ACRM
AMERICAN CONGRESS OF REHABILITATION MEDICINE

Archives of Physical Medicine and Rehabilitation

journal homepage: www.archives-pmr.org

Archives of Physical Medicine and Rehabilitation 2013;94:782-7

REVIEW ARTICLE (META-ANALYSIS)

Impact of Hydrophilic Catheters on Urinary Tract Infections in People With Spinal Cord Injury: Systematic Review and Meta-Analysis of Randomized Controlled Trials

Li Li, PhD,[a] Wenqin Ye, MSc,[a] Hong Ruan, MSc,[b] Baoyan Yang, MSc,[a] Shuqi Zhang, MSc,[a] Li Li, MSc[a]

From the [a]Department of Nursing, Changhai Hospital, Second Military Medical University, Shanghai; and [b]Department of Nursing, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China.

Abstract

Objectives: To identify randomized controlled trials comparing the use of hydrophilic and nonhydrophilic catheters for intermittent catheterization (IC) in patients with spinal cord injury (SCI), and to perform a meta-analysis evaluating the occurrence of hematuria and urinary tract infection (UTI).

Data Sources: We searched the following electronic databases to identify studies: EMBASE (1991 to August 2011), PubMed (1991 to August 2011), Cochrane Library (no date restriction), China National Knowledge Infrastructure (no date restriction), and the Chinese Biomedical Literature Database (no date restriction).

Study Selection: Randomized controlled trials, parallel-control, crossover-control, and prospective cohort studies that assessed morbidity associated with the use of hydrophilic catheters and nonhydrophilic catheters in patients after SCI were included.

Data Extraction: Data extraction was performed using standardized forms of the Cochrane Collaboration. Methodologic quality was independently assessed by 2 reviewers using the Downs and Black instrument. Pooled odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for dichotomous data.

Data Synthesis: Five studies involving 508 subjects; 462 subjects completed the study and were included in this meta-analysis. There was a significantly lower incidence (OR = .36; 95% CI, 24%−54%; $P < .0001$) of reported UTIs in the hydrophilic-treated group compared with the nonhydrophilic-treated group. Hematuria was also reported significantly less in the hydrophilic catheter group than in the nonhydrophilic catheter group (OR = .57; 95% CI, 35%−92%; $P = .001$).

Conclusions: This meta-analysis found UTIs and hematuria less frequently associated with the use of hydrophilic-coated catheters for IC in patients with SCI. These findings support the use of hydrophilic catheters in this patient population.

Archives of Physical Medicine and Rehabilitation 2013;94:782-7

Urinary tract disease continues to be a prominent cause of morbidity after spinal cord injury (SCI). Urinary tract infection (UTI) is still the most frequent medical complication during initial medical rehabilitation of patients with SCI.[1,2] High residual bladder volume is considered an important risk factor for UTI. Efficient bladder emptying is the primary goal that drives the choice of a bladder management program. Intermittent catheterization (IC) has been effective in decreasing the incidence of upper urinary tract disease in patients with SCI.[3] However, UTI and hematuria related to catheterization still occur. Due to lacking the protective defense mechanisms of healthy tissue on the surface of a urinary catheter, bacteria easily colonize the catheter surface, the choice of urinary catheter materials may be significant.[4]

Hydrophilic catheters have a smooth and slippery surface that is less irritating than standard polyvinyl catheters.[5] In the general population, the long-term use of hydrophilic catheters can decrease urethral irritation[6-8] and reduce urethral microtrauma.[8-10] Hydrophilic catheters have a high level of patient satisfaction because they are comfortable.[6-8]

Supported by the Shanghai Science and Technical Committee Foundation of China (grant no. 044119610).

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit on the authors or on any organization with which the authors are associated.

0003-9993/13/$36 - see front matter © 2013 by the American Congress of Rehabilitation Medicine
http://dx.doi.org/10.1016/j.apmr.2012.11.010

