

REDUCING TRAUMA DURING THE REMOVAL OF MALE AND SUPRA-PUBIC CATHETERS: FROM EVIDENCE TO EXPERIENCE

Contributors

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INTRODUCTION

Community nursing practice often involves working with people who use indwelling urinary catheters to manage urinary retention and intractable incontinence (Addison/Mould 2000; Mercer-Smith 2003; Robinson, 2004). Urinary catheterisation is neither a benign nor simplistic intervention. Typically long term indwelling catheters are associated with a number of risks, such as: traumatic removal; infection; urethral erosion; histological changes; sedimentation; perforation of the bowel at cystostomy formation; encrustation leading to catheter blockage and haematuria (Addison et al, 2000, Pomfret, 2006, Godfrey/Fraczyk, 2005; Madigan et al., 2003; Association of Continence Advice ACA, 2004; Robinson, 2005a). The principle goal therefore is to implement nursing care that minimises catheter related risks and meets a high expectation of client satisfaction, to ensure a sustained quality of life. Experiential evidence from the second author's practice noted episodes of trauma and discomfort experienced during male urinary and supra-pubic catheter removal, which initiated a research project which was conducted during 2006/7. It was considered important to critically examine the evidence supporting this area of community nursing practice, so as to act in the best interests of clients.

The aim of the research was to examine the evidence around the traumatic removal of male and supra-pubic catheters, the impact on the client, and to determine best practice. In this newsletter, we report the principal findings of this project and discuss interventions that are intended to avoid incidents of traumatic removal of male and supra-pubic catheters. A focus of this article will also be the translation of evidence into catheter care practice, thereby building the skills and capacity of community based nurses to improve outcomes for clients. In so doing, the clients'

perspective is valued, alongside research evidence and practice experience.

WHAT IS THE ISSUE?

The clinical risk of traumatic catheter removal increases commensurately with the site and duration of catheter insertion, with male and supra-pubic sites carrying the greater degree of risk (Addison et al., 2000; Pomfret, 2006). The experience of repeated trauma at catheter replacement is likely to be harmful to the client both physically and psychologically, a factor which is born out in practice experience (Jannings et al., 2001; Wilde, 2004; Salloum, 2005; Jahn et al., 2007). A small amount of research has identified factors associated with traumatic removal, including the catheter balloon material, balloon infl/pre-testing, the role of the detrusor and rectal muscles, frequency of catheter changes and the level of nursing skill and capacity (Wilde 2004, Jannings/Kelly, 2001; Robinson 2002; 2003a,b; 2005a,b; Pomfret, 2000). We now discuss some of these factors in more detail.

Catheter Material

Catheter balloon materials may contribute to difficult removal because once deflated, may "ridge or cuff" as the catheter is being withdrawn, therefore obstructing removal. Prior to insertion, the catheter balloon diameter is approximately 1-2mm wider than the actual catheter. Following inflation, the diameter of the catheter balloon on removal is increased by a further 1-5mm (Parkin et al., 2002; Robinson 2003, 2005a,b). The extra balloon material is drawn into a ridge, crease or cuff (the phenomenon is known as hysteresis) as the catheter is being withdrawn through the supra-pubic cystostomy or prostatic site. Contributing to hysteresis is the gripping of the catheter by the detrusor and rectal muscles, which occurs when they are stimulated by attempts to withdraw the catheter. Cuffing has been shown to create difficulties in catheter removal and the resulting traction as the catheter is being pulled, causes trauma to surrounding tissue. Consequences for the client can be pain, distress and tissue damage with eventual inflammation and scarring (Jannings et al., 2001; Parkin et al., 2002; Robinson, 2003, 2004, 2005a,b).

Indwelling urinary catheters vary both in material and design (Jahn et al., 2007, Godfrey/Evans, 2000), which may also produce variability in performance (Mercer-Smith, 2003; Getliffe et al., 2003). Within the literature, much attention is given to the type of catheter material used (Jahn et al., 2007, Wilde, 2004; ACA, 2004; Getliffe et al., 2003; Robinson, 2005a,b) and its role in traumatic

removal. There are conflicting views about what constitutes the ideal catheter material, with different emphasis on specific advantages and shortcomings. Hydrogel is a silky soft material that has been demonstrated to cuff less on balloon deflation (Pratt et al., 2001) than 100% silicone which is noted for its tendency to form a significant cuff (Parkin et al., 2002; Robinson 2005a,b). Latex catheters are acknowledged as being soft, but carry the risk of latex allergy (ACA, 2004). Essentially, the issue of the 'best material' for urinary catheters remains unresolved in the literature, although the emphasis is now more on catheter balloon materials, since the balloon deformity on deflation appears to be central to the problem of traumatic removal (Robinson, 2003, 2005a,b). Recent developments in balloon material have offered new options, but as yet they have received little research attention (Robinson, 2005a,b).

