

# Abstract for the Poster Session at INUS 2025



Poster ID: 1-01

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## **Early Diagnosis of Bladder Cancer in People with Neurogenic Lower Urinary Tract Dysfunction**

Gianluca Sampogna, Stefania Musco, Luca Gemma, Antonio Galfano, Aldo Maria Bocciardi, Emanuele Montanari, Giulio Del Popolo, Michele Spinelli

### Introduction

Neurogenic lower urinary tract dysfunction (NLUTD) is a recognized risk factor for bladder cancer (BCa), with a higher incidence of aggressive squamous cell carcinoma (SCC) and elevated mortality. However, there is no established strategy for BCa screening and early diagnosis in NLUTD patients. This study aimed to analyze BCa outcomes in NLUTD patients monitored by two tertiary referral centers and to explore the potential relationship between NLUTD management and cancer staging at diagnosis.

### Methods

After approval by our Ethics Committee, we retrospectively collected all pre-, intra- and post-operative data of our patients having NLUTD for > 5 years and BCa diagnosed from January 2010 to December 2020. Patients were divided into two groups: muscle invasive BCa (MIBC) versus non-MIBC. Statistical tests were applied to compare the groups, with significance at  $p < 0.05$ .

### Results

The study included 25 BCa cases with NLUTD, mostly due to spinal cord injury (60%) and myelomeningocele (16%). The median age at BCa diagnosis was 55 years, with a median interval of 37 years from NLUTD onset. Macrohematuria occurred in 48% cases. Cystoscopy linked to botulinum toxin injections detected BCa in 28% patients, while routine annual ultrasound (US) identified BCa incidentally in 28% cases. Urine cytology was negative, positive, and atypical in 16, 1, and 3 cases, respectively. Radical cystectomy was performed in 20 patients, with 70% experiencing surgical complications. SCC was found in 24% cases. After a median follow-up of 28.5 months, seven patients died due to BCa. Considering MIBC (n=16) versus non-MIBC (n=9) groups, no statistically significant differences were detected in all variables, except for the mode of BCa diagnosis. Specifically, non-MIBC was detected in 63.6% cases undergoing periodical cystoscopies and US compared to 14.3% patients in the cluster not undergoing any regular exam for NB ( $p = 0.011$ ).

### Conclusions

The study suggests that BCa in NLUTD patients typically appears in advanced stages, contributing to poor outcomes. However, regular follow-up, including cystoscopy and ultrasound, may facilitate earlier detection, potentially reducing disease progression. Further studies with larger samples are recommended to validate these results and refine BCa screening protocols for NLUTD patients.

# Abstract for the Poster Session at INUS 2025



Poster ID: 1-02

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## **Factors Predicting Successful Sacral Neuromodulation: The Experience of a Tertiary Referral Center**

Gianluca Sampogna, Davide Cattaneo, Luca Frediani, Ottavio De Cobelli, Emanuele Montanari, Michele Spinelli

### Introduction

Sacral neuromodulation (SNM) is a treatment for several pelvic dysfunctions. Since SNM is expensive, the definitive system is implanted after some evaluative steps. Many studies tried to identify factors predicting SNM success, but none have proposed a specific tool yet. This study aimed to analyze the cases addressed to SNM pathway by a tertiary referral center and identify factors predicting SNM outcomes.

### Methods

After approval by our Institutional Review Board, we performed a retrospective analysis of data of patients undergoing SNM pathway by our centre from Jan 2010 to Dec 2020. We evaluated factors predicting treatment success. A nomogram was constructed considering factors which were independently associated with the outcomes. The nomogram predictive ability was tested using concordance index and compared with several advanced models obtained through machine learning algorithms. Based on this nomogram, an application software was developed to estimate rapidly the predicted success rate.

### Results

The study considered 536 cases addressed to SNM evaluation for different indications: overactive bladder, OAB (25.9%); urinary retention, UR (54.9%); chronic pelvic pain, CPP (19.2%). The mean age was 50.1 years (SD:  $\pm$  15.8; range: 13-90). The females and males were 282 and 254, respectively. Univariate analysis highlighted female gender, younger age, and indication (i.e., better outcomes in OAB compared to UR and CPP) were significantly correlated with the treatment success, later this result was confirmed by multivariate analysis. Considering these variables, we built a nomogram with a valid predictive ability (concordance index = 0.744). The logistic regression model showed comparable accuracy, sensitivity, and specificity to sophisticated statistical models. Based on the nomogram an application software was successfully built.

### Conclusions

This study suggested gender, age and pelvic dysfunction type were factors predicting SNM success. We validated a nomogram which could be used easily in routine clinical practice, also thanks to the application software.

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Poster ID: 1-03

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## **Temporal dynamics of urological management during acute spinal cord injury rehabilitation**

Collene E Anderson, Veronika Birkhäuser, Martina D Liechti, Xavier Jordan, Eugenia Luca, Sandra Möhr, Jürgen Pannek, Thomas M Kessler, Martin WG Brinkhof; for the SwiSCI Study Group

### Introduction

Timing of intervention, medication for storage symptom reduction and upper urinary tract protection as well as establishment of a patient-tailored bladder emptying method, is an important aspect of urological management after acute spinal cord injury (SCI). Timing decisions require balancing potential benefits of early treatment for upper and lower urinary tract function against potential side effects and complications. We aimed to provide a description of the temporal dynamics of key urological interventions during SCI rehabilitation because evidence on this topic is limited.

### Methods

Data from clinical records were collected by a prospective, population-based, multicenter, longitudinal study, the Swiss Spinal Cord Injury (SwiSCI) Inception Cohort. SwiSCI includes adult Swiss residents undergoing inpatient specialized post-acute SCI rehabilitation. Participating centers used a treatment approach based on the EAU Guidelines on Neuro-Urology. Time to the first report of bladder storage medication use (antimuscarinics and beta-3 adrenergic agonists), suprapubic catheter placement, self-intermittent catheter (SIC) use and spontaneous voiding were evaluated using multivariable time-to-event regression analyses, adjusting for demographic and SCI characteristics.

### Results

During rehabilitation, 329/1084 patients (30%) used bladder storage medication, with the median first reported use 97 (Q1-Q3: 76-166) days after SCI. Bladder storage medication start was associated with more severe SCI (American Spinal Cord Injury Association Impairment Scale [AIS] grades A,B, and C [vs. AIS D]) and rehabilitation center. Use of suprapubic catheter, SIC, and spontaneous voiding was reported in 20% (213/1084), 34% (373/1084), and 48% (548/1084) of patients, respectively. The median (Q1-Q3) first reported use was 75 (39-168) days for suprapubic, 90 (72-160) days for SIC, and 42 (25-85) days for spontaneous voiding. Age at SCI, SCI severity and neurological level, and rehabilitation center were associated with all bladder emptying outcomes, while sex was associated with use of a suprapubic catheter and SIC but not spontaneous voiding.

