

## Incidence of Urethral Stricture in Patients With Spinal Cord Injury Treated With Clean Intermittent Self-Catheterization

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<b>OBJECTIVE</b>	To report the incidence of urethral stricture and its management in patients with spinal cord injury treated with clean intermittent self-catheterization (CIC).
<b>MATERIALS AND METHODS</b>	The clinical records of 333 patients with spinal cord injury treated with CIC since 2001 were identified, and those who developed a urethral stricture during their follow-up, including their treatment and results achieved, were analyzed.
<b>RESULTS</b>	The patients had a median age at the time of injury of 27 years, of which only 14 patients (4.2%) developed urethral stricture at a mean duration of self-catheterization of 9 years; 86% of them were treated with urethrotomy, without recurrence through a mean of 1-year follow-up. There are no previous reports of rates of urethral stricture in this type of patients in our institution; the rate found is considerably low, as is the recurrence after urethrotomy, which can be decreased by the continuous self-obturation achieved with catheterization.
<b>CONCLUSION</b>	Urethral stricture as a complication of CIC in patients with spinal cord injury has a low incidence and can be effectively treated in those who develop it. UROLOGY 99: 260–264, 2017. © 2016 Elsevier Inc.

In 1972, Jack Lapidus introduced and developed the concept of clean intermittent self-catheterization (CIC) for management of patients with chronic urinary retention, especially of neurogenic origin. Implementation of this treatment had an important impact on lowering the rate of urinary tract infections and the degree of renal damage; it also helped improve continence and quality of life, and increased survival of these patients.<sup>1</sup> Most of the patients who develop neurogenic bladder due to spinal cord injury are a group of young, active patients who have to be rehabilitated accordingly; that includes the ability to self-catheterize. The term “clean” implies the washing of hands and instruments used to catheterize; however, it is not a sterile process. Throughout time, there have been proposals of modifications to the process, preferring the use of hydrophilic-coated catheters<sup>2–5</sup> and the use of microwave heating to keep the catheters clean and help decrease the episodes of urinary tract infections and minimize

urethral trauma (up to 10 times less friction with hydrophilic tip).<sup>6,7</sup> Urethral strictures are one of the most feared complications in these patients due to the repeated urethral trauma achieved with catheterization. In our country and institution, previous studies that report this complication in patients with neurogenic bladder due to spinal cord injury are nonexistent.

### OBJECTIVE

To report the incidence of urethral stricture and its management in patients with spinal cord injury treated with CIC in a tertiary-care institution.

### MATERIALS AND METHODS

The clinical records of patients with spinal cord injury treated in the National Institute of Rehabilitation since 2001 were reviewed in a retrospective manner. The patients treated with CIC were identified and some baseline characteristics were reviewed, such as age at the time of spinal cord injury, the cause, extent and level of injury, duration of catheterization, complications derived from treatment, and those who developed a urethral stricture during their follow-up. The follow-up protocol consisted of office visits every 3 months, during which clinical information was assessed with emphasis on any change for performing the catheterization and any sign of urinary tract

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infection, as well as a urinalysis and a kidney-ureter-bladder plain film. The voiding method of the rest of the patients who were not catheterized was also identified. Urethral stricture was defined as the narrowing of the urethral lumen confirmed by urethroscopy in a patient with inability or difficulty to introduce a 14-Fr catheter but was previously catheterized without this problem. Even though this is not the standard definition, this was the best method for identifying patients with strictures in our population. Therefore, in patients who mentioned any difficulty for catheterizing, a urethroscopy under anesthesia was performed; if a urethral stricture was found, a direct vision optical internal urethrotomy (DVIU) was performed at the same time. In cases where the stricture seemed long during urethroscopy (over 10 mm), the DVIU was not performed and the protocol was complemented with a urethrography to assess the full length of the stricture. The treatment performed for the stricture and its results were also identified. After all the data were collected, a descriptive analysis using the program SPSS 21.0 was performed.