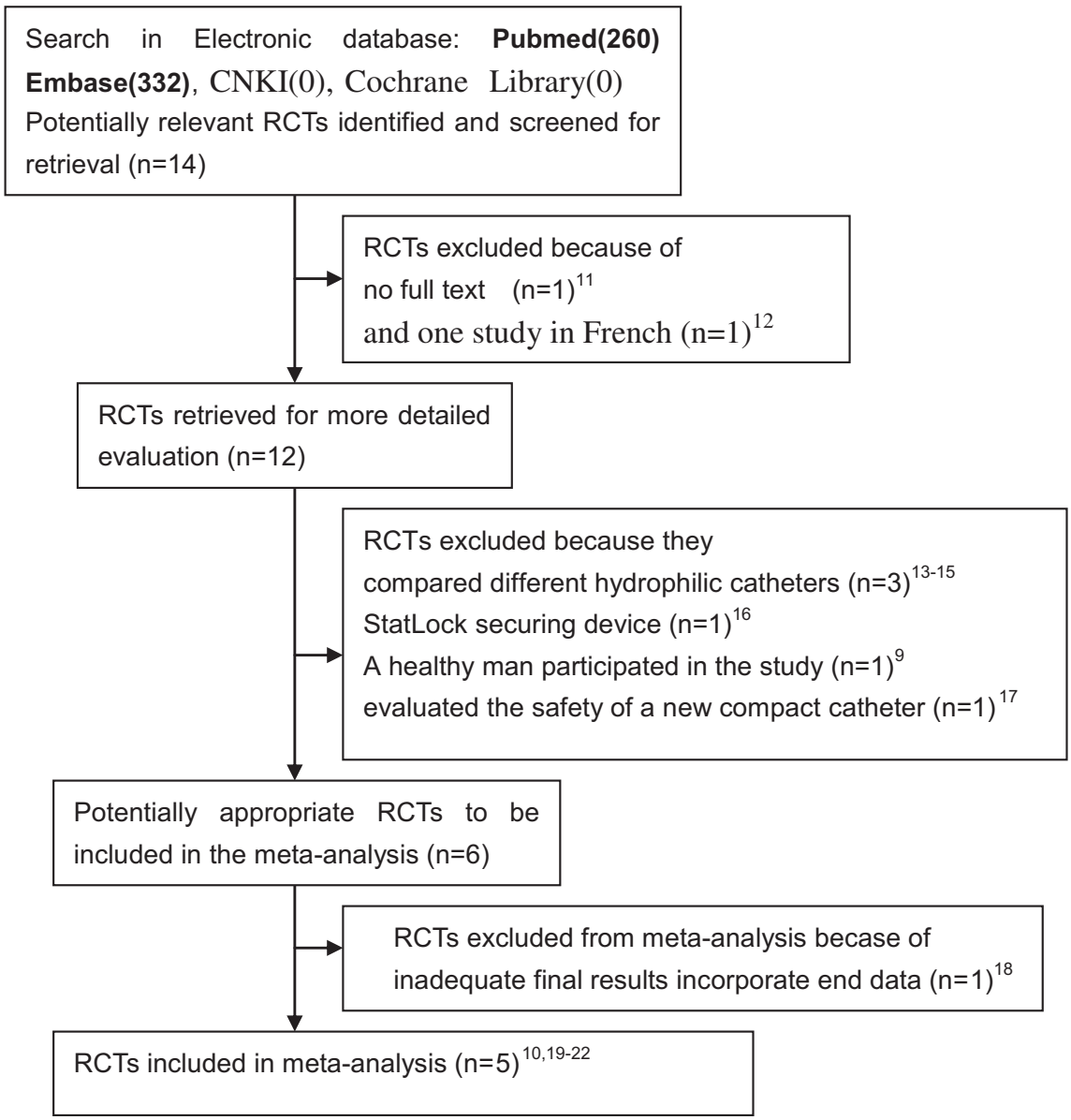

Fig 1 Flowchart of search results. Abbreviation: RCTs, randomized controlled trials.

Although some reports suggest that hydrophilic catheters have advantages when used in clean intermittent catheterization (CIC), other studies show little benefit. Sarica et al[18] reported no significant difference between hydrophilic and nonhydrophilic catheters with respect to "symptomatic UTI and microbiological analysis of urine culture."[18(p473)] Only 10 patients completed the study. Because previous reports have had various results and small numbers of subjects, there is a need for further study with a meta-analysis.

List of abbreviations:

CI	**confidence interval**
CIC	**clean intermittent catheterization**
CNKI	**China National Knowledge Infrastructure**
EMBASE	**Excerpta Medica Database**
IC	**intermittent catheterization**
MeSH	**Medical Subject Heading**
OR	**odds ratio**
SCI	**spinal cord injury**
UTI	**urinary tract infection**

Methods

This meta-analysis was performed according to the criteria of the Preferred Reporting Items for Systematic Reviews and Meta-analyses[23] and the recommendations of the Cochrane Collaboration.[24]

Data source and search

Medical Subject Headings (MeSH) were used while searching languages interpretable to this group—English and Chinese. We searched the following electronic databases to identify studies: Excerpta Medica Database (EMBASE) (fig 1) (1991 to August 2011), PubMed (1991 to August 2011), the Cochrane Library (no date restriction), China National Knowledge Infrastructure