Catheter Balloons

The advent onto the Australian market in 2006 of the 100% silicone catheter with an integrated balloon (Coloplast Releen In-Line Foley catheter, Coloplast 2006) marked a distinct improvement on reduction of trauma associated with catheter removal. The decreased likelihood of traumatic removal is due to the initial diameter of the integrated balloon being significantly less than a traditional silicone catheter balloon. The results are less cuffing, less traction against the bladder wall and less muscle spasm occurring at removal. Consequently, the risk of trauma is minimised. Evidence from trials of the integrated balloon suggests that it was withdrawn easily and the client experienced little or no pain during catheter removal (Robinson 2005a,b). The integral balloon appears to be pivotal to ensuring safer catheter removal of male and supra-pubic catheters.

To Pre-test or Not?

What is the evidence around the practice of pre-test catheter balloons prior to insertion (Mercer-Smith 2003. Robinson 2003)? Unfortunately this remains a grey area because the evidence remains inconclusive about the benefits or otherwise of pre-testing catheter balloons prior to catheter insertion. The aim of pre-testing a balloon is to pre-empt a faulty catheter prior to insertion. A balloon that fails to inflate symmetrically can cause bladder spasms, urinary bypassing and bladder neck erosion (Mercer-Smith 2003). Some manufacturers instructions however, advise against pre-testing, maintaining that it occurs as part of the manufacturing quality assurance process. Some manufacturers also emphasise that all catheter valves are for single inflation/deflation only (Olsen, 2007; Robinson 2004) and using them more than once risks hysteresis and consequent trauma upon removal. On the other hand, a balloon that fails to perform properly can increase the likelihood of hysteresis and trauma on removal. Nurses are left with the dilemma of whether to pre-test the balloon or not. This is an issue that requires further research and debate. Until such time when further evidence is published, nurses are advised to follow the policies and procedures recommended by their organisations.

Balloon Infil

The amount of infil recommended for standard inflation of the catheter balloon varies depending on the type of

catheter being used and on the manufacturer's recommendations. Robinson (2005b) suggests it can vary from 2.5-5ml for paediatric length catheters, and 10-30ml for standard length and female length catheters. Other authors maintain that it ranges from 5-10ml of sterile water (Jannings et al., 2004, Getliffe, 1994, Godfrey et al., 2000). The usual quantity is between 5-10ml, with larger volumes of up to 30ml being used following urological procedures to control bleeding (Mercer-Smith 2003, ACA, 2004). Balloons that are inflated beyond their capacity are at increased risk of hysteresis, being in danger of bursting and causing tissue damage and expulsion of the catheter (Godfrey et al 2000; Robinson, 2005b).

Method of Deflation

Prior to catheter removal, the water must be drained from the balloon in a manner that allows it to collapse as smoothly as possible and return to its original state. The literature considers the different methods for achieving this (Mercer-Smith 2003, ACA, 2004) including:

- Leaving the catheter in situ for a few minutes post-deflation to allow the balloon to return to its original state (this method was unsuccessful when trialled). (Robinson, 2003a,b)
- Allowing the syringe to deflate the balloon under its own vacuum until the plunger ceased withdrawing. This method can be successful for some catheters and not others (Robinson, 2003b) and is a method advised by the Association of Continence Advice (2004). Robinson (2003b) suggests there is a lack of evidence for this method.
- Manual aspiration produced a significant ridge and an increase in the balloon diameter which is likely to cause hysteresis (Robinson, 2003b).

The issue of which is the optimal method of deflation requires further research and remains unresolved. Allowing the syringe to deflate under the syringe vacuum is associated with less likelihood of cuffing. Within the second authors practice, it is acceptable to allow the balloon to deflate under the syringe vacuum without manual assistance, however the manufacturers instructions should also be taken into consideration (Mercer-Smith 2003; Robinson, 2003a.; 2005a,b).

The Use of Gel

Use of an anaesthetic gel is recommended by some authors to ensure adequate lubrication of the site to ease the catheter's passage during insertion and removal (Pomfret, 2000; 2001, 2004; ACA, 2004; Addison et al., 2000; McMahon-Parkes, 1998). However, debates exist in the literature as to the most effective and appropriate gel to use (water or petroleum based) and the best method of instillation at removal or re-insertion to prevent trauma (Addison et al., 2000, Godfrey et al., 2000, Pomfret, 2001). Ogden (2002) and Pomfret (2001) advise inserting anaesthetic gel along the inner aspect of the catheter in males and withdrawing the catheter so gel is laid internally along the length of the urethra. Practice experience of the second author, however, is that routine use of gel infil has the potential to introduce additional debris and calculi back into the urethra, potentially causing trauma or infection. Addison and Mould, (2000) also caution about the routine use of anaesthetic gel prior to catheter removal. If bleeding

occurs then systemic absorption is likely, therefore it is important to identify those at risk of possible systemic effects before use.