## RESULTS

Three hundred and thirty-three patients, 250 men and 83 women, treated with CIC were included from a total population of 675 patients with spinal cord injury and neurogenic bladder from the National Institute of Rehabilitation; the mean age at the time of injury was 27 years (standard deviation  $\pm 12.3$ ), most of them with complete spinal cord injury (73%). The rest of the patients who were not treated with CIC (342) were distributed as follows: 172 patients (25.4%) were managed with chronic urethral catheterization, 168 patients (24.9%) had spontaneous voiding, and only 2 (0.3%) had continuous leak that required use of diapers; the outcomes of these patients were not analyzed for the purpose of the study. The distribution of the injury level and the most common causes for the injuries are summarized in Figures 1 and 2. After proper rehabilitation, 78% of patients with CIC returned to work. The mean duration of self-catheterization was 9 years. The most common complication of CIC was development of bladder stones (10%). Overall, only 14 patients (4.2%) developed urethral stricture confirmed by urethroscopy at a mean time

for diagnosis of 19.8 months after beginning catheterizing. All patients with urethral stricture were men; none of the women developed stricture. Twelve patients had the stricture in the bulbar urethra, whereas 1 patient had a meatal stricture and another patient had it in the penile urethra; the treatments granted for the stricture are shown in Figure 3. All the strictures in the bulbar urethra developed by the patients were short-segment strictures, which made them feasible to treat with DVIU; this procedure was performed with a conventional straight blade and a single cut at 12 o'clock; after the procedure, a 16-Fr silicone Foley catheter was placed and removed at the 14th postoperative day. Once the catheter was removed, the patients resumed catheterization with the same intervals as before the surgery, which indirectly worked as a mechanism of self-obturation. The meatal stricture only required meatoplasty because the rest of the urethra was patent; finally, the penile stricture was complex, with multiple strictures of variable length, so the patient preferred a suprapubic tube rather than a 2-stage urethroplasty. At a mean follow-up of 1 year after DVIU, no recurrence of the strictures has been identified.

## DISCUSSION

The results in our population are similar to other series; the population is mainly composed of young men, with complete injuries, most of them at the thoracic and lumbar levels and related to accidents, either firearm or motor vehicle. Besides that, most of them had proper rehabilitation and achieved a productive lifestyle. CIC is of paramount importance to achieve complete rehabilitation; however, physicians sometimes underuse it due to unfounded reasons. Therefore, it is important to reinforce the low rate of complications that can be achieved by using this treatment, such as in urethral stricture. In our population, a considerable number of patients were not suited for CIC, mostly because they were not able to perform it and had poor family support to achieve it; others also preferred another treatment over CIC.

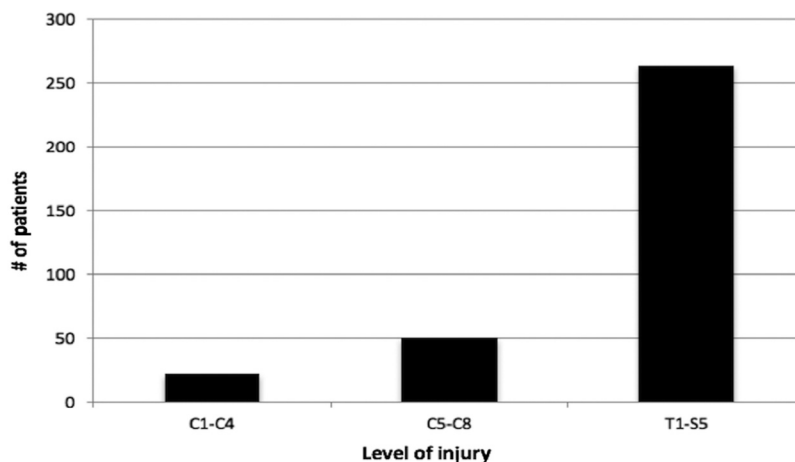


Figure 1. Distribution of spinal cord injury by level.

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