### Conclusions

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These results provide a preliminary description of the temporal dynamics of key urological interventions during SCI rehabilitation in a high-resource setting. Targeted prospective research evaluating center-specific patient management in relation to long-term outcomes is warranted to inform recommendations regarding optimal intervention timing. Clinical trials in acute SCI should account for between-center differences.

# Abstract for the Poster Session at INUS 2025



Poster ID: 1-04

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## **Beyond the threshold: sex differences in maximum storage detrusor pressures in patients with spinal cord injury**

Veronika Birkhäuser, Collene E. Anderson, Marko Kozomara, Martin W. G. Brinkhof, Oliver Gross, Lorenz Leitner, Martina D. Liechti, Ulrich Mehnert, Lara Stächele and Thomas M. Kessler

### Introduction

Spinal cord injury (SCI) frequently results in neurogenic lower urinary tract (NLUTD) dysfunction, which represents a relevant risk for deterioration of renal function. High maximum storage detrusor pressure (pDetmax storage) is an established risk factor for upper urinary tract damage; however, there is no universally accepted threshold for harmful pressure levels. While a pDetmax storage of  $\geq 40$  cmH<sub>2</sub>O is commonly used, it remains unclear whether relevant sex-specific differences exist. Therefore, the objective of this study was to evaluate sex differences in pDetmax storage during the first year after SCI.

### Methods

Within the framework of the population-based longitudinal European Multicenter Study on Spinal Cord Injury (EMSCI), consecutive patients with NLUTD due to acute traumatic or ischemic SCI underwent urodynamic investigations at 1, 3, 6 and 12 months after acute SCI from 01/2014 to 12/2019 at a single university SCI centre. Patients were managed according to the EAU Guidelines on Neuro-Urology. Pearson's chi-squared tests and mixed-effects regression were used to compare females to males.

### Results

Of 97 patients, 34% were female; females were generally older than males (median age: 63 vs. 56 years,  $p=0.04$ ), and had less severe SCI (AIS Grade D: 70 vs. 42%,  $p=0.02$ ). Within the first year after SCI, 9% of the females presented with a pDetmax storage of  $\geq 40$  cmH<sub>2</sub>O, in contrast to 55% of the males ( $p<0.001$ ). In addition, females had lower pDetmax storage than males (grand mean [SD]: 13 [8] vs. 31 [20] cmH<sub>2</sub>O; coeff=18 cmH<sub>2</sub>O; 95% CI: 13-24;  $p<0.001$ ). The cumulative incidence of females and males receiving antimuscarinic therapy and reporting urinary incontinence was similar (female vs. male: 55% vs. 70%,  $p=0.12$ ; 53% vs. 43%,  $p=0.42$ , respectively). Importantly, females presented with lower detrusor overactivity leak point pressure (DOLPP) than males (grand mean [SD]: 15 [4] vs. 35 [20] cmH<sub>2</sub>O; coeff=20 cmH<sub>2</sub>O; 95% CI: 11-29;  $p<0.001$ ).

### Conclusions

Females rarely reached the established threshold of pDetmax storage  $\geq 40$  cmH<sub>2</sub>O during the first year after SCI, and the DOLPP was lower in females compared to males. In contrast, the prevalence of urinary incontinence was similar in females and males. Thus, a more sex-tailored approach to patient management is highly recommended.

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Poster ID: 1-05

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## **Assessment of sensory qualities of neobladders during storage phase and correlation to video-urodynamic parameters in patients after robotic-assisted radical cystectomy: A cohort Study**

Katharina Böhler, Pia Kraft, Gabriel Frölicher, Fabian Obrecht, Christoph Schregel, Beat Foerster, Hubert John, Jure Tornic

### Introduction

Orthotopic neobladders are a well-established option for continent urinary diversion in patients having cystectomy. However, lower urinary tract perception, such as bladder distention may differ post-surgery. Furthermore, neobladder emptying may relate to individual bladder fullness sensation or a fixed schedule. Vesico-ureteral reflux (VUR) may occur due to the ureteric implantation site and pressure conditions of the reservoir.

This study aimed to assess lower urinary tract sensations in patients with neobladders, to apply them during video-urodynamics and to correlate them with the recorded urodynamic parameters and VUR occurrence.

### Methods

This observational cohort study involved 20 patients (18 male, 2 female) who underwent cystectomy with orthotopic neobladder between 2015 and 2022. Bladder voiding habits were documented with bladder diaries and bladder emptying routines including individual sensations of the lower urinary tract were assessed in interviews. Medical records were reviewed for a history of recurrent urinary tract infections (rUTIs).

Video-urodynamic studies were conducted prospectively and standardized as closely as possible to ICS-"Good Urodynamic Practice", using individual sensory qualities in every case.

### Results

Bladder diaries of 19/ 20 patients (95%) were analyzed. Three patients lacked post-operative data due to external treatment. During interviews, 95% initiated bladder emptying based on individual sensation. All reported different bladder sensations post-surgery. Triggers for bladder emptying included (multiple mentions possible): urge 84%, pressure in the lower abdomen 73%, tension 10%, pain 5%, undefinable abdominal discomfort 16%, genital discomfort 16%, and taste changes 5%. Vesico-uretral reflux was found in 75% of patients. In 80% of these patients, a specific sensation was observed during VUR and rUTI were reported in 15%. Only one of the VUR subgroup performed intermittent self-catheterization.

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Conversely, 75% of the subgroup without VUR reported rUTI. In this group 25% (1/4) performed intermittent self-catheterization.

## Conclusions

Patients without vesicoureteral reflux had larger neobladder capacities, higher post-void residuals, and more recurrent UTIs, suggesting a link between urinary tract function and UTI risk. Video-urodynamic studies could assess long-term morbidity. However, current ICS recommendations for lower urinary tract sensation may be inappropriate for neobladder patients, necessitating revised criteria to reflect different sensory triggers.

# Abstract for the Poster Session at INUS 2025



Poster ID: 1-06

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## **Intracellular and intercellular calcium signalling in the intact urothelium**

Ashlee Caldwell, Laura Schillebeeckx, Wouter Everaerts, Thomas Voets

### Introduction

The urinary bladder urothelium functions as both an impermeable barrier and a component of the sensory signaling pathway from the bladder. Changes to the urothelium are thought to impact neuro-urological signalling, contributing to symptoms such as increased voiding frequency, urgency, and pain, which can be severely debilitating for patients suffering from chronic bladder conditions. Despite this, the intra- and intercellular signalling mechanisms of the urothelium as a sensory unit remain largely unknown. Previous studies have been predominantly limited to mediator release assays or imaging of isolated urothelial cell cultures. Here, we utilise *ex vivo* calcium imaging of mouse bladder mucosal tissue to investigate the signalling mechanisms of the intact urothelium.

