine bathing or showering (Loveday et al., 2014). Cleanse under the foreskin and be cautious that retracting the foreskin can cause paraphimosis.

Paraphimosis

Paraphimosis is a condition that only affects uncircumcised males (Healthline, 2020). It develops when the foreskin can no longer be pulled forward over the tip of the penis. This causes the foreskin to become swollen and stuck, which may slow or stop the flow of blood to the tip of the penis. The condition can lead to serious complications if it isn't treated. Paraphimosis most often occurs when a healthcare provider handles the foreskin improperly. They may not return the foreskin back to its normal position after a physical exam or medical procedure. Paraphimosis shouldn't be confused with phimosis. Phimosis is a condition in which the foreskin can no longer be pulled back from the tip of the penis (Healthline, 2020). It typically occurs in younger children, and it usually isn't a serious condition. Paraphimosis, however, is an emergency condition. Contact your doctor or go the hospital immediately if you're experiencing symptoms of paraphimosis.

Prevention *conditioned (editor please kindly restructure titles and sections as you see fit)*

Where the catheter meets the meatus, is important in the prevention of ascending infections and meatal trauma (Wilson, 2005). Its of paramount importance that that bacteria or faecal matter does not encounter the catheter as this will contribute to a

CAUTI. All indwelling catheters should be connected to sterile closed urinary drainage systems ensuring that connection is only broken only for good clinical reasons, such as bag change at least every 7 days in line with manufacturers guidelines (NICE, 2014; RCN, 2019). It should be noted that some drainage bags are designed for longer use. The maintenance of a closed drainage system is essential is reducing the risk of CAUTI's. Drainage bags should always be positioned below the resident s' bladder and not in contact with the floor. Urine bags should be emptied frequently and when clinically indicated to maintain urine flow and prevent vesicoureteral reflux (NICE, 2014). See X A separate container to empty the catheter bag must be used for each person. Contact between urinary drainage bag and the container should be avoided (NICE, 2014; RCN, 2019). Urine samples must be collected from a sampling port using an aseptic technique (NICE, 2014). Change the drainage bag if it becomes discoloured, contains sediment or there is an offensive smell. However, it is important to remember that frequent bag changes increase the risk of infection by breaking the sterile system (RCN, 2019). Bags should never be reused, washed or reconnected (RCN, 2019). Nurses should consider the use of non-drainable bags to reduce the risk of infection (RCN, 2019). It's important to recognise that non-drainable bags need to be changed thereby breaking the sterile system. It is important to note that non drainable bags do not have a needle free sample port. Non-drainage bags need to be weighed up against drainable bags which can remain in place for much longer. Nurses should also consider catheter maintenance solutions if indicated weekly or up to a maximum of twice weekly to remove small clots, debris and tissue etc. These are last resort and considered very high risk, and these solutions are not effective to remove encrustation (RCN, 2019). It is important to note that one of the risks associated with bladder irrigation (Yates, 2004). Nurses should consider the use of an anti-microbial

catheter inflation solution to improve patency by reducing encrustations and improve residents' experience. The British Geriatrics Society (2018) stresses the importance of considering intermittent catheterisation as a form of emptying the bladder in preference to an indwelling catheter is the resident has mental capacity and dexterity to carry it out.

Consent and capacity (RCN, 2017)

Consent

The RCN (207) have noted that several recent and less recent judicial reviews and rulings by the Supreme Court have confirmed that the need for "informed consent" is a legal requirement (Montgomery v Lanarkshire Health Board [2015]). Many interventions are not a simple "yes/ no" situation; it is not enough to provide adequate information to ensure consent for the examination, treatment and/or care. Enough evidence-based information must be provided to the person to enable them to make a balanced and informed decision about their care and treatment. As well as a general explanation of the procedure there is also a duty to explain the risks inherent in the procedure and the risks inherent in refusing the procedure. Information must also be provided regarding alternatives to the proposed intervention. This will assist the person to make the decision to consent to, or refuse consent for a intervention, whilst respecting their right to autonomously decide what happens to them. Failing to meet this legal duty can give rise to an action in negligence if the person is subsequently harmed.

