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State of the Science Review

Identifying safe practices for use of the urinary leg bag drainage system in the postacute and long-term care setting: An integrative review

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Background: In the postacute and long-term care setting, the practice of changing the indwelling urinary catheter large sterile drainage bag to a small-size leg drainage bag is intended to maintain a person's mobility, dignity, and comfort. There is scant evidence that assesses the impact of intermittent use of a leg bag on frequency of urinary tract infection since this breaks the closed urinary drainage system.
Methods: We reviewed research published between 1993 and 2014 for the answers to 20 practice questions developed by experts and long-term care clinicians on the risks and benefits, cleaning, connection, and storage of reusable leg bags.
Results: Seventeen of the 26 publications and studies provided varying advice on the risk of breaking the closed system and on practices for changing, disinfecting, and storing leg bags between uses. Thirteen of 20 practice questions were answered by ≥1 publications, few of which were evidence based.
Conclusions: We identified the existence of low-level evidence that leg bags pose no evident, disproportionate risk of infection compared with maintaining a closed system. The lack of uniformity in evidence in the literature suggests aseptic technique should guide practice. Available evidence suggests that aseptic technique should guide practice.

BACKGROUND

Residents in postacute and long-term care facilities (LTCFs) with a clinical need for a long-term indwelling urinary catheter may prefer to change from using a large urinary drainage bag to a more discreet, smaller, reusable urinary leg bag collection device during the day. Use of a leg bag may assist with optimizing mobility and independence with activities of daily living, and when concealed under clothing the leg bag may promote dignity for the resident. This practice requires a break in the closed urinary drainage system when the collection bag is changed to a smaller leg bag. The Centers for Disease Control and Prevention (CDC) guideline[1] and the Society for Healthcare Epidemiology of America, Inc (SHEA) compendium[2] both recommend maintaining a closed drainage system after aseptic insertion to avoid the risk for catheter-associated urinary tract infections (CAUTIs). Although current evidence supporting these recommendations comes from investigations among patients in acute care facilities, innate risks exist regardless of care setting. Kunin and McCormack's landmark observational study found a significant reduction of CAUTI using a closed system compared with an open system in which the catheter drains into an open urine collection container.[3] Subsequently, 2 studies in critically ill patients by Leone et al[4,5] found no statistical difference in incidence of bacteriuria in

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patients using a catheter plus drainage bag attached at insertion versus a system with a presealed catheter junction. Additional studies found that breaks in the system did not result in immediate harm.[6,7] The Infectious Diseases Society of America has critically appraised this evidence and concluded that incidence of catheter-associated bacteriuria may be reduced by using a preconnected system.[8] Although numerous guidelines, position papers, and best practice reviews have been published on various aspects of the use and care of reusable urinary leg bags, no definitive set of evidence-based infection prevention recommendations is available that can be widely used. This lack of evidence may result in variances in maintaining asepsis during urinary leg bag changes that may exacerbate the potential for development of a CAUTI.

A subcommittee of the national project team coordinating the Agency for Healthcare Research and Quality (AHRQ) Safety Program for Long-Term Care: HAIs/CAUTI issued a call to action for researchers to conduct a search of the medical literature for evidence-based infection prevention practices in the use, cleaning, and storage of reusable urinary leg bags and the impact of leg bag use on development of CAUTI.

