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INDWELLING URINARY CATHETER CONSIDERATIONS

In acute care settings, the use of IUCs is associated with UTIs and increases the risk of mortality especially in the elderly {Monaghan et al., 2011, #63382}.

The use of indwelling urinary catheters (IUCs) is a significant risk factor for delirium in the elderly {Inouye and Charpentier, 1996, JAMA, 275, 852-7} most likely because catheters increase the likelihood of urinary tract infection (UTI) and urosepsis {Lee and Malatt, 2011, Perm J, 15, 49-52}. Thus an effective approach to reducing delirium and functional impairment is to avoid when possible the use of IUCs, and to remove them when no longer indicated.

In order to facilitate discussion, some definitions:

- Significant bacteriuria: Presence of a specified number (usually $> 10^5$ CFU/mL) of a single species of bacteria in a freshly voided, midstream specimen of urine ("significant" in this case means unlikely to be due to contamination by skin flora) {Beveridge et al., 2011, Clin Interv Aging, 6, 173-80}
- Complicated UTI: All UTIs in males, all UTIs associated with urinary catheters, and all UTIs with systemic symptoms are considered complicated UTIs {Beveridge et al., 2011, Clin Interv Aging, 6, 173-80}.
- Asymptomatic bacteriuria (ASB): In men, a single clean-catch midstream sample growing $\geq 10^5$ CFU/mL without symptoms. ASB in women is defined as 2 consecutive clean-catch midstream urine samples growing $\geq 10^5$ CFU/mL of the same uropathogen (no more than 2 species) in a patient without symptoms of a UTI and no indwelling urinary catheter within 7 days of the first urine culture. {Matthews and Lancaster, 2011, Am J Geriatr Pharmacother, 9, 286-309}
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There is general agreement that screening for ASB should not be done, as treatment of ASB leads to increased drug resistance. The implication is that one should look for UTI only if there are symptoms/signs, such as fever, chills, or flank pain, or urinary urgency, frequency, pain or burning on urination, or suprapubic pain, hematuria, or foul-smelling urine. As a psychiatrist, I consider delirium to be a symptom/sign whose differential includes UTI. Thus, the presence of a new-onset delirium of unknown cause, should trigger testing for UTI. This should hold whether or not there is an IUC.

When an IUC has to be used, are there ways to reduce the risk of UTI associated with catheter use? A number of studies have looked at the role played by catheter materials in modifying the risk for bacteriuria. For example, a recent study from the UK {Pickard et al., 2012, Lancet} compared silver alloy, nitrofurantoin, and PTFE coated latex catheters, and found no significant differences in CAUTI rates after 6 weeks, in acute care hospitalized patients requiring short-term

urinary catheterization. Earlier studies were recently reviewed by Tenke et al {Tenke et al., 2012, World J Urol, 30, 51-7} who conclude that catheters impregnated with antibiotics were effective at reducing asymptomatic bacteriuria at one week but the effect was no longer statistically significant after one week; silver alloy catheters continued to be effective past one week, but there are no clinical trials for long-term catheterization. These authors view a couple of technologies currently in development as showing promise: one is Gendine-coated catheters (Gendine is an antiseptic containing Gentian Violet and chlorhexidine), and another is urethral stents, including those made with nitinol.

Yet another technology that may help to deal with catheter-related infection employs surface acoustic waves to mechanically disrupt biofilms on catheter surfaces {Dror et al., 2009, Sensors (Basel), 9, 2538-54; Hazan et al., 2006, Antimicrob Agents Chemother, 50, 4144-52}.

A proprietary coating for medical devices, Byotrol() G32, inhibits both planktonic and biofilm bacteria {Govindji et al., 2013, #95168}.

It may be that in some patients, an indwelling catheter can be substituted with an intermittent catheterization protocol.

In males, discomfort or periurethral suppurative conditions should lead to consideration of suprapubic placement {Drinka, 2006, #73806}.

Bedside detection of delirium

A review of the scientific literature on the bedside detection of delirium identified 25 studies involving a total of 3027 patients, covering 11 bedside delirium instruments, which included data on diagnostic accuracy {Wong et al., 2010, JAMA, 304, 779-86}. The reviewers concluded that the CAM (Confusion Assessment Method), which takes 5 minutes to administer, had the best available supportive data, while the MMSE (Mini-Mental State Examination) was the least useful for identifying patients with delirium.

Confusion Assessment Method (CAM)

“The CAM includes an instrument and diagnostic algorithm for identification of delirium. The instrument assesses the presence, severity, and fluctuation of 9 delirium features: acute onset, inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbances, psychomotor agitation or retardation, and altered sleep-wake cycle. The questionnaire can be administered in 5 minutes. The algorithm is based on the cardinal elements of the Diagnostic and Statistical Manual of Mental Disorders (DSM) (Third Edition, Revised) criteria for delirium: features 1 (acute onset and fluctuating course) and 2 (inattention) are

essential features, and feature 3 (disorganized thinking) or 4 (altered level of consciousness) is supported by expert judgment and clinical practice, in which the first 2 and either of the latter 2 are required for diagnosis." {Wong et al., 2010, JAMA, 304, 779-86}

To simplify the use of this instrument, a bilingual, web-based version has been developed, which incorporates the logic for making a definitive diagnosis of delirium or for ruling it out.

Proposal to SAH

We propose to do a pilot study to look at the how indwelling urinary catheters are used at SAH. The study would involve, for each patient at SAH identified as having an IUC, a chart review, and interviews with the patient, with the primary nurse, and with the patient's treating physician. If the significant morbidity associated with IUCs in the literature is also found at SAH via the pilot study, we propose to develop a protocol, including charting tools, to minimize the future use of IUCs and to optimize their use when no alternatives can be employed.

Extraction of information from the chart and from interviews:

Hx of IUC use: how long, what kind of catheter, problems, care issues

Medications

Medical diagnoses

Mobility status

Risk of falling

Cognitive status

QOL rating ?

Initial indications for use

Current status of initial indications

Hx of UTIs: symptoms/signs, how diagnosed, how treated

CAM for assessment of delirium

Budget:

Research assistant for 50 days, plus 10 days for training.