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Feature Article

Evidenced based review of recommendations addressing the frequency of changing long-term indwelling urinary catheters in older adults

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ABSTRACT

The frequency of changing long-term indwelling urinary catheters is a subject of debate. The focus of this integrative review is to determine if routinely scheduled changes of long-term indwelling urinary catheters in older adults is evidence-based. There are no current research studies specifically studying routine changes of chronic indwelling urinary catheters available to support or refute this common practice. The frequency of chronic urinary catheter changes should be tailored to the individual patient and occur as clinically indicated. Rigorous research studies are needed to advance the science used to provide evidence-based care for this vulnerable population.

Introduction

Long-term urinary catheters and the older adult

Long-term placement of urinary catheters is a necessity for many older adults to optimally manage urine flow in clinical situations including: chronic urinary retention or urethral obstruction when surgical interventions fail, urinary incontinence not amenable to other management methods, end-of-life care when pain or immobility restricts toileting, and to promote the healing of significant pressure ulcers.[1–3] Indwelling urinary catheters are often preferred for older adults with cognitive deficits, limited hand dexterity, and impaired vision which limits the feasibility of intermittent catheterization.[4–6] There is no standard definition for long-term placement, but the presence of an indwelling catheter for >30 days is commonly documented.[1,6,7] The Centers for Disease Control reports the overall prevalence of long-term urethral urinary catheterization is unknown.[8] According to the 2007 National Home Hospice Care Survey 19% of patients in either the home health care or hospice care setting used a urinary catheter.[9] Long-term indwelling catheters are also present in 5–10% of long-term care residents.[3,10] Judicious use of indwelling catheters in older adults residing in all settings is imperative due to the great risk for significant complications.[2]

Catheter-associated complications increase morbidity, health care utilization, and costs.[11] Urinary tract infections and blockage are two of the most common catheter-associated complications and have potentially serious consequences.[11,12] Additional complications of indwelling catheterization include urinary stones, urethral erosions, hematuria, and fistula formation.[3] Social stigmas, bothersome symptoms, and daily disruptions created by the chronic presence of indwelling urinary catheters profoundly impact quality of life for older adults.[13,14] In addition to their impact on older adults, urinary catheters create a high burden of care on caregivers.[11,15] Many older adults with long-term catheters have lower functional status and numerous co-morbidities in comparison to those without.[10] Situations in which a long-term catheter is necessary to maintain urine flow, optimal care of the catheter may help to minimize bothersome catheter related symptoms and to prevent or effectively manage common catheter related complications.[3]

Frequency of change debate

The frequency of routinely scheduled catheter changes is a principle in catheter management that has been a subject of debate.[16,17] Chronic indwelling catheters are traditionally changed

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at routine monthly intervals to avoid urinary tract infections and blockage.[17] Evaluating the evidence to support traditional practices is important because many commonly implemented interventions are ineffective or associated with potentially harmful outcomes.[3] Those who are against routine catheter changes cite risks for infection, trauma, and long-term histological changes with increased frequency of changes.[16,17] Proponents of both sides of this argument advocate for the elimination or reduction of catheter-related urinary tract infections.

Pathogenesis of urinary tract infections

Chronic co-morbid conditions predispose older adults to urinary tract infections.[18] Cerebrovascular accidents, Alzheimer's disease, multiple sclerosis, and Parkinson's disease create impaired emptying of the bladder and ureteric reflux contributing to bacteriuria.[18] Indwelling urinary catheters increase the risk for infection as they connect a sterile body site to the outside world, and this inert catheter material is susceptible to microbial colonization.[19] Bacteria are introduced to the bladder as perineal flora attach at the tip of the catheter during insertion, via extraluminal migration, or with intraluminal contamination following handling of the drainage system.[20] All patients with chronic indwelling urinary catheters become colonized overtime with bacteria in their bladder.[19,21] Many bacteria colonize chronic catheters as biofilms and consist of adherent microorganisms, their extracellular products, and host components.[19] Biofilm plays a vital role in the pathogenesis of urinary tract infections[19] and is responsible for the most common cause of urinary catheter blockage, encrustation created by the bacteria *proteus mirabilis*, affecting all types of catheters.[22]