### Methods

Using 12-18-week-old male and female Sox2-GCaMP3 mice, calcium imaging was performed on flat preparations of intact urinary bladder mucosa, separated from the underlying musculature. Changes to intracellular calcium levels were measured via fluorescence microscopy. Images were obtained using either an upright epifluorescent microscope with a 10x immersion objective or a Nikon spinning disk confocal microscope. Mechanical stimulation was performed via a glass probe using a micromanipulator. Pharmacological stimulation was performed via gravity-fed perfusion of ATP (30  $\mu$ M), Compound 48/80 (20  $\mu$ g/mL), and ionomycin (2  $\mu$ M) in carbogenated bicarbonate buffer.

### Results

Spontaneous calcium oscillations were observed in both umbrella and underlying (intermediate/basal) cells. Umbrella cells exhibited spontaneous, oscillating, slow intracellular calcium waves (10.37  $\mu$ m/sec  $\pm$  0.46 SEM; N=3 mice, n=37 cells). Spontaneous and induced (mechanical and pharmacological) calcium wave frequency and patterns in umbrella cells were characterised. Differential responses between umbrella cells (Compound 48/80 > ATP) and underlying urothelial cells (ATP > Compound 48/80) were observed, allowing both epifluorescent and confocal identification of intercellular signalling patterns between the different cell types within the urothelium.

### Conclusions

Using epifluorescent and confocal *ex vivo* imaging of the intact urothelium, we have characterised both spontaneous and induced intracellular calcium waves in umbrella cells. Further, we have demonstrated distinct signalling activity between umbrella cells and intermediate/basal urothelial cells and utilised this to identify intercellular calcium signalling. Understanding urothelial signalling



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mechanisms and how these are altered during bladder pathologies, such as UTIs, IC/BPS, and OAB, may lead to improved treatment opportunities for patients.

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Poster ID: 1-07

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## **Bilateral pudendal nerve block reduces maximum urethral pressure in SCI patients with DESD**

Christopher J. Chermansky MD, Vickie Polanco-Garcia, Andrew Moyer, William C de Groat PhD, Changfeng Tai PhD

### Introduction

We have previously shown in ASIA-A T9 SCI cats that DESD could be blocked with high frequency, biphasic, bilateral pudendal stimulation. We report on our initial SCI patients with DESD treated with our FDA-approved Nerve Block and Stimulation External Pulse Generator.

### Methods

The study was IRB approved. All patients had ASIA-A SCI between T7 and L5 of at least 1-year duration. Urodynamics commenced until capacity was reached. Crede maneuver was performed, and baseline maximum urethral pressure (Max Pure) was recorded. Fluoroscopy was used to insert bilateral foramen needles toward the ischial spine until pudendal nerve stimulation was confirmed with C-MAP. Bilateral pudendal block during Crede began with 1 kHz at 1mA for 30 seconds. If Max Pure was not reduced to < 50 cm H<sub>2</sub>O, the 1 kHz stimulation was increased to 3.8mA for 30 seconds, for 1 minute, for 2 minutes, and finally for 4 minutes. The primary endpoint was reduction in Max Pure during Crede to < 50 cmH<sub>2</sub>O. All adverse events (AEs) were noted.

### Results

A total of 4 patients (3 men and 1 woman) completed the study. The primary endpoint was achieved in all 4 subjects. Max Pure in Subject #1 (56-year-old male with T9 SCI and DESD but no NDO) was reduced from 65 cm H<sub>2</sub>O to 35 cm H<sub>2</sub>O. Max Pure in Subject #2 (46-year-old female with T8 SCI and DESD with NDO) was reduced from 70 cm H<sub>2</sub>O to 51 cm H<sub>2</sub>O. Max Pure in Subject #3 (55-year-old male with T10 SCI and DESD with NDO) was reduced from 62 cm H<sub>2</sub>O to 23 cm H<sub>2</sub>O. Max Pure in Subject #4 (41-year-old male with T9 SCI and DESD but no NDO) was reduced from 94 cm H<sub>2</sub>O to 47 cm H<sub>2</sub>O. AEs included mild nausea (from Crede) and brief dysuria (no UTI) in 1 patient.

### Conclusions

Max Pure was successfully reduced in 4 SCI patients with DESD using 1 kHz bilateral pudendal nerve block. AEs included mild nausea and dysuria. This study supports the development and testing of an implantable device to treat DESD by bilateral pudendal nerve block.

# Abstract for the Poster Session at INUS 2025



Poster ID: 1-08

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## **Correlations between fatigue, depression, and pathological urodynamic findings in people with multiple sclerosis**

Anke K. Jaekel 1,2, \*, Julius Watzek, Jörn Nielsen, Ruth Kirschner-Hermanns 1,2 and Stephanie C. Knüpfer 1,2

### Introduction

Fatigue and depression are common symptoms of multiple sclerosis (MS) severely impairing quality of life. Factors influencing fatigue are of increasing interest to establish therapeutic synergisms. Correlations between symptoms of neurogenic lower urinary tract dysfunction (NLUTD) and fatigue have been described several times, but correlations between urodynamic (UD) results, fatigue, and depression have not been investigated so far.

### Methods

In 274 people with MS (PwMS), UD findings were correlated with scores on the Fatigue Scale for Motor and Cognitive Systems (FSMC) and the General German Depression Scale (GDS). The effects of abnormal UD and the single urodynamic parameters on the FSMC and GDS scores were examined. Abnormal UD was defined as the presence of one or more of the following parameters: first desire to void (FDV) <100ml, strong desire to void < 250ml (SDV), abnormal sensitivity, detrusor overactivity, detrusor-sphincter dyssynergia, reduced cystometric bladder capacity <250ml (MCBC), compliance <20ml/cmH<sup>2</sup>O (Clow).

### Results

PwMS with abnormal UD showed an increased risk of clinically significant fatigue. PwMS with Clow (t-test mean difference 3.21, 95% CI 0.25; 6.17, p = 0.036) and FDV<100ml (t-test mean difference 2.61, 95% CI 0.1; 5.12, p= 0.041) had significantly higher FSMC mean values than without these parameters. PwMS with MCBC<250ml (relative risk 1.06, 95% CI 1.02; 1.1, p=0.006) or Clow (relative risk 1.06, 95% CI 1.02; 1.1, p=0.004) had an increased risk of clinically relevant fatigue. No difference was found for GDS between abnormal and normal UD or for pathological single UD parameters.

### Conclusions

PwMS with NLUTD have significantly higher FSMC scores and an increased risk of clinically relevant fatigue. Prospective longitudinal data on the relationship between successfully treated NLUTD and the severity of fatigue must be assessed in order to be able to use therapeutic synergisms for an improvement of quality of life in pwMS.

