URINARY CATHETER CARE: WHAT DOES THE EVIDENCE SAY?

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Nurse ***Helen Cowan*** reviewed research published by the Cochrane Library (a collection of databases providing independent evidence to inform healthcare decision making), to look for evidence to influence her approach to urinary catheter care.

How frequently should indwelling urinary catheters be changed? Are catheter washouts effective? Which type of catheter reduces rates of urinary tract infection?

After 13 years of nursing in acute surgery, hospice care and the nursing home setting, I was hoping to have answers to these questions.

When it comes to urinary catheters, I've seen it all. My first ever placement as a student nurse was on a urology ward, where catheters were passed with ease by expert mentors, flip-flo valves were fitted to the ends of catheters to train the bladder to hold increasing amounts of urine, and nurses raced to empty bursting bags of urine as it flowed freely during post-surgical bladder lavage.

Since then, I've nursed in neurological rehabilitation, working with neurogenic bladders after SCI, and in neurosurgery where I have strictly monitored urine production after pituitary surgery to monitor for diabetes insipidus. Currently, I work in the nursing home setting where poor fluid intake, decreasing renal function and advancing dementia provide new challenges to catheter care.

It was, however, when caring for a family member when I first realised that for some people, a blocked urinary catheter can mean the difference between life and death. Autonomic Dysreflexia is a medical emergency that can occur in someone with an SCI; a stimulus such as a blocked catheter can trigger an excessive sympathetic nervous response resulting in hypertension, stroke, convulsions, cardiac arrest and death (Cowan, 2015).

BLOOD, SWEAT AND TEARS CAUSED BY CATHETERS

Admittedly, Autonomic Dysreflexia is an extreme and rare condition. The presence of an indwelling urethral catheter is, however, commonly associated with other complications and adverse effects.

Blood in the urine is one such example, often as a result of urinary tract trauma – either during catheter insertion or when the catheter is inadvertently tugged. I've seen urine so filled with blood that it has been described as 'blackcurrant jam urine'.

Sweating due to fever can also result from catheter insertion; almost all catheter users develop bacteriuria within four weeks of catheter insertion (Cooper et al., 2016). People with indwelling catheters are up to six-and-a-half times more likely to develop a urinary tract infection (Shepherd et al., 2017). The patient's own colonic and perineal flora, and the hands of healthcare professionals, act as the source of micro-organisms.

When I worked on cardiac surgery, a gentamicin injection always preceded catheter insertion in order to minimise the risk of infection. This is especially important in a patient about to undergo cardiac valve replacement surgery, since catheter-associated urinary tract infection (CAUTI) can lead to secondary bacteraemia in the blood (Shepherd et al., 2017).

Throughout my nursing career, I've sought out studies related to catheter care in an attempt to minimise the blood, sweat and tears of life with a urinary catheter. I turned to the Cochrane Library to answer some questions about catheter care, concentrating specifically on long-term indwelling urinary catheters (those that stay in the bladder for a long time) rather than short-term indwelling catheters, or intermittent catheters (which are inserted to drain the bladder and then removed).

DO SPECIALLY DESIGNED URINARY CATHETERS REDUCE THE RISK OF CAUTI?

Alternatively: "Should every catheter have a silver lining?" Some catheters are impregnated with antiseptic or antibacterial agents. Silver is commonly chosen as a bactericidal agent. Other catheters are coated with silicone or hydrogel, but little is known about relative rates of CAUTI when comparing catheter types.

Jahn et al. (2012) conducted a Cochrane review in which the relative merits of different types of urinary catheter in reducing infection were considered. Three small, and relatively old, studies were identified. In one study from 1996, 12 patients tested out silver and silicone impregnated catheters, swapping between the catheter types every two weeks. In a randomised controlled trial from 1979, 21 patients used either PVC, latex or silicone catheters. Another trial from 1991 randomised 69 patients to hydrogel or silicone coated catheters.

Dishearteningly, all participants in all studies had CAUTI. No type of catheter was shown to significantly reduce rates of infection. However, in the 1991 study, there is a possibility that hydrogel coated catheters afforded more protection than silicone coating.

The authors of the review conclude that the studies were too small. The confidence intervals were too wide to provide reliable evidence. Importantly, the studies only considered rates of CAUTI. What about adverse events such as bleeding or discomfort?

ARE URINARY CATHETER WASHOUTS EFFECTIVE?

Opinion remains divided about catheter washouts (Healthtalk, 2014). I have seen catheter blockages causing pain and distress. Washouts, however, can cause bleeding through trauma. In a Cochrane review, concern is expressed that: "Use of washouts can damage the bladder mucosa and increase infection rates due to opening the closed catheter system" (Shepherd et al., 2017: 7). The same review acknowledges that blood pressure changes and bladder spasms can also result.

Three crossover studies and four randomised controlled trials were identified, comparing catheter washout versus no washout, or determining the relative merits of different washout regimens (saline, weak acid, strong acid and antimicrobial solutions were all included).

Methodological problems were identified in the studies. Some crossover trials were based on between-group differences rather than on individual participant's differences for sequential interventions. Other studies were small and one study mixed results for both suprapubic and urethral catheters. No trial considered patient satisfaction or comfort.

The authors concluded that: "Insufficient data exists providing reliable evidence about the benefit or harms of washout policies." If proven beneficial, further questions include necessary frequency, timings and volumes of catheter washouts.

HOW FREQUENTLY SHOULD A URINARY CATHETER BE CHANGED?

Some settings advise strict adherence to a three-monthly change policy, others advise change when clinically indicated. Frequent catheter change may reduce biofilm development that can harbour bacteria. It may also cause trauma that could contribute to infection (Cooper et al., 2016).

A recent Cochrane review struggled to find enlightenment in this area (Cooper et al., 2016). Only one all-male study from 1982 was identified. When considering incidence of symptomatic CAUTI, no significant difference was found between those in whom catheters were changed only when clinically indicated, and those in whom catheter changes occurred monthly as well as when clinically indicated.

Further studies are needed and they should also consider financial implications. Do the savings resulting from reduced use of bladder washout solutions offset the increased costs of more frequent catheter changes?

ANY ADVANTAGES TO ANTIBIOTICS?

Administering antibiotics at time of catheter change is a controversial question. One small, underpowered study with inconsistent data showed no significant benefit of administering intravenous meropenem 30 minutes before catheter change (Firestein, 2001).

A Cochrane review addressed the antibiotic question, but mainly with regards to intermittent catheterisation. The one included study in which urethral catheters were considered showed that the use of antibiotic did reduce rates of CAUTI (Niël-Weise, 2012). However, the study was small. Results also warned of antibiotic-induced development of resistant organisms – a well-known phenomenon that is threatening modern medicine (Cowan, 2015).

CONFUSION CONTINUES TO SURROUND CATHETER CARE

Cochrane reviews confirm the confusion that surrounds catheter care. The questions are endless: does the home or the clinical environment provide the optimum setting for catheter care? Is chlorhexidine superior to saline for periurethral cleansing? Which lubricants should be used? Are better outcomes achieved when patients or healthcare professionals manage their catheter care?

Until rigorous, adequately powered, randomised controlled trials answer these questions – and specifically the questions that matter most to SCI people – catheterisation will continue to be associated with bewilderment and blood, sweat and tears on all sides.

Helen Cowan's article was first published on Evidently Cochrane – www.evidentlycochrane.net. References available upon request.