Capacity

The ability to make decisions independently is often referred to as “having capacity”. Principles underpinning UK mental health legislation and mental capacity legislation support “assumption of capacity”; that is, adults are presumed to have the ability to independently make decisions about and decide whether to agree to or refuse any aspect of their care, treatment and/or support. A person who has capacity is able to provide or withhold consent for examination, treatment and/or care. If an adult makes a voluntary and appropriately informed decision to refuse care, treatment and/or support, then registered nurses must respect this decision (RCN, 2017).

X*

Vesicoureteral Reflux (Urology Care Foundation, 2019) *this was asked to be added by one of the reviewers.*

Normally, urine flows one way, down from the kidneys, through tubes called ureters, to the bladder. But what happens when urine flows from the bladder back into the ureters? This is called vesicoureteral reflux. With vesicoureteral reflux, urine flows backward from the bladder, up the ureter to the kidney. It may happen in one or both ureters. When the "flap valve" doesn’t work and lets urine flow backward, bacteria from the bladder can enter the kidney. This may cause a kidney infection that can cause kidney damage. When the flow of urine back up the ureters is more severe, the ureters and kidneys become large and twisted. More severe reflux is tied to a greater risk of kidney damage if there is an infection present.

Conclusion

Catheterisation in a residential setting is an invasive procedure which can lead to complications and CAUTI's especially in older people. It is important to consider all alternatives, the method most suitable for the resident and review the clinical need for catheterisation regularly. The benefits of inserting a urinary catheter must outweigh any possible complications the resident may experience. As reflective and evidence-based practitioners, nurses who work in residential settings must continue to continually professionally develop their knowledge of urinary catheters and adopt best practice techniques to minimise any potential risks. Catheters are not always successful in managing incontinence but may be necessary if the resident has persistent urinary retention. Bacteriuria, chronic urinary tract infection and urethral damage are always associated with long term indwelling urethral catheters. Recurrent blockage with debris/crystals is common and later complications include the formation of bladder stones. Leakage may occur around the side of the catheter and so not resolve the problem. Discomfort and odour cause distress to the resident. Indwelling catheters deny residents the opportunity to void 'normally', making a return to continence unlikely. Intermittent catheterisation is a preferable form of emptying the bladder and should be considered if the resident has the mental capacity and dexterity to carry it out. If not, care staff should consider carrying this out in preference to a long-term indwelling catheter. All catheters and urine drainage bags are available on prescription. Every resident who has an indwelling catheter requires a daily warm soapy wash of the whole genital area (or a bath or shower). Older people frequently have many complex health histories', and are taking lots of tablets and medicines which, in themselves, can contribute to urinary incontinence or make its management more difficult. Although incontinence is not inevitable, it is much more common if the

resident is severely confused and physically disabled. It follows that correction of confusion or active rehabilitation will reduce incontinence.

Reference List

Bermingham SL, Hodgkinson S, Wright S, Hayter E, Spinks J, Pellowe C. (2013) Intermittent self-catheterisation with hydrophilic, gel reservoir, and non-coated catheters: a systematic review and cost effectiveness analysis. BMJ.

Bernard, M.S., Hunter, K.F., Moore, K.N (2012) A review of strategies to decrease the duration of indwelling urethral catheters and potentially reduce the incidence of catheter-associated urinary tract infections. *Urologic Nursing,* 32 (1), 29-37

British Geriatrics Society (2018) *Continence Care in Residential and Nursing Homes.* Available at: https://www.bgs.org.uk/resources/continence-care-in-residential-and-nursing-homes. (last accessed 05.11.2019).

Centres for Disease Control and Prevention (CDCP) (2015) Catheter-associated Urinary Tract Infections (CAUTI) Available at: https://www.cdc.gov/hai/ca_uti/uti.html (accessed on: 08.01.2020)

Clark JF, Mealing SJ, Scott DA, Vogel LC, Krassioukov A, Spinelli M, et al. (2015) A cost-effectiveness analysis of long-term intermittent catheterisation with hydrophilic and uncoated catheters. Spinal Cord. ;54(1):73–7.