# Abstract for the Poster Session at INUS 2025



Poster ID: 1-09

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## **Diagnoses and Treatment Recommendations—Interrater Reliability of Uroflowmetry in People with Multiple Sclerosis**

Anke K. Jaekel 1,2,\* , Julia Rieger 1, Sandra Möhr, Oliver Schindler, Fabian Queissert, Ruth Kirschner-Hermanns 1,2 and Stephanie C. Knüpfer 1,2

### Introduction

Uroflowmetry (UF) is an established procedure in urology and is recommended before further investigations of neurogenic lower urinary tract dysfunction (NLUTD). Some authors even consider using UF instead of urodynamics (UD). Studies on the interrater reliability of UF regarding treatment recommendations are rare, and there are no relevant data on people with multiple sclerosis (PwMS). The aim of this study was to investigate the interrater reliability (IRR) of UF concerning diagnosis and therapy in PwMS prospectively.

### Methods

UF of 92 PwMS were assessed by 4 raters. The diagnostic criteria were normal findings (NFs), detrusor overactivity (DO), detrusor underactivity (DU), detrusor–sphincter dyssynergia (DSD) and bladder outlet obstruction (BOO). The possible treatment criteria were as follows: no treatment (NO), catheter placement (CAT), alpha-blockers, detrusor-attenuating medication, botulinum toxin (BTX), neuromodulation (NM), and physiotherapy/biofeedback (P/BF). IRR was assessed by kappa ( $\kappa$ ).

### Results

$\kappa$  of diagnoses were NFs = 0.22; DO = 0.17; DU = 0.07; DSD = 0.14; and BOO = 0.18. For therapies, the highest  $\kappa$  was BTX = 0.71, NO = 0.38 and CAT = 0.44.

### Conclusions

There is a high influence of the individual rater. UD should be subject to the same analysis and a comparison should be made between UD and UF. This may have implications for the value of UF in the neuro-urological management of PwMS, although at present UD remains the gold standard for the diagnostics of NLUTD in PwMS.

# Abstract for the Poster Session at INUS 2025



Poster ID: 1-10

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## **Functional MRI in the lumbosacral spinal cord during electrical stimulation of the tibial nerve**

C. W. Kündig, S. Büeler, M. D. Liechti, T. M. Kessler, P. Freund, G. David

### Introduction

Tibial nerve stimulation (TNS) is a non-invasive neuromodulatory treatment option for lower urinary tract symptoms (e.g., urgency, frequency, urgency incontinence). While the mechanism underlying TNS is still under research, functional MRI (fMRI) might provide valuable insights. In contrast to the large number of blood-oxygen-level-dependent (BOLD) fMRI studies in the brain, its application in the spinal cord remains limited due to technical challenges. We have recently demonstrated the feasibility of fMRI in the lumbosacral cord during a lower limb motor task. Here, we aimed to establish the feasibility of lumbosacral fMRI during electrical stimulation, a technique that is more widely applicable in patients.

### Methods

Twenty healthy volunteers underwent one-sided (right) transcutaneous tibial nerve stimulation with a frequency of 3.1 Hz, pulse width of 200  $\mu$ s, and an amplitude above the motor threshold. A single run consisted of blocks of 15 s stimulations alternated with blocks of 15 s rest for a total of 10 min. Four runs were acquired for each volunteer. Imaging was performed on a 3T Siemens Prisma scanner using an echo planar imaging sequence.

### Results

We detected significant BOLD responses during unilateral electrical stimulation of the tibial nerve. In the spinal cord cross-section, BOLD responses were highly lateralized in and around the dorsal gray matter horn on the ipsilateral side, with involvement of the intermediate gray matter horn at caudal locations. These gray matter layers contain mostly sensory and interneurons, which receive projections from proprioceptors, mechanoreceptors, and nociceptors. Along the rostro-caudal axis of the spinal cord, two clusters emerged: one spanning from neurological level L2 to L3, and another spanning from neurological level L3 to L4.

### Conclusions

It is feasible to detect BOLD responses in the lumbosacral spinal cord during electrical stimulation of the tibial nerve. Our ongoing work is focused on assigning BOLD activations to accurate neurological levels, using a novel approach based on identification of spinal nerves rather than relying on a template. These findings suggest that TNS primarily activates the dorsal gray matter horns of the spinal cord, which might play a key role in the neuromodulatory effects of TNS treatment.

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**Poster ID: 2-01**

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## **An Examination of SNM Safety, Effectiveness, and Patient Experience in Treating Overactive Bladder and Urinary Retention**

Gwen Gonzales, Fangxin Lyu, Sara Simeoni, Mahreen Pakzad, Jalesh Panicker, Caroline Salai

### Introduction

This systematic review aimed to assess the safety, effectiveness, and patient experience of SNM in treating OAB and UR, particularly in refractory and chronic idiopathic cases.

### Methods

A comprehensive literature search was conducted across databases, including PubMed, Cochrane Library, and Ovid, focusing on studies that evaluated SNM's safety, effectiveness, and patient-reported outcomes. The analysis of both quantitative and qualitative data were included to provide a holistic view of SNM's impact. Part (1) Review of Safety and efficacy of SNM: 9 eligible studies were included. Part 2: Review of patients' experience of SNM: 23 eligible studies were included.

### Results

The results demonstrated that SNM has a generally favourable safety profile, with most adverse events being minor and manageable, and serious complications were rare. Effectiveness was consistently shown through significant improvements in key symptoms such as voiding frequency, incontinence episodes, and catheterization volume, with benefits sustained over extended follow-up periods. Patients also reported significant enhancements in quality of life, psychological well-being, sexual function, and daily functioning. However, variability in study designs, patient demographics, and the number of included measures among identified studies introduced confounders that warrant further investigation.

### Conclusions

SNM represents a promising intervention that can significantly improve the lives of patients with OAB and UR, but further studies are needed to address existing confounders and ensure the generalizability of these findings. Future research should focus on

(i) standardizing study designs and further exploring SNM's impact on psychological and sexual health to strengthen the evidence base and optimize treatment protocols (ii) in line with developments in Shared Decision Making (SDM) these findings can support the development of a Decision Aid.

# Abstract for the Poster Session at INUS 2025



Poster ID: 2-02

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## **Development of Psychoeducation Tool for Clinicians' use after Diagnosing Chronic Idiopathic Urinary Retention (CIUR) / Fowler's Syndrome: a scoping review**

Collette Haslam, Bhumi Gowda, Sara Simioni, Mahreen Pakzad, Jalesh Panicker, Caroline Selai

### Introduction

Chronic idiopathic urinary retention (CIUR) in young women is poorly understood, and prospective studies suggest that despite extensive urological and neurological investigations, a probable aetiology may be established only in around 40% of women, most commonly a primary disorder of external urethral sphincter relaxation, sometimes referred to as Fowler's Syndrome.

This review aimed (i) to review the published psychoeducation interventions giving information about FS or CIUR; (ii) to develop a psychoeducation intervention for clinicians to use after giving the diagnosis of FS or CIUR.

