

## URETHRAL INJURY AND ASSOCIATED COMPLICATIONS IN INDIVIDUALS FOLLOWING SCI

### Hypothesis / aims of study

Management of neurogenic lower urinary tract dysfunction (NLUTD) is among the highest of priorities for individuals with spinal cord injury (SCI). Among the various options presently available to facilitate bladder emptying in individuals who are unable to void spontaneously, clean intermittent catheterization (CIC) is considered to be the preferred management for preserving bladder function and reducing the risk of developing upper urinary tract damage and renal failure. Despite CIC's widespread acceptance in clinical practice, urinary tract infections (UTI) and hematuria still occur. Moreover, whether certain methods and types of catheters are more likely to cause urethral damage is unknown. This is a critical question as urethral damage resulting from catheterization can commonly lead to the development of urethral strictures and urinary tract infections, which furthermore can result in potentially life-threatening episodes of severe spikes in blood pressure known as autonomic dysreflexia. Despite this, there is little information available on the incidence, severity, and mechanism of urethral injuries related to catheter usage in adults. Furthermore, there is a paucity of data available on factors (e.g. type of catheter, behavioural, etc.) that predispose individuals who utilize CIC to urinary tract infections.

The main question of the study is to establish the incidence of urethral injuries and related complications in individuals with SCI using CIC.

### Study design, materials and methods

In this retrospective cross-sectional study, we utilized a questionnaire to collect desired information. This 30-item questionnaire, comprising multiple segments (three for females, four for males), provides information on a) demographics including the character of the SCI, b) questions from the assessment form 'lower urinary tract' of the International Standards to document remaining Autonomic Function after Spinal Cord Injury (ISAFSCI), c) catheterization and complications, and d) history of urinary tract inflammation. Overall, 117 individuals with chronic SCI were enrolled in this study.

### Results

Data from 116 (including 13 females) participants, who completed the questionnaire, was analysed. Baseline characteristics are shown in table 1.

While 84% (97, i.e. 10 females, 87 males, out of 116) of all participants performed CIC as their preferred method of bladder emptying, the remaining 16% (19/116) either were able to void spontaneously, used a condom or indwelling catheter, performed the Crede maneuver or a combination of different methods.

In individuals performing CIC, the overall incidence of urethral injuries was 28% (27/97, i.e. all males) – either during self-catheterization (78%, 21/27) or CIC performed by others (22%, 6/27). Participants with urethral injuries were using either hydrophilic (37%, 10/27) a non-hydrophilic (33%, 9/27) or other catheter (30%, 8/27).

As a result of an urethral injury, 5 participants (19%) had to convert from urethral CIC to other permanent methods of bladder emptying, i.e. suprapubic (n=2) or urethral Foley catheter (n=3).

The incidence of UTI during the last 12 months was more than 60% (59/97, i.e. 6 females, 53 males) in this subpopulation. Of the affected participants, 24 (41%) were using a hydrophilic catheter, 20 (35%) a non-hydrophilic catheter, and 12 (24%) could not specify their catheter.

The frequency of UTI during the last 12 months was as follows: once (41%), twice (32%), thrice (9%), 4 to 10 times (15%) or more (3%). Antibiotic treatment was applied in 80% (47/59) of all UTIs.

Furthermore, 28% (24/87) of males using CIC reported about the history of inflammations from other lower urinary tract organs, i.e. testicles 23% (20/87), epididymis in 9% (8/87) and prostate 2% (2/87).

Table 1 – Baseline characteristics

Characteristics	All participants (n = 116)
Age in years ( $\pm$ SD)	35 $\pm$ 8
Time after SCI in years ( $\pm$ SD)	14 $\pm$ 8
<b>Sex</b>	
Female	13 (11%)
Male	103 (89%)
<b>Completeness of lesion (AIS)</b>	
Complete (AIS A) vs. incomplete (AIS B-D)	51 (44%) / 65 (56%)
Motor complete (AIS A-B) vs. motor incomplete (AIS C-D)	99 (85%) / 17 (15%)
AIS A	51 (44%)
AIS B	48 (41%)
AIS C	11 (10%)
AIS D	5 (4%)
Unknown	1 (1%)
<b>Type of plegia</b>	
Tetraplegic	109 (94%)
Paraplegic	5 (4%)
Unknown	2 (2%)
<b>Level of lesion</b>	
Cervical	109 (94%)
C3	1
C4	11
C5	23
C6	52
C7	21
C8	1
Thoracic	5 (4%)
T3	1
T4	1
T5	2
T10	1
Unknown	2 (2%)

Interpretation of results

Our findings reveal a high incidence of urethral injuries and associated complications in individuals performing CIC following SCI.

Concluding message

This retrospective study provides evidence that urethral injuries and associated complications, i.e. UTI, and the need for conversion to other methods of bladder emptying, in individuals performing CIC following SCI are underrepresented in the current literature.

Potentially, prospective studies might determine whether continuous education of individuals living with SCI performing CIC can reduce urethral injuries and associated complications in the future.

Disclosures

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