METHODS

Initial examination of the available evidence pointed to the need to perform an integrative review because most studies were of low or very low quality in terms of strength and quality of methodology. The integrative review addressed this need by summarizing empirical experience and available evidence, allowing for expert or consensus opinion including theoretical strategies to inform both policy and practice.[9] In response to queries from LTCF clinicians and input from subject matter experts engaged in the AHRQ Safety Program for Long-Term Care: HAIs/CAUTI, the authors formed an expert panel to formulate questions in 4 research categories to better understand the current recommended practices. The expert panel consisted of 3 board-certified infection preventionists and 2 physicians with experience with infection prevention in aging populations. Twenty questions were formulated on the risks, benefits, cleaning, connections, emptying and storage of reusable urinary leg bags in residents of LTCFs who have long-term indwelling urinary catheters; the risk for CAUTI; and cleaning, connection, and storage of leg bags (Table 1). The U.S. Food and Drug Administration (FDA), the Centers for Medicare and Medicaid Services, and the National Association For Continence were contacted to reconcile conflicts or gaps in direction in national evidence-based guidelines, recommendations, and requirements. A sampling of 7 online manufacturer instructions was also searched for information on the use of reusable disposable urinary leg bags.

Search strategy

A comprehensive search strategy was developed with the assistance of a medical librarian to find English language studies and information on the main subject areas of the integrative review from 2008-2014 (Fig 1). The database search terms included the following: indwelling urinary catheter, urinary leg bag, long-term care, urine drainage, and urine collection. We identified original research, evidence-based guidelines, consensus papers, surveys, clinical practice and patient guides through MEDLINE, CINAHL, Embase, PubMed, ScienceDirect, Wiley, AccessMedicine, Journals@OVID, Google, and the Cochrane Library electronic database; and the Association for Professionals in Infection Control and Epidemiology, the Society for Healthcare Epidemiology of America, Inc, the Infectious Diseases Society of America, and the CDC Web sites. Most documents were published between 2008 and 2014. We opted to call out 3 older studies published from 1993-1998 that were cited in the more recent systematic reviews because of the value of the content.

We included studies or guidelines that provided recommendations on care and maintenance of indwelling urinary catheters or urinary drainage systems, and manufacturers' instructions for use available online in the public domain. We excluded studies of these devices in pediatric populations. We included only the literature that answered ≥1 of the 20 key questions (Table 1).

Table 1
Research questions: 4 categories related to risks and benefits of reusable disposable urinary leg bags: use, cleaning, connection, and storage

Research category	Practice question
Risks and benefits of use of urinary catheter leg bags	1. Should we use leg bags? If so, then are we are breaking the closed system? 2. Should there be a protocol to change a large collection bag to a leg bag?
Cleaning and changing • Procedures • Chemical • Frequency • Dwell time	1. How should the bag exterior be cleaned? How often? 2. How should the leg straps be cleaned? How often? 3. How should the leg bag caps be cleaned? 4. What is the best chemical to use when rinsing the leg bag: vinegar, bleach, or soap and water? 5. What is the optimal procedure: continual rinse or let the bag soak in the chemical? If so, how long? 6. Should the leg bag be rinsed after the chemical disinfectant is used? 7. How should the urine collection drainage container be rinsed? Is tap water sufficient? 8. Should the leg bag be changed weekly, every 2 weeks, monthly? Or as needed (eg, bag cleanliness is compromised)?
Connection • Aseptic technique • Chemical • Timing	1. When connecting the leg bag to the Foley catheter, should the leg bag nozzle be wiped with an alcohol preparation pad prior to connecting it to the catheter? 2. When connecting the leg bag to the Foley catheter, the leg bag cap is sometimes attached to the gravity bag. Should the gravity bag nozzle be disinfected first? How often should the cap be changed? Should the cap itself be disinfected? How?
Storage • Procedure • Location	1. How do you store the bags in between use? 2. Should the leg bag be stored upright, open to air, and allowed to dry? 3. Is storing the leg bag and gravity bag in the resident's bathroom ideal? 4. Where in the bathroom should they be stored—on top of the toilet, in the shower (if available), or on the floor (in a washbasin)? 5. If stored in a washbasin how often should this basin be cleaned? 6. Should the leg bag nozzle be kept sterile or clean while the leg bag is in use? 7. Should the urine collection container be stored upright or upside down? If stored upside down, should it sit on a paper towel first? 8. Should leg bag caps air dry? Should they be stored upright or upside down?