### Methods

A scoping review was conducted, and the review's findings were reported, in accordance with PRISMA-ScR guidelines. Studies with relevant interventions were searched for in databases. Key characteristics of the interventions were extracted and described.

### Results

31 studies with 29 interventions were found. 14 studies on Urinary Incontinence, studies on OAB, five studies on LUTS, two on stress urinary incontinence, one on overactive bladder and urinary incontinence and one on nocturia were found. The interventions were based on education, management and bladder training, and physical therapy. Elements of psychoeducation were found in all the interventions; these included education, lifestyle modifications, a toilet program, physical therapy, and supportive counselling.

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## Conclusions

In conclusion, this scoping review highlights the diversity and complexity of psychoeducational interventions for Lower Urinary Tract Symptoms but also reveals significant gaps in the literature, particularly for underrepresented populations and rare conditions like Fowler's Syndrome. The findings underscore the need for more rigorous, patient-centred research incorporating diverse populations and standardising intervention components. Future efforts should develop accessible, cost-effective programs integrating patient education and shared decision-making to optimise health outcomes and patient satisfaction.



# Abstract for the Poster Session at INUS 2025



Poster ID: 2-03

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**Clinical and urodynamic benefit of adding antimuscarinics after a loss of efficacy of intradetrusor botulinum toxin in patients with multiple sclerosis. A retrospective study**

Adrien Haegel; Camille Chesnel; Maëlys Teng; Gérard Amarenco; Claire Hentzen

Introduction

Intradetrusor injection of botulinum toxin A (IDBTX-A) is a common treatment for neurogenic bladder in refractory overactive bladder, but long-term cohorts showed an important rate of primary or secondary failure, with 20-30% discontinuation at 5 years and almost 50% at 10 years. To delay surgery options, a combination of IDBTX-A and antimuscarinic drug (AM) is commonly offered, without evidence of the efficacy of this association. The aim was to assess in real-life practice the effectiveness of adding AM when facing a loss of efficacy of IDBTX-A in patients with multiple sclerosis (PwMS) on overactive bladder symptoms and urodynamic parameters.

Methods

All PwMS who had IDBTX-A injections between January 2023 and December 2023 were screened. Patients with a loss of efficacy of IDBTX-A on bladder symptoms and/or detrusor overactivity, and who received AM as an add-on therapy were included. Data collected were urodynamic parameters (bladder capacity, fill volume of first detrusor overactivity (DO), maximal detrusor pressure at DO, area under curve of detrusor pressure (AUUC)), and clinical parameters (persistence of spontaneous voiding, number of self-catheterization, nocturia, persistence of urgency and/or urinary urgency incontinence, number of urinary tract infection (UTI)).

Results

Thirty-four patients were included (mean age  $49 \pm 8.7$ ; 20 (58%) women). The number of patients with DO significantly decreased after the addition of AM (27 (81%) vs 11 (33%) patients;  $p < 0.01$ ). Increasing of bladder capacity from  $311 \pm 124$  ml to  $381 \pm 70$  ml ( $p < 0.01$ ) was the only other significant change in urodynamics after the addition of AM. The number of patients reporting urinary urgency decreased from 23 (68%) to 11 (32%) ( $p < 0.01$ ).

Conclusions

Adding antimuscarinics to intradetrusor botulinum toxin for treating DO in PwMS reduces the rate of patients with DO on urodynamics, and improves bladder capacity and the occurrence of urgency.

# Abstract for the Poster Session at INUS 2025



**Poster ID: 2-04**

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## **Midline Sacral Meningeal Cysts: Correlation with pelvic sensory and visceral symptoms and neurophysiology findings**

Ivan Cabrilo, Claire Hentzen, Prasad Malladi, Sara Simeoni, Gérard Amarenco, Nathalie Zaidman, Mahreen Pakzad, Sachit Shah, Adrian T Casey, Jalesh N Panicker

### Introduction

Midline sacral meningeal cysts (MSMC) are cerebrospinal fluid (CSF)-filled dural diverticula that communicate with the terminal thecal sac (1). Although widely considered to be asymptomatic, cases with voiding difficulties or radicular pain have been anecdotally reported. The aim of this study is firstly, to describe the clinical presentation of patients with symptomatic MSMC; secondly, to assess the impact of the cyst on sacral nerve root function; and thirdly, to assess whether nerve root injury is more frequent in patients with MSMC than in those with Tarlov cysts, the most frequent type of sacral nerve cysts.

### Methods

Consecutive patients with MSMC, presenting with at least one pelvic symptom participated in a cross-sectional review of symptoms using validated questionnaires. Findings of pelvic neurophysiology (pudendal sensory evoked potentials, sacral dermatomal sensory evoked potentials, external anal sphincter electromyography) and urodynamics testing were collected retrospectively. The relationship between neurophysiology, MRI findings and patients' symptoms were assessed using Fisher and ANOVA tests. Neurophysiology findings were compared with those of Tarlov cyst patients.

### Results

Eleven female patients were included (mean age 42.3±12.4y). All patients reported urinary symptoms. Back pain (91%), radicular leg pain (91%), bowel symptoms (45%) and sexual dysfunction (75%) were also frequently reported. Nine patients (82%) had abnormal findings on neurophysiology; three (27%) patients had one abnormal test, and six (55%) had two abnormal tests.

MRI showed compression of a median of 6 (range: 3-8) sacral nerve roots. No association was observed between abnormal dermatomal SEPs and compression of the related sacral nerve roots.

Ten patients underwent a uroflowmetry, four of which had an abnormal curve, and three had a post-void residual > 100ml.

Patients with MSMC were more likely to have at least two abnormal neurophysiology test results compared to Tarlov cyst patients (55% vs 18% respectively, p = 0.018).

### Conclusions

# Abstract for the Poster Session at INUS 2025



Our results indicate that MSMC are indeed associated with injury to the sacral somatic innervation in most patients presenting with symptoms. MSMC are more likely to cause sacral nerve root damage compared to Tarlov cysts.

# Abstract for the Poster Session at INUS 2025



Poster ID: 2-05

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## **Penk Neurons in Barrington's Nucleus Mediate Sex-Specific Control of Lower Urinary Tract Function**

Natalie Klymko, Andrea M. Sartori, Cassandra Seifert, Mark L. Zeidel, Anne M.J. Versteegen

### Introduction

Understanding of the neural mechanisms underlying lower urinary tract (LUT) function remains incomplete. Barrington's nucleus (Bar) in the brainstem has been implicated in initiating voiding and consists of distinct neuron subpopulations. Through single-nucleus RNA sequencing, we identified a novel subpopulation within Bar defined by Proenkephalin (Penk) expression. This study investigates the role of Penk-expressing neurons in LUT control.