Asymptomatic vs. symptomatic urinary tract infections

Asymptomatic versus symptomatic urinary tract infection is an important distinction. Bacteriuria simply means bacteria are present in urine and are not affecting the patient by creating signs or symptoms of infection. The colonization of microbes in the bladder does not always lead to a symptomatic infection.[7] There are no clear standardized diagnostic criteria used to define an acute symptomatic catheter-related urinary tract infection.[1,23] The Infectious Diseases Society of America defines catheter-associated urinary tract infection as the presence of signs and symptoms compatible with a urinary tract infection (i.e. fever, altered mental status, lethargy, hematuria) with no other identified source of infection along with $>10^3$ colony forming units (cfu)/ml of bacterial species in a urine specimen.[24] Acute symptomatic urinary tract infections in older adults with chronic indwelling urinary catheters are not always easy to identify because classic symptoms may not be visible, febrile response could be blunted, and the clinical picture complicated by the presence of multiple co-morbid conditions.[1]

In the context of acute symptomatic urinary tract infections, biofilms create a survival advantage to invading organisms and resist antibiotic treatment.[19,22] As a result, changing the catheter is recommended when the older adult is experiencing an acute *symptomatic* urinary tract infection to improve accuracy of culture results and enhance treatment.[19,25] There is, however, no evidence to support routinely removing catheters will *prevent* acute symptomatic catheter-related infections in those with chronic indwelling urinary catheters.[19]

Acute vs. long-term catheter management strategies

Strategies to prevent catheter-related urinary tract infections in patients with chronic indwelling urinary catheters are limited by the lack of rigorous research trials to provide sufficient evidence to make recommendations. Two Cochrane reviews, one exploring long-term management strategies including which type of catheter is best to use[26] and one exploring the efficacy of bladder washouts[27] both concluded there was too little evidence to make a decision in favor or against these interventions. Unfortunately, much of what is known about the prevention of catheter related urinary tract infections is derived from research performed within the acute care setting where catheters are initiated short-term.[28] Studies of patients in acute care settings with catheters prescribed for short-term indications have found that the daily risk of developing bacteria within the bladder increases the longer the catheter remains in place.[29] Therefore, early discontinuation of the catheter to avoid bacteriuria and subsequent symptomatic infection has been an integral part of short-term catheter related urinary tract infection prevention. However, this reasoning may not be appropriate within the context of chronic indwelling urinary catheter users where long-term placement is the standard and bacteriuria is inevitable.[19] The purpose of this integrative review was to assess evidence based recommendations for routinely scheduled changes of long-term indwelling urinary catheters.

Methods

In order to gather relevant research reports as well as clinical consensus and best practice guidelines, a set of databases were searched using a standard set of terms for English language citations within the past ten years. CINAHL, MEDLINE, Google Scholar, and Proquest Nursing & Allied Health databases were searched using key words "urinary catheters," "home health," "community health nursing," and "chronic indwelling catheters" individually and in combination. Abstracts and reference lists from research reports and guideline articles selected were scanned for additional citations. Studies taking place in acute care settings or those examining the short-term use of catheters were excluded. Clinical guidelines were searched utilizing the National Guideline Clearinghouse search engine.

Results

Multiple studies exploring the management of chronic indwelling urinary catheters,[6,11–13,25,30] were reviewed seeking information related to the frequency of chronic indwelling catheter changes. Table 1 summarizes the characteristics of these studies. Clinical guidelines[16,24,33–36] and best practice articles[2,17] were referenced to obtain expert consensus. Table 2 summarizes characteristics of all the guidelines identified.

Frequency of routinely scheduled changes

No research studies exploring the scheduled frequency of changing chronic indwelling catheters within the past ten years were found. One small study,[30] conducted in 1982, specifically evaluated routinely scheduled catheter changes. This randomized controlled study[30] was performed with a small sample of patients with indwelling urinary catheters living in a nursing home. One group had their catheters changed monthly and as needed for obstruction and/or infection and the other only as needed for obstruction and/or infection.[30] The results of this study reported no difference between groups in length of time catheters were in place at time of urinary tract infection and no difference in incidence of clinical infections.[30] While this finding is not statistically significant, the number of catheter related urinary tract infections was higher in the group that did not receive routine catheter changes.[30]

Guidelines developed by the Centers for Disease Control,[33] the European Society of Urology Nurses,[34] and the Massachusetts