Despite a divide in the expert opinion about the use of anaesthetic gel (Robinson 2005a), many guidelines do advise the use of gel. Acknowledged debate and discussion concludes that sufficient evidence exists for the use of a gel during all male and supra-pubic catheter changes (ACA, 2004), to reduce pain and trauma, enhance the client's experience of catheter procedures and promote improved health outcomes. It is also important to consider client preference regarding the use of gel.

Frequency of Catheter Changes

Historically, catheters have been routinely changed at six week intervals even though manufacturers recommend catheter duration as being acceptable up to twelve weeks. Examination of the literature confirms the debate, but the weight of evidence is clearly in favour of individualising the care plan to meet the client need and circumstances (Jannings et al., 2001, Godfrey et al., 2000; Getliffe et al., 2003; Yates, 2003; Australasian Urological Nurses Society Inc. AUNS, 2004). Determining factors identified during an assessment, risk management plan and trial of duration enable the nurse to determine when the individualised catheter change should occur.

Instructions from the Manufacturer

There is a pattern in the literature of referring health professionals to the instructions provided by the manufacturer, when there is uncertainty or confusion over particular aspects of catheter care. Some aspects of catheter care lack reliable evidence, therefore it is recommended that the manufacturers instructions be factored into problem solving.

TRANSLATING EVIDENCE TO EXPERIENCE

Changing an indwelling catheter is a skilled nursing procedure (Robinson 2005a) and should be preceded by an appropriate teaching process from an experienced nursing practitioner, rather than be based on the tradition of the institution (Mercer-Smith 2003, Godfrey et al 2000). Here we do not focus on the actual process of changing a catheter, but rather the evidence based principles that underpin improved catheter removal technique and reduced risk to the client.

Nurses have reported incidents of catheters becoming "stuck" (Robinson 2003; 2005a,b, Parkin et al., 2002) during catheter removal causing pain, trauma and bleeding (Jannings et al 2001). Evidence suggests that this predominantly occurs in males and supra-pubic sites, and is directly related to the type of catheter balloon material being used and the detrusor and rectal muscle spasm initiated by removal (Parkin et al., 2002; Robinson, 2003a,b, 2005a,b). There has been minimal research conducted, hence there is inconclusive evidence about how to overcome these difficulties. Nurse competence in changing catheters is gained from observation, practice and experience, therefore the very real difficulty for novices when changing a male or supra-pubic catheter, is knowing what evidence exists and how to translate it into practice. Competence is also

informed by engaging with clients and effectively using communication skills during assessment, intervention, evaluation and education, to minimise trauma.

Removal of male and supra-pubic catheters should be conducted in a methodical and sequential manner incorporating the following evidence-based practice points:

- Always gain consent from the client. Provide an explanation of the procedure and the opportunity for the client to ask questions.
- Risk assessment for suprapubic catheterisation should exclude people for whom it is contraindicated, including people with haematuria, known bladder tumour, small fibrotic bladders, and prosthetic devices in material in the lower abdomen (Mercer Smith, 2003; Shah et al., 1998; ACA, 2004).
- Use a catheter that has an integral balloon to decrease the likelihood of hysteresis and consequent trauma (Robinson 2005a,b).
- Check that the catheter is approved for supra-pubic use (ACA, 2004; Robinson, 2005a).
- Follow the manufacturer's instructions to ensure that the appropriate amount of balloon infl is used and to inform the decision of whether or not to pre-test the balloon (Robinson 2003, Mercer-Smith 2003).
- All catheters should be removed slowly and gently to protect against possible trauma caused by cuffing or encrustation (Robinson, 2005a).
- Catheter changes should be determined by an individualised care plan rather than changed at routine intervals (Getliffe et al., 2003; Yates, 2003; ACA, 2004; AUNS, 2004).
- Use anaesthetic gel to minimise pain and reduce trauma (ACA, 2004; Pomfret, 2000; 2001; 2004; Addison et al., 2000).

A CLIENT PERSPECTIVE

The following case study illustrates the importance of taking account of the client's experience and perspective, so that catheter care can be individually tailored to meet their needs. This case demonstrates the heavy psychological toll of repeated pain and suffering associated with traumatic catheter removal. This was seriously undermining Bob's (pseudonym) experience of a suprapubic catheter. Holistic review, evidence based problem solving and practice and patient centred care, underpins the effective approach taken by the district nurse.

