Clinical Update
Report from the ANFC Symposium, April 2008 – Melbourne
Common problems associated with indwelling urinary catheters and suggestions for practice

Introduction
With 96 million catheters sold worldwide, the clinical relevance of catheter-related problems cannot be underrated. At the Australian Nurses for Continence (ANFC) Victorian Branch Nursing Symposium on Incontinence, held in Melbourne in April, Professor Kathryn Getliffe addressed two significant issues associated with urinary catheterisation – catheter associated urinary tract infections (CAUTI) and catheter associated blockages.

CAUTI & biofilms
As detailed by Professor Getliffe, CAUTI unfortunately are often a consequence of indwelling urinary catheterisation. By Day 30, bacteruria is generally inevitable, with most organisms being derived from patient’s own normal flora. Seventy two percent of these patients will remain asymptomatic and not require treatment; however, 24% will develop symptomatic CAUTI without bacteraemia and 4% will develop bacteraemia 1.

CAUTI become difficult to treat when bacterial biofilms form. Biofilms begin as individual cells chemically communicating with each other to collect in one place (on animate and inanimate objects). The cells form cities of microbial tower-like structures, with ‘streets’ formed between them that convey nutrients, O₂, and other necessities to the community. A protective complex protein matrix and use of cooperative communication techniques such as cell-to-cell signalling make these biofilm communities highly tolerant to antibiotics and host defences.

Interventions that are believed to help reduce the risk of biofilms include using a closed system of drainage, hand washing and possible use of antimicrobial (silver alloy) catheters. Silver alloy has been shown to have some benefit in short-term catheterisation but more research needs to be done. Antiseptics in drainage bags, routine bladder washouts and antibiotics (other than when infection is present) are not considered effective. The main recommendations from this presentation were to avoid unnecessary catheter use and to avoid treating asymptomatic bacteruria.

Catheter associated blockage
According to research undertaken by Professor Getliffe, up to 50% of individuals with a long-term indwelling urinary catheter (IDC) develop catheter blockage 2 and, although catheter blockage can be a consequence of rectifiable factors such as twisted tubing or constipation, recurrent catheter blockage caused by encrustation is difficult to treat. Urease producing bacteria cause urea to split, producing ammonia and alkalinisation of urine which facilitates struvite and calcium phosphate to precipitate and form encrustation. Those who have a blocked IDC in this way tend to have higher urinary pH (7.4) than those who do not. The urinary pH at which crystallisation (or nucleation) occurs differs for differing ionic compounds and occurs at different times 3, 4, with ‘blockers’ having significantly lower safety margins between them than non-blockers.

Suggestions for preventing catheter blockage include avoiding indwelling urinary catheterisation in the first instance and considering clean intermittent self catheterisation as an alternative. Where indwelling urinary catheterisation is necessary, however, Professor Getliffe recommends a pro-active stance. This involves identifying blockers and implementing a planned catheter change regime. A further suggestion is the instillation of weak acidic washout solutions into the catheter, which may extend the life of the catheter – with volumes of less than 100mls instilled for 2-5 minutes as they are only needed to clear the catheter. As to a preferred catheter, the research highlights that no one type of catheter is resistant to biofilm and encrustation, although time to encrustation may vary. A study by Morris and Stickler (1998) reported that the time to encrustation for silver coated latex catheters was 17.7 hours, 34 hours for hydrogel coated latex catheters, 38 hours for silicone coated latex and 47 hours for all-silicone catheters 5.
Other strategies were discussed which at this point in time have only been demonstrated in smaller studies:

- Releasing catheter valves every 2-4/24 may extend catheter change time.
- Instilling Triclosan (a product in toothpaste) into the catheter balloon may reduce *Proteus mirabilis*.
- Increasing fluid intake increases time to blockage and nucleation pH.
- Increasing fluid in urine above 1.5mg/ml may increase time to catheter blockage (e.g. drinking 500mls of orange juice increases citrate in urine to 1.25mg/ml).

There is no evidence to support use of cranberry juice or vitamin C in reducing catheter associated blockage 7.

**Comment**

Professor Getliffe's presentations confirmed that there are many challenges involved in the care of patients with long-term catheters. Many past practices to manage problematic catheters, e.g. encouraging fluid intake in order to ‘flush’ the microbes out of the bladder, were derived from anecdotal and speculative sources. Research has challenged these practices, however. For example, conventional wisdom suggests that the use of vitamin C or cranberry juice may reduce catheter blockage. However, at this point, the evidence for these approaches is weak. Professor Getliffe also highlighted the importance of differentiating between “evidence of no evidence” and “evidence of no effect”.

Many healthcare practices in nursing have a poor evidence base which highlights the need for more research rather than the need to dismiss the practice.

The battle to stay ahead of CAUTI and catheter blockage is unenviable and challenging. As these problems are common among patients with long-term indwelling urinary catheters, it is important that clinicians are familiar with contemporary research and expert opinion on this topic.

**References**