### Methods

Stereotaxic injections of Cre-dependent viral tracers, Designer Receptors Exclusively Activated by Designer Drugs (DREADDs), Diphtheria Toxin A (DTA), or ChrimsonR were administered in transgenic mice expressing Cre-recombinase in Penk neurons. Voiding function and voluntarily controlled scent-marking behavior were assessed using non-invasive micturition video thermography. Additionally, bladder pressure and external urethral sphincter (EUS) electromyography recordings were conducted. Appropriate controls were included, and post hoc analysis of the central nervous system was performed to confirm injection sites and verify descending projections.

### Results

Penk-expressing neurons in Bar project to the lumbosacral level of the spinal cord, where bladder motor neurons and interneurons innervating EUS motor neurons reside. Chemogenetic activation of Bar-Penk neurons significantly increased voiding frequency in male mice, while similar activation in females did not yield the same effect. Selective ablation of Penk neurons in males revealed their pivotal role in a specific micturition behavior, scent marking. Furthermore, optogenetic stimulation confirmed that activation of Bar-Penk neurons facilitates EUS relaxation. Retrograde tracing with modified rabies identified forebrain structures providing input to these neurons.

### Conclusions

Penk-expressing neurons in Barrington's nucleus project to the lumbosacral spinal cord, innervating downstream neurons involved in distinct aspects of LUT function. This study uncovers sex-dependent differences in the functional roles of these neurons, particularly in the control of external urethral sphincter (EUS) activity. These findings underscore the complex molecular and neural connectivity profiles associated with LUT regulation and suggest a specialized role for Penk neurons in the circuits for coordinating sex-specific urinary behaviors.

# Abstract for the Poster Session at INUS 2025



Poster ID: 2-06

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## **Decision making of healthcare workers when prescribing urinary catheters: a nationwide survey study**

Coen HH Christiaans, Felice EE van Veen, Bertil FM Blok

### Introduction

The decision which type of urinary catheter should be chosen is made on individual basis. Ideally, this includes taking into account the patient's individual needs and circumstances. However, the current decision-making process regarding assisted bladder drainage is not transparent or standardized. The objective is to identify the decision-making process of healthcare workers in the Netherlands when prescribing or managing urinary catheters to ultimately standardize the decision-making and improve standard of care and patient satisfaction.

### Methods

A cross sectional study was conducted from August to September 2024 at 12 urology departments and 8 rehabilitation centers across the Netherlands. Respondents were urologist, rehabilitation doctors, nurses and physician assistants (PA). The survey was developed by structured consensus meeting and consisted of 12 questions.

### Results

The survey was sent to 300 healthcare workers of whom 102 filled in the survey (response rate 34%). 43 were urologist or urologist in training, 40 were nurse, 9 were PA, 6 were rehabilitation doctor and 4 were others. In 57% of the participants, the majority of their patients had an indwelling catheter (IDC). 83% participants prefer to advise clean intermittent catheterization (CIC) and 17% have no specific preference. 15% was not involved in the decision making, all were nurses or other. 93% and 73% based their decision on the patient characteristics and the indication, respectively. 85% discussed other treatment options besides urinary catheters, of which 79%, 38% discussed medication, deobstruction, and sacral neuromodulation, respectively.

### Conclusions

This survey shows that a majority of Dutch healthcare workers prefer CIC over IDC when prescribing urinary catheters, following the EAU guidelines on Neuro-Urology. However, the majority of outpatient patients have an IDC and are not on CIC, which can be explained by time constraints and less available health care workers. The choice of catheter is mostly based on patient characteristics, according to the EAU guidelines. Decisions are also often based on the indication, which is understandable but should not be a weighty factor because of the scarce indications to primarily choose for an IDC. Not all treatment options are discussed equally, 15% does not discuss other options, which causes bias in the patient's choice for a urinary catheter. Although the EAU guidelines are largely followed, greater emphasis should be placed on standardizing the decision-making processes to enhance equality and user satisfaction.

# Abstract for the Poster Session at INUS 2025



Poster ID: 2-07

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## **The willingness of Dutch healthcare workers and patients to use a reusable catheter for the treatment of urinary retention: a nationwide survey study**

Coen HH Christiaans, Felice EE van Veen, Bertil FM Blok

### Introduction

Urinary retention is a common lower urinary tract disorder. The preferred treatment is clean intermittent catheterization (CIC) 4-6 times daily. Virtually all patients in European countries use single-use catheters and only single-use catheters are reimbursed. The use of a reusable catheter is not approved. Single-use catheters have a major negative impact on the environment and healthcare costs. A reusable catheter could improve sustainability, reduce healthcare costs, and improve patient convenience worldwide. The objective is to determine the opinion of Dutch healthcare workers and patients who perform CIC towards a reusable catheter.

### Methods

A cross sectional study was conducted from August to September 2024 at 12 urology departments and 8 rehabilitation centers across the Netherlands. Additionally, another questionnaire was sent to CIC patients in the MediReva database, a Dutch medical specialty supplier. The surveys were developed by structured consensus meeting and consisted of 3 questions for the healthcare workers and 2 questions for the patients.

### Results

In total, 102 healthcare workers (response rate 34%) and 2335 patients (response rate 33%) responded. 68% of the healthcare workers would recommend the reusable catheter to their patients, only 4% would not. 79% would use the reusable catheter as new golden standard for the treatment of urinary retention. The majority thinks >20% of their patients would use the catheter. In the patient group, 52% would use the reusable catheter, only 24% would not. 53% would use the catheter all the time, where 32% and 15% would use it mostly at home or while away respectively.

### Conclusions

Although reusable catheters are already occasionally utilized in high-income countries like Japan and Australia, nearly all patients in European Community (EC) use single-use catheters. This study demonstrates that if the reusable catheter is reimbursed in the EC, Dutch healthcare workers and patients would be willing to adopt it. Implementing a reusable catheter could result in significant savings, amounting to millions of euros, and a substantial reduction in plastic waste annually in the EC.

# Abstract for the Poster Session at INUS 2025



Poster ID: 2-08

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## **Patient satisfaction and Quality of Life in long-term urinary catheter users in the Netherlands: a nationwide survey study**

Coen HH Christiaans, Felice EE van Veen, Bertil FM Blok

### Introduction

In the recent decades the (long-term) use of urinary catheters in the Netherlands has substantially increased. Because of the aging, the future number of patients on catheterization will only rise. To improve standard of care, it is important to know more about the catheter users in the Netherlands and their perspective on urinary catheters. The objective is to identify the patient satisfaction and the quality of life (QoL) in long-term (>6 months) urinary catheter users in the Netherlands.

### Methods

A cross sectional study was conducted from August to September 2024 at the urology department of the Erasmus MC Rotterdam. Patients who apply clean intermittent catheterization (CIC) or have an indwelling catheter (IDC), or a suprapubic catheter (SPC), were identified through the MediReva database, a Dutch medical specialty supplier. The survey consisted of a validated questionnaire (ICIQ-LTCqol) and the EQ-5D-5L. This study was approved by the Medical Ethical Review Committee.