Dougherty, L. Lister, S. (2015) *The Royal Marsden manual of clinical nursing procedures*. Ninth edition, John Wiley and Sons Ltd

Healthline (2020) *Paraphimosis.* Available at: https://www.healthline.com/health/paraphimosis. Last accessed: 08.01.2020.

Li L, Ye W, Ruan H, Yang B, Zhang S, Li L. Impact of hydrophilic catheters on urinary tract infections in people with spinal cord injury: systematic review and meta-analysis of randomized controlled trials. Arch Phys Med Rehabil. 2013;94(4):782–787.

Loveday, HP., Wilson, J.A., Pratt, R.J., et al (2014) epic3: national evidence-based guidelines for preventing healthcare-associated infection in NHS hospitals in England. *Journal of Hospital Infection.* 86 (Suppl 1), S1-70

Newman DK. (2017) Devices, products, catheters, and catheter-associated urinary tract infections. In: Newman DK, Wyman JF, Welch VW, editors. Core Curriculum for Urologic Nursing. 1st ed. Pitman (NJ): *Society of Urologic Nurses and Associates*, pp.439-66.

Nicolle L. E. (2016). The Paradigm Shift to Non-Treatment of Asymptomatic Bacteriuria. *Pathogens* (Basel, Switzerland), 5(2), 38.

NHS (2017) *Urinary Catheter Types.* Available at https://www.nhs.uk/conditions/urinary-catheters/types/ (last accessed 05.11.2019).

NICE (2014) Infection prevention and Control. Available at: www.nice.ootg/guidnace/qs61 (Accessed: 11/11/19).

NICE (2017) Infection: Healthcare-associated infections: prevention and control in primary and community care. Available at: https://www.guidelines.co.uk/infection/nice-healthcare-associated-infections-guideline/453383.article (last accessed 11.11.2019).

Ostaszkiewicz, J. Paterson, J. (2012) Nurses' advice regarding sterile or clean urinary drainage bags for individuals with long-term indwelling urinary catheter. *Journal of Wound, Ostomy and Continence Nursing*, 39(1), 77-83

Pickard, R. Lam, T. MacLennan, G. Starr, K. Kilonzo, M. McPherson, G. Gillies, K. McDonald, A. Walton, K. Buckley, B. Glazener, C. Boachie, C. Burr, J. Norrie, J. Vale, L. Grant, A. N'Dow, J. (2012) Antimicrobial catheters for reduction of symptomatic urinary tract infection in adults requiring short-term catheterisation in hospital: a multicentre randomised controlled trial. *The Lancet,* Volume 380, Issue 9857, Pages 1927-1935.

Prieto J, Murphy CL, Moore KN, Fader M. (2014) Intermittent catheterisation for long-term bladder management. Cochrane Database Syst Rev.(9).

Prinjha, S. Chapple, A. Feneley, R. Mangnall, J. (2015) Exploring the information needs of people living with long-term indwelling urinary catheter: a qualitative study. *Journal of Advanced Nursing.* PP. 1335-1346

RCN (2017) *Principles of Consent: Guidance for nursing staff.* Clinical professional resource. RCN. Available at: file:///C:/Users/hillbar/Desktop/PUB-006047.pdf (last accessed: 03.01.2020)

RCN (2019) *Catheter Care. RCN Guidance for health care professionals*. Clinical professional resource. RCN. Available at: https://www.rcn.org.uk/professional-development/publications/PUB-007313 (last accessed: 08.11.2019)

Rognoni, C., & Tarricone, R. (2017). Intermittent catheterisation with hydrophilic and non-hydrophilic urinary catheters: systematic literature review and meta-analyses. BMC urology, 17(1), 4. doi:10.1186/s12894-016-0191-1

Urology Care Foundation (2019) What is Vesicoureteral Reflux? Available at: https://www.urologyhealth.org/urologic-conditions/vesicoureteral-reflux-(vur) (accessed on: 03.01.2019)

Wilson, L.A. (2005) Urinalysis. *Nursing Standard,* 19(35), 51-51

Yates, A. (2004) Crisis management in catheter care. *Journal of community Nursing*, 18(5), 28-31