

#185: Risk factors for urethral fistulae in patients with spinal cord injury

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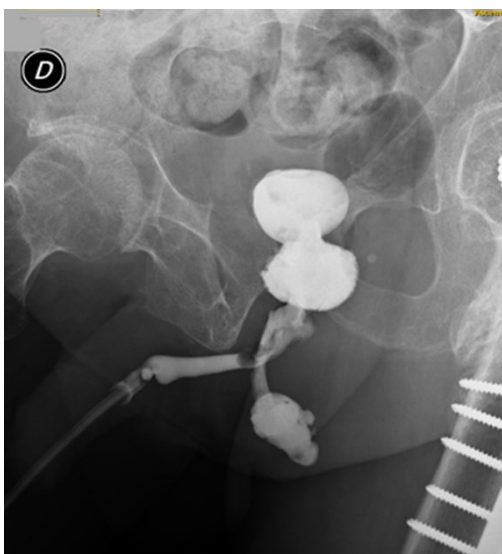
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Introduction

- ✓ People after spinal cord injury (SCI) have a neurogenic lower urinary tract dysfunction (NLUTD) in about 70-84% of cases.
- ✓ The goals of treatment of these patients include preservation of upper urinary tract function, absence of infection, and maintenance of a low-pressure bladder that is both continent and capable of emptying well. When these goals are not met, complications occur.
- ✓ One of these complications is the urethral fistula (UF), which can be defined as the abnormal communication of the urethra with other structures like the rectum, the skin, the bladder, and the male or female genital tract.
- ✓ This pathology, although rare, is serious due to the challenges of its treatment. Therefore, it is worth preventing it by acting on its risk factors.
- ✓ Given the presence of NLUTD in these patients, it would be very interesting to assess the type of bladder dysfunction associated with this pathology.
- ✓ Consequently, the **objective** of this study is to evaluate the clinical and urodynamic risk factors for urethral fistula formation in patients with spinal cord injury.

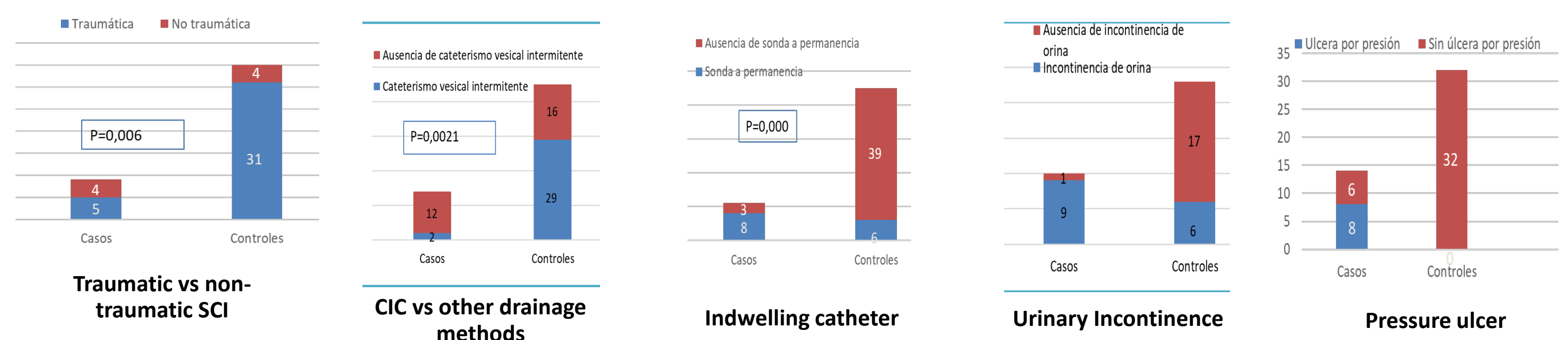


Study Design, Material and Methods

- ✓ A **case-control study** was carried out:
 - ✓ Cases: 15 adult patients with SCI who had been diagnosed with urethral fistula.
 - ✓ Controls: 45 adult SCI patients without UF.
- ✓ **Diagnosis of urethral fistula:** clinical examination + imaging technique: urethrography and fistulography, or computed tomography when necessary.
- ✓ The **sample size** was calculated according to the data obtained from the study by Singh et al. [1] With a probability of having urethral stricture of SCI patients with indwelling catheter of 0.25 and a probability of patients without indwelling catheter of 0.08, three control patients for each case, a type I error probability of 0.05 and a statistical power of 0.8, the total number of patients required was 60.
- ✓ The study consisted of a **retrospective review** of the clinical history and the results of the most recent urodynamic study. The urodynamic studies were performed according to the specifications to International Continence Society (ICS) with a Solar polygraph (MMS, Enschede, The Netherlands).

