

## INTERMITTENT CATHETERISATION WITH HYDROPHILIC-COATED CATHETERS DELAYS THE ONSET OF URINARY TRACT INFECTION IN PATIENTS WITH ACUTE SPINAL CORD INJURY: AN INTERNATIONAL, MULTICENTER, RANDOMISED CONTROLLED TRIAL.

### Hypothesis / aims of study

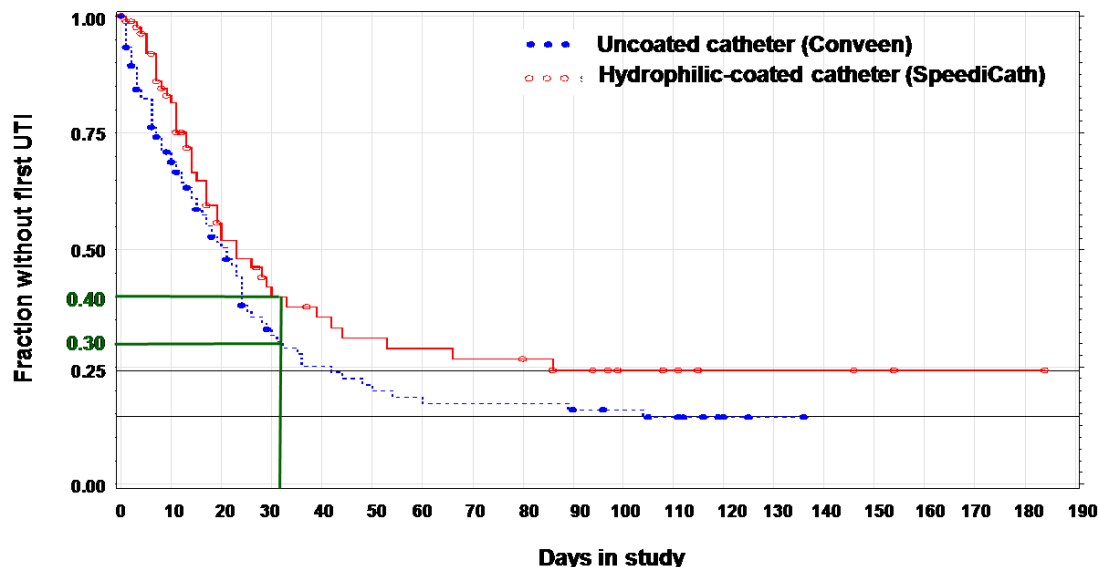
Urinary tract infection (UTI) is a major complication of neurogenic bladder dysfunction arising from spinal cord injury (SCI). UTI is a serious health risk to these patients and is a very frequent medical complication during their initial rehabilitation as well as a common cause of morbidity throughout their lifetime. Intermittent catheterisation (IC) is typically the preferred method of bladder management method in SCI patients with neurogenic bladder as there is good evidence that IC decreases the risk of UTI and alleviates other complications associated with permanent indwelling catheterisation (1, 2). However, the challenge remains to further reduce the risk of UTI. Hydrophilic-coated catheters have a polymer substance coating which binds water resulting in a smooth and slippery surface which ensures lubrication throughout the entire length of the urethra. Although current literature suggests that, compared to uncoated IC catheters, hydrophilic-coated catheters reduce the risk of UTI, stronger evidence for this effect needs to be established (3). This randomised controlled trial is the largest to date to investigate the effect of hydrophilic-coated catheters on UTI occurrence. The **primary objective** of this study was to investigate whether IC using hydrophilic-coated catheters delayed the onset of the first UTI in acutely injured SCI patients as compared to IC using uncoated catheters.

### Study design, materials and methods

A prospective, randomised, parallel-group, international multicenter trial was conducted between April 2006 and August 2009 at 15 hospitals or rehabilitation units in the United States (11 sites) and Canada (4 sites). Patients aged 18 years or older who 1) had traumatic SCI no longer than 3 months before study inclusion, 2) required IC for bladder management and 3) had given written consent, were randomly assigned to a sterile, single use hydrophilic-coated (SpeediCath) or uncoated PVC (Conveen) catheter. A computer-generated randomisation list was produced and sealed envelopes were provided to the investigational sites. Participants were included in the study during their stay at the hospital or rehabilitation unit where they would typically be changing from other bladder management, e.g. indwelling catheterisation, to IC. UTI episodes and bladder management data were recorded during the rest of their hospital/rehabilitation stay and for the initial period (max. 3 months) after discharge. The maximal time a patient could participate in this study was 6 months. For this study, a UTI was defined as a UTI for which antibiotic treatment had been prescribed. The primary endpoint (time to first UTI) was measured as the time from the first catheterisation with the study catheter to the first day of UTI symptoms. Sample size estimation was based on the following assumptions: 1) 65% of uncoated catheter users and 40% of hydrophilic-coated catheter users would experience a UTI during the course of the study and 2) dropout rate of 33%. To detect a difference of 25% in the number of patients who experienced a UTI in the study period with a power of 90% and a significance level of 0.05 the aim was to enrol a total of 226 patients. Endpoint analyses were done on the intent-to-treat population. Due to the obvious difference in appearance of the two catheter types it was not possible to blind clinical staff and patients.