### Results

The survey was sent to 10109 patients. Patients who completed at least 50% of the questionnaire were included in the study, resulting in a total of 3,320 participants (response rate 33%). 383 had an IDC, 303 had an SPC and 2634 performed CIC. 75.9% was male and the mean age was 72 years. 19.2% had a urinary catheter because of a known neurogenic problem. Catheter function and concern score was significantly better in CIC patients compared to IDC and SPC patients. The lifestyle impact score was also significantly better in CIC patients compared to IDC and SPC patients, and in SPC compared to IDC patients. The EQ-5D-5L health value was significantly better in CIC patients compared to IDC and SPC patients, and in SPC compared to IDC patients.

### Conclusions

This is the largest study to date to compare patient satisfaction and QoL in different long-term urinary catheter users. CIC patients performed significantly better on the different patient satisfaction and QoL scores, multivariate analysis showed that IDC and SPC had the strongest negative association with these scores compared to the other variables. Therefore this study underlines, that if possible, CIC is strongly preferred over IDC and SPC for assisted bladder drainage, which is in accordance to the EAU guidelines on Neuro-Urology

# Abstract for the Poster Session at INUS 2025



Poster ID: 2-09

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## **Decoding Kidney Function: Evaluating Arterial Resistive Index and Cystatin C Serum Values in Individuals with Neurogenic Lower Urinary Tract Dysfunction**

Elisabeth Jehli, Jörg Krebs, Udo Schirp, Martin Walter, Jürgen Pannek, Jens Wöllner

### Introduction

Patients with neurogenic lower urinary tract dysfunction (NLUTD) due to spinal cord injury/disease (SCI/D) should undergo regular renal scintigraphy assessments according to guidelines. However, scintigraphy is time-consuming, costly, exposes patients to radiation, and is not widely available. Consequently, there is a need for alternative diagnostic parameters that are both reliable and less burdensome for patients. Therefore, this study investigated the correlations between renal sonography results, Cystatin C values and renal sequential scintigraphy results for assessing kidney function in individuals with NLUTD.

### Methods

This study included 46 adult individuals ( $\geq 18$  years old, 6 females, 40 males) with NLUTD for at least five years. Participants underwent renal sonography during routine consultations, followed by renal scintigraphy within six weeks. The sonographic parameters analyzed included renal arterial resistive index (RI), parenchymal thickness, and kidney size. These measurements, along with serum Cystatin C levels, were correlated with scintigraphy clearance values using Spearman correlations.

### Results

Significant correlations were found between scintigraphy clearance and mean left renal RI ( $R = -0.41$ ,  $p = 0.0075$ ) as well as Cystatin C values ( $R = -0.45$ ,  $p = 0.0031$ ). However, no significant correlations were observed for mean right arterial RI ( $p = 0.86$ ), parenchymal thickness (left:  $p = 0.51$ ; right:  $p = 0.77$ ) and kidney size (length left:  $p = 0.78$ ; length right:  $p = 0.096$ ; width left:  $p = 0.42$ ; width right:  $p = 0.42$ ; height left:  $p = 0.079$ ; height right:  $p = 0.84$ ).

### Conclusions

The significant correlations between scintigraphy clearance and mean left arterial RI as well as Cystatin C levels suggest that these measures could serve as additional diagnostic parameters for assessing renal function. They may potentially be used for regular screening assessments in individuals with NLUTD to decide whether further scintigraphy evaluation is necessary. Further research with a larger cohort is needed to validate these findings and confirm the utility of this diagnostic approach.



# Abstract for the Poster Session at INUS 2025



Poster ID: 2-10

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## **Current concepts put to the test: the course of lower urinary tract dysfunction after spinal cord injury or disease**

Jörg Krebs, Jens Wöllner, Jürgen Pannek

### Introduction

Detrusor a- or hypo-contraction during the acute phase after spinal cord injury or disease (SCI/D) and in individuals with low- or sub-thoracic levels are current concepts of neurogenic lower urinary tract dysfunction (NLUTD). Thus, urodynamic evaluation of NLUTD following SCI/D is often postponed to the chronic phase, especially in individuals with supra-sacral lesions, which may put the upper urinary tract at risk. We have therefore investigated the course of NLUTD within the first year after SCI/D.

### Methods

Patients undergoing primary rehabilitation for SCI/D in a specialized rehabilitation center from 2015 to 2022 were evaluated. Urodynamic data were collected retrospectively at three time points: first and last examination during primary rehabilitation as well as first examination after primary rehabilitation. The following were considered unfavorable urodynamic findings: detrusor overactivity (DO), maximum storage detrusor pressure (Pdetmax) >40cmH<sub>2</sub>O and bladder compliance <20ml/cmH<sub>2</sub>O. Urodynamic data were analyzed separately for individuals with lesions above T10 and those at T10 or below. The changes over time and the differences between the two lesion categories were evaluated. Furthermore, the number of individuals with DO within the first 42 days after SCI/D was determined.

### Results

The data of 406 men (73.8%) and 144 women (26.2%) with a mean age of 54±19 years were analyzed. During primary rehabilitation, there was a significant ( $p<0.0001$ ) increase in Pdetmax to 15cmH<sub>2</sub>O (6 / 36cmH<sub>2</sub>O) and significant ( $p<0.0001$ ) decreases in bladder capacity and compliance to 475ml (400 / 550ml) and 61ml/cmH<sub>2</sub>O (35 / 112ml/cmH<sub>2</sub>O), respectively. The need for detrusor relaxation increased from 4.9% to 33.3% during primary rehabilitation. There was no significant difference ( $p<0.05$ ) in the use of detrusor relaxation between patients with lesions above T10 and those at T10 or below. Detrusor overactivity was observed in 11 of 24 patients (45.8%, 25.6-67.2%) with an initial urodynamic evaluation within the first 42 days after SCI/D. The prevalence of DO was 19.2% in patients with lesions at T10 or below compared to 52.2% in those above T10 ( $p=0.006$ ).

### Conclusions

The present data support the need for early and regular urodynamic examinations after SCI/D.

# Abstract for the Poster Session at INUS 2025



Poster ID: 3-01

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## **Is there a role of ambulatory urodynamics in Neuro-Urology?**

Oliver Gross, Collene E. Anderson, Veronika Birkhäuser, Martina D. Liechti, Ulrich Mehnert, Raphael Röthlisberger, Lara Stächele, Stéphanie Van der Lely, Thomas M. Kessler, Lorenz Leitner

### Introduction

Video-urodynamic investigation (VUDI) is the gold standard to assess neurogenic lower urinary tract dysfunction (NLUTD), but in some patients the findings are equivocal. We therefore aimed to investigate if an ambulatory urodynamic investigation (aUDI) could provide additional information in such selected patients and thereby support clinical decision making for the neuro-urological management.