Results

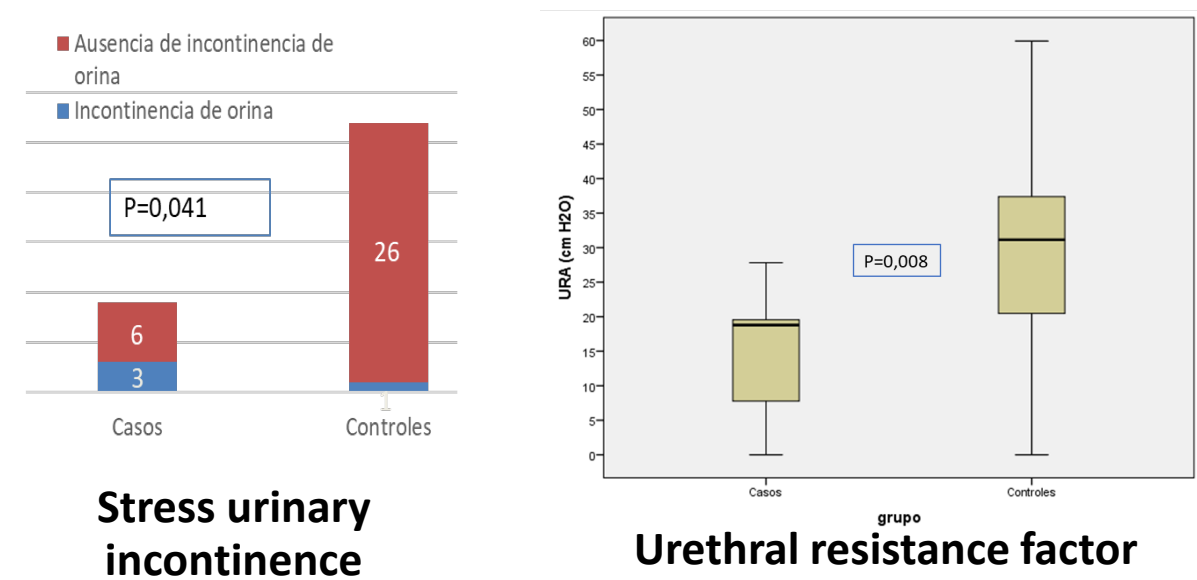
Clinical variables showing statistically significant differences between cases and controls:



Urodynamic variables showing significant differences between cases and controls:

The **regression analysis** showed that there are two independent clinical variables:

- The performance of CIC: protective factor (OR less than 1),
- The presence of urinary incontinence: increases more than 22 times the risk of having UF (OR = 22.178).



Discussion

This study found several clinical risk factors that favour the appearance of UF. Some of them, such as the presence of indwelling catheters and the absence of CIC, have been already proposed. Others, such as the urinary incontinence and a history of pressure ulcers, have also been implicitly suspected, and finally the non-traumatic cause of SCI has not been reported to date. On the other hand, urodynamic risk factors associated with UF have been proposed for the first time in this work.

In multivariate analysis we found that there were only two independent risk factors: the absence of CIC and mainly the presence of urinary incontinence. Urinary incontinence was shown to be the most important risk factor for UF. This complication was present in our series in 90% of patients with UF. Urinary incontinence was also related to urethral fistulae associated with pressure ulcers.

We can hypothesize that the absence of CIC and especially the presence of indwelling catheters can lead to a decubitus as proposed by Raup et al [2]. This decubitus associated with the deleterious effect of urine leakage can injury the urethral and skin tissues causing UF. Consequently, to avoid the appearance of UF in people with SCI who cannot manage their urinary incontinence with CIC, the resolution of this incontinence would be very necessary, even using a suprapubic catheter when necessary.

The urodynamic risk factors found in this study can be explained because of an injury to the sphincter mechanism. Indeed, most UFs are in the membranous urethra where the distal sphincter mechanism responsible for maximum urethral pressure is found. Its injury explains the high incidence of stress urinary incontinence among these patients. This also explain the lower urethral resistance in patients with UF because the urethral resistance is concentrated in a small segment located in the membranous urethra that acts as a flow controlling zone [3].

Conclusions

- Urinary incontinence and the absence of adequate bladder drainage by CIC in patients with SCI are serious risk factors for UF formation.
- Lower urinary tract dysfunctions associated with this pathology are stress urinary incontinence and low urethral resistance.

References

1. Singh R, Rohilla RK, Sangwan K, Siwach R, Magu NK, Sangwan SS. Bladder management methods and urological complications in spinal cord injury patients. Indian J Orthop. 2011;45(2):141-7
2. Raup VT, Eswara JR, Weese JR, Potretzke AM, Brandes SB. Urinary-cutaneous Fistulae in Patients with Neurogenic Bladder. Urology. 2015 ;86(6):1222-6.
3. Schaefer W. principles and clinical application of advanced urodynamic analysis of voiding function. Urol Clin of North America. 1990;17(3):553-556.