### Results

A total of 224 patients were allocated to the two study arms (108 to the hydrophilic-coated and 116 to the uncoated catheter). There were no significant differences between the two groups in demographics including gender, age and neurological level (paraplegia vs. tetraplegia). Thirty-three % of the patients discontinued the study before they contracted their first UTI. Consequently, the primary analysis (time to first UTI) included 150 patients (59 in the hydrophilic-coated and 91 in the uncoated catheter group). The primary endpoint analysis showed a significantly increased daily risk of contracting the first UTI in the uncoated catheter group (hazard ratio = 1.502). Thus, the time from first catheterisation to the onset of the first UTI was found to be significantly delayed in the hydrophilic-coated catheter group ( $p=0.038$ ).



**Figure 1. Hydrophilic-coated intermittent catheterisation significantly delays the onset of UTI compared to IC with uncoated catheters (p=0.038).** The figure is a survival graph showing the fraction of patients who had not yet contracted their first UTI. For each study group, the “fraction without first UTI” at the mean time of hospital/rehabilitation discharge (32 days) is indicated in green.

Interpretation of results

Patients with acute SCI are vulnerable to multiple medical complications during their initial rehabilitation. Minimizing these complications and preventing unnecessary interruptions or delays to their rehabilitation program is of utmost importance. For these patients, UTI is a serious health risk which can cause extended hospital/rehabilitation stay, missed rehabilitation sessions as well as additional emotional stress for the patient. In this trial, the mean time from study inclusion to discharge from hospital/rehabilitation was 32 study days. As shown (in green) in Figure 1, 40% of patients in the hydrophilic-coated catheter group vs. 30% in the uncoated catheter group had not yet contracted their first UTI after 32 study days. These results indicate that hydrophilic-coated IC will allow more patients to leave hospital/rehabilitation without having experienced a UTI.

Concluding message

The use of hydrophilic-coated intermittent catheters delays the onset of the first UTI in patients with acute SCI. Such a delay could reduce the risk of contracting a UTI while at hospital or rehabilitation unit, thereby minimizing UTI-related complications, treatment costs and rehabilitation delays.

References

1. Bladder management for adults with spinal cord injury: A clinical practice guideline for health-care providers. Consortium for Spinal Cord Medicine 2006
2. Stöhrer M et al. EAU Guidelines on Neurogenic Lower Urinary Tract Dysfunction. Eur Urol 2009;56:81-88
3. Moore KN et al. Long-term bladder management by intermittent catheterisation in adults and children. Cochrane Database Syst Rev. 2007;4:CD006008

<b>Specify source of funding or grant</b>	This trial was sponsored by Coloplast A/S.
<b>Is this a clinical trial?</b>	Yes
<b>Is this study registered in a public clinical trials registry?</b>	Yes
<b>Specify Name of Public Registry, Registration Number</b>	ClinicalTrials.gov, NCT00318591
<b>Is this a Randomised Controlled Trial (RCT)?</b>	Yes
<b>What were the subjects in the study?</b>	HUMAN
<b>Was this study approved by an ethics committee?</b>	Yes
<b>Specify Name of Ethics Committee</b>	Institutional Review Boards of Baylor College of Medicine, Mt. Sinai School of Medicine, Kessler Institute for Rehabilitation, Shepherd Center, Craig Hospital, University of Miami, Rancho Los Amigos National Rehabilitation Centre, Carolinas Rehabilitation, University of Michigan, Boston University, Mayo Clinic, Santa Clara Valley Medical Centre. Research Ethics Boards of Lyndhurst Centre, G.F. Strong Rehabilitation Centre, Lawson Health Research Institute, Parkwood Centre, University of Alberta
<b>Was the Declaration of Helsinki followed?</b>	Yes
<b>Was informed consent obtained from the patients?</b>	Yes