

Does our bundle stack up! Innovative nurse-led changes for preventing catheter-associated urinary tract infection (CAUTI)

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Abstract. *Introduction:* The aim of this project was to develop and implement an innovative nurse-led model of care in the use and management of indwelling urinary catheters (IUC) utilising evidence-based 'bundle interventions' to reduce the incidence of catheter-associated urinary tract infections (CAUTI).

Design and method: A pre and post intervention study designed to progress in three phases was conducted in the orthopaedic ward and urology ward of a large tertiary referral facility. Phase one involved a clinical data collection pre intervention on all inpatients receiving an IUC over a 3-month period from February to April 2013. A staff survey assessed knowledge and skills and an evidence-based care bundle, nurse-led protocols, and education resources were developed through collaboration with clinicians. Phase two involved implementation and Phase three was an evaluation with the primary outcome targets being reduced IUC usage, days IUC *in situ* and incidence of CAUTI.

Results: Pre audit data revealed a high rate of IUC use: 31% of all inpatients in the orthopaedic ward and 25% in the urology ward. Compliance with current guidelines was inconsistent and documentation related to IUCs was poor. Overall CAUTI rate was relatively low at 2.2% of all patients with an IUC and was higher in the orthopaedic ward.

Conclusion: The development of a systematic and standardised approach to IUC care for inpatients using bundle care interventions will potentially reduce IUC use, provide a clear pathway for nurse-initiated IUC removal and reduce the incidence of catheter-associated urinary tract infections (CAUTI).

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Introduction

Catheter-associated urinary tract infection (CAUTI) has received greater attention in recent years as it accounts for 40% of all Australian healthcare-associated infections

(HAI).¹ There are an estimated 100 million urinary catheters used annually around the world² and urinary tract infections (UTI) are estimated to cause one death per 1000 episodes of urinary catheterisation.³ Despite these staggering statistics

Implications

- Standardised practice guidelines through the use of a CAUTI care bundle for insertion and management of IUCs and audit tools to monitor practice compliance were developed.
- Clinicians' knowledge of CAUTI risks associated with IUC use increased.
- A clear pathway for nurse-initiated ICU removal that will reduce IUC use and the incidence of CAUTI was provided.

and a collective agreement that there is a need to reduce the use of indwelling urinary catheters (IUC) to minimise the impact CAUTI incidence, international literature suggests that between 15 and 25% of all hospital inpatients have an IUC inserted during hospitalisation.^{4,5}

It is argued that IUC insertion can be unjustified in up to 50% of cases.^{6,7} Furthermore, the risk of CAUTI increases with the duration of catheterisation: 26% of patients with an IUC *in situ* for a period of between 2 and 10 days will develop bacteriuria and 25% of these patients will develop a CAUTI.⁶ CAUTI risk also increases with catheter care violations and older age.⁸ Evidence indicates that effective care strategies to reduce the rate of catheter-based infections incorporating staff educational programs, multidisciplinary team involvement, compliance monitoring and feedback, can be effective in reducing CAUTI rates⁹ but uptake of this evidence into clinical practice has been slow.

This paper outlines a project aimed at reducing the incidence of CAUTI using a coordinated nurse-led interprofessional approach to develop protocols for managing IUC insertion within a large trauma referral centre in New South Wales, Australia. The facility has 600 plus beds and is an adult and paediatric teaching hospital with 75 768 (2011–2012) separations annually; 70% of these are older people over the age of 65.

Search strategy

Using the search terms: 'CAUTI', 'catheter AND urinary tract infections', and 'catheter AND bacteriuria', searches were conducted for the period between 2000 and 2013 in the following electronic databases: Ovid MEDLINE(R), CINAHL Plus, Embase, Wiley Online, Proquest, Oxford Journals Online, Science Direct and EBSCO.

Literature

Historically, CAUTIs were viewed as a normal consequence of hospitalisation, but they are now considered as 'an unacceptable harm resulting from medical care' (p. 2783),¹⁰ which are in most cases preventable.⁵ In the United States, hospitals are no longer compensated for the costs of hospital-acquired UTI's because they are perceived to be preventable.¹¹ Despite the extensive literature on CAUTI

prevention, interventions to reduce the placement of inappropriate IUCs have been implemented inconsistently across healthcare settings.¹ IUCs have been overused in acute care settings¹ and as a consequence CAUTI's are one of the most frequently occurring nosocomial healthcare infections.^{12,13} Morbidity and mortality rates resulting from CAUTIs result in a substantial burden of care, and significant hospitalisation costs related to length of stay and infection treatment.⁵

Most studies however, do not differentiate between symptomatic and asymptomatic CAUTIs (also known as asymptomatic bacteraemic urinary tract infection or ABUTI).^{4,5,14,15} It is important to note that the presence of bacteria in the urine (bacteriuria) of otherwise healthy patients with an IUC is generally asymptomatic and this typically resolves with the removal of the catheter. ABUTI does not pose an increased risk of symptomatic CAUTI unless the patient is predisposed to developing an infection.¹ Nonetheless, antimicrobial treatment is commonly used in patients with ABUTI¹⁶ even though it has not been shown to be beneficial.¹⁷

The duration of catheterisation is the key risk factor for the development of CAUTIs. Occurrences of short-term catheter-related bacteriuria as stated earlier are generally asymptomatic¹⁸ whereas infection is nearly universal by 30 days *in situ*.¹⁶ For those patients who have an IUC in place for between 2 and 10 days, one in four will develop bacteriuria. Symptomatic infection develops in ~20% of patients with catheter-associated bacteriuria adding 1 to 2 hospital days to the length of stay (LOS).⁶ Bacteraemia develops in fewer than 4% of catheterised patients with bacteriuria, with reports of associated mortality rates ranging from 10 to 13%.¹² Urinary catheterisation is also associated with patient discomfort and pain, restriction of activity and consequential discharge delays⁶ with the additional concern that CAUTIs 'comprise one of the largest reservoirs of multidrug-resistant bacteria in healthcare settings' (p. 41).¹

Evidence-based guidelines

Evidence-based guidelines have been developed recently to assist in the reduction of CAUTI rates.^{5,18–20} Such guidelines include: restricting IUCs to where there are clear indications for their use and removing the catheter as soon as possible;¹⁹ usage reduction efforts should be directed towards those patient populations at highest risk of developing catheter complications;^{5,16,21} catheters should not be routinely used postoperatively;⁵ portable ultrasound bladder scanning can be effective in reducing unnecessary catheter insertions;^{5,19} and where appropriate, alternatives such as external catheters or intermittent catheterisation can be considered in selected population groups.^{5,18,21}

Despite the availability of evidence-based guidelines, simple dissemination of this information is often not effective in changing clinical practice.^{6,7} For instance, data from the USA found that 30% of hospitals do not monitor urinary tract infection (UTI) rates, more than 50% do not monitor the

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