Bob's Circumstances

Bob is an 82 year old gentleman living in a boarding hostel with minimal social supports. He was originally admitted to the community nursing service for assistance and support of his supra-pubic catheter. Subsequently this had been managed by the Registered Nurse (RN) in the field. During this time Bob experienced persistent traumatic removal of his catheter and was becoming resistive to the nurses visits. A review of the care plans by the Continence Advisor (CNA) identified a history of bleeding, trauma and pain during catheter removal. On occasions Bob had been returned to hospital when the nurse had been unsuccessful with the catheter change. The CNA discussed with Bob his perspective of the catheter changes. Bob expressed his admiration for the nurses but had reached the point where he was going to

refuse care as he was no longer able to put up with the consequences. Bob was in pain both physically and psychologically.

A complete review identified the following features of Bob's situation:

- Poor fluid intake
- Little understanding of catheter maintenance
- Constipation
- 100% silicone Indoplas catheter in-situ
- Inflamed stoma site that was exuding haemo-serous fluid and was painful to examine

Given the circumstances the next catheter change was deferred.

Bob was advised to:

- Increase his fluid to 2 litres daily (predominantly water)
- Change to a softer Hydrogel catheter (less likely to cuff)
- Rotate his catheter daily in the shower to prevent adhesions and wash the site twice daily to remove exudate, reduce inflammation, prevent infection and use a dry dressing short-term to keep his clothes clean
- Visit the GP for antibiotic therapy
- Take two paracetamol and a warm drink an hour prior to the catheter change to relax him and provide some prophylactic analgesia

Bob was understandably anxious about the catheter change but was provided with reassurance and education regarding how the change would be effected to minimise pain, trauma and bleeding. At the time of the catheter change Bob was pacing and anxious, however the CNA used this visit as a learning exercise for the RN as well as an opportunity to resolve Bob's issues. A hydrogel catheter had been ordered and was available for the change. Despite Bob's anxiety, the catheter removal was effected with minimal resistance due to a generous application of lignocaine gel 15 minutes prior to the actual removal. The new catheter was inserted smoothly. Bob stated that he had never had a catheter change like this one and was feeling much better. Over the next few months Bob's catheter changes became even easier and the RN was able to resume visits. Bob learnt how to manage his catheter more effectively in between RN visits and was less concerned with constipation now he had increased his fluids.

At six months Bob was pleased with the new routine (which had been individualised to his needs and was occurring every eight weeks) and requested to trial a female length catheter as he experienced difficulty with the standard length, given that he preferred to wear his catheter bag higher on his thigh. A female length catheter was organised and trialled with effect. Bob is

now confident and comfortable with the RN changing the catheter, he experiences no difficulty and has a clearer understanding of the essential maintenance required to independently manage his suprapubic catheter.

ECONOMIC EVALUATION

As evidenced from the case history above, the question of cost or risk must always be examined in relation to benefits and considered in the context of the person's circumstances (Mercer-Smith 2003, Wilde 2004; NICE, 2006; Addison et al., 2000; Pomfret, 2006). Cost cannot always be neatly accounted for in fiscal terms (ACA, 2004). Clients who live with an indwelling urinary catheter and experience traumatic removal as a routine event, must have the psychological and physical cost factored into their ongoing management and suitability for a suprapubic catheter (Pomfret 2006; Addison & Mould, 2000). Risk assessment not only involves the identification of risks but also implementation of preventative action to minimise the risk.

It is the responsibility and accountability of every health professional involved in the daily management of catheter maintenance to ensure that they are providing a service that meets researched evidence based guidelines (Mercer-Smith 2003, Pomfret 2006). It is essential that health professionals remain vigilant and open to the possibility of being able to change or improve practice (Pomfret 2006). The advent and arrival of improved products, techniques and equipment to substantiate our health goals should be embraced. Economic evaluation for this group of clients can only readily be measured in terms of health outcomes and quality of life (Wilde, 2004).

CONCLUSION

The need for indwelling urinary catheterisation places people at potential risk of physical and psychological trauma. This can have a negative impact on health and quality of life. Implications for practice and client health outcomes should be considered before embarking on catheter changes, because even though there is experiential evidence and expert opinion, there is little research around the difficulties encountered during male and supra-pubic catheterisation. The solution to reducing traumatic removal of a urinary catheter is multifactorial, with no one aspect for cause or resolution being adequate on its own. Sound evidenced based guidelines or protocols, acknowledgement of client preference and experience, and the use of appropriate catheter balloon material, will only be effective when coupled with competent nursing skills and experience. Even so, these elements may not provide a straightforward solution in all situations.

References

The complete reference list is available on request - email researchunit@rdns.org.au or phone 8208 5355.