### Methods

We investigated 59 neuro-urological patients who underwent an aUDI due to discrepancies between lower urinary tract symptoms (LUTS) and VUDI findings. All these patients had no changes in therapies influencing the lower urinary tract and a stable underlying neurological disorder between VUDI and aUDI. The patients were divided in two groups. Group 1 (n=37): patients reporting urgency symptoms without the presence of detrusor overactivity (DO) in VUDI. Group 2 (n=22): patients with DO and a maximum detrusor storage pressure (pDetmax) jeopardizing the upper urinary tract (>40 cmH<sub>2</sub>O or renal reflux) but without any LUTS. Findings between VUDI and aUDI were compared.

### Results

The median time interval between VUDI and aUDI was 215 (Q1-Q3: 40-356) days.

Using aUDI a DO could be unmasked in 70% (26/37) of patients in group 1 (median age 52, Q1-Q3: 40-61 years; 59% female subjects), with a median pDetmax of 44 (Q1-Q3: 26-85) cmH<sub>2</sub>O.

In 95% (21/22) of patients in group 2 (median age 49, Q1-Q3: 41-57 years; 23% female subjects) a DO was confirmed performing aUDI. The median pDetmax was 52 (Q1-Q3: 38-56) cmH<sub>2</sub>O and 56 (Q1-Q3: 25-92) cmH<sub>2</sub>O (p=0.787), for VUDI and aUDI, respectively.

Overall maximum cytometric bladder capacity was similar between the groups at time of VUDI (575, Q1-Q3: 383-735 mL) vs. (543, Q1-Q3: 443-746) (p=0.796).

### Conclusions

In Neuro-Urology, aUDI has a role if VUDI findings are equivocal and might be relevant for clinical decision-making warranting more well-designed prospective studies.

# Abstract for the Poster Session at INUS 2025



Poster ID: 3-02

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## **Responder profile of spinal cord injury patients undergoing sacral neuromodulation**

Stéphanie van der Lely\*, Carl M. Zipser\*, Collene E. Anderson, Stephanie Knüpfer, Lorenz Leitner, Ulrich Mehnert, Stephanie A. Stalder, Jure Tornic, Jens Wöllner, Thomas M. Kessler, Martina D. Liechti

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### Introduction

Neurogenic lower urinary tract dysfunction (NLUTD) is a major concern after spinal cord injury (SCI) with lifelong consequences and a serious risk of upper urinary tract damage. As there is no cure yet, optimal bladder management, is a key priority and essential for quality of life. In patients with unsatisfactory outcomes, sacral neuromodulation (SNM) can be considered. This well-established therapy for non-NLUTD is still understudied in neurological patients and predicting response remains a challenge. We previously found lower SNM response rates in SCI (24%) compared to general neurological patients (53%). This study aims to identify target SCI populations that could benefit from neuromodulation.

### Methods

Within the setting of a randomised, sham-controlled, double-blind, multicentre clinical trial investigating the efficacy of SNM in NLUTD, patients with SCI underwent baseline assessment and lead (Medtronic Inc., USA) placement into the sacral foramina S3 (rarely S4). During at least three weeks, stimulation was tested (typically starting from a frequency of 15Hz/210µs pulse width) to determine optimal stimulation parameters for urological treatment success. The test phase was considered successful if the key bladder diary outcomes improved by at least 50% compared to baseline (responders). Logistic regression was used to examine predictors of response to SNM treatment among patients with SCI, controlling for age, sex, lesion location, and type of NLUTD.

### Results

From 50 patients with SCI with symptomatic refractory NLUTD, 15 were SNM responders (5 URGENCY, 6 RETENTION, 4 COMBINED) with 6 suprasacral and 9 sacral-infrasacral lesions. Among the non-responders (n=35; 7 URGENCY, 14 RETENTION, 14 COMBINED), 31 had suprasacral lesions (odds ratio, 31.8; 95% confidence interval, 2.7 to 368.5; p=0.006). Regarding sex, 10 females/5 males were a clinical success, while 12/23 were non-responders (odds ratio, 5.2; 95% confidence interval, 0.8 to 32.5; p=0.081). All 3 patients with complete lesions (AIS A) were male non-responders with NLUTD type COMBINED.

### Conclusions

Sex and location of the SCI were found to be associated with clinical success after SNM testing. Sacral and infrasacral lesions or females seem to have better chances than males or patients with

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suprasacral lesions. This knowledge is crucial for an informed decision-making when SNM is considered in SCI patients.

#### Acknowledgement

We thank all the patients who participated in this study. We would also like to thank Dominik Abt, Daniel S. Engeler, Livio Mordasini, and Jürgen Pannek for their assistance in recruiting patients with SCI at the collaborating study centres.

# Abstract for the Poster Session at INUS 2025



Poster ID: 3-03

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## **Role of dermatomal somatosensory evoked potentials (dSEPs) in confirmed cauda equina syndrome cases**

Prasad Malladi, Jalesh Panicker

### Introduction

Cauda equina syndrome (CES) is one of the most frequent referral conditions to the Uro-Neurology department. Bladder, bowel, and sexual functions are the most commonly affected in this condition. Current neurophysiology tests such as the pudendal SEP, bulbocavernosus reflex and the anal sphincter EMG have a very limited value in the evaluation of CES due to multiple roots innervation to the pudendal nerve. S2, S3 and S4 dSEP have a potential role in evaluating the CES due to their ability to assess individual sacral roots.

### Methods

Twenty volunteers were recruited who had a history of loss sensation in at least one area, which includes the back of thighs, buttocks, or genital area, due to known sacral roots injury. MRI scans were performed prior to the study. The level of sacral roots injury was taken from the MRI report or clinical or surgical notes but not from the image itself. All volunteers underwent neurological examinations following the protocol of the International Standards for the Neurological Classification of Spinal Cord Injury. All twenty volunteers underwent neurophysiological examinations, including tibial SEP, pudendal SEP, and S2, S3, and S4 dSEPs.

### Results

Eight volunteers (40%) have urinary retention symptoms, and 11 (55%) suffer from urinary urgency. Thirteen volunteers (65%) suffer from bowel-related symptoms and 10 (50%) suffer from sexual dysfunction.

The study showed that dSEPs are more sensitive in identifying abnormalities than Tibial SEP and Pudendal SEPs in CES condition. dSEP identified abnormalities in 85% of volunteers compared to 40% and 69% in Tibial SEP and the Pudendal SEP, respectively. The S2 dSEP showed 75%/70% sensitivity/specificity with an AUC of 0.760 (p-value:0.005). The S3 dSEP showed 90%/85% sensitivity/specificity with an AUC of 0.910 (p-value:0.000) and the S4 dSEP showed 90%/85% sensitivity/specificity with an AUC of 0.910 (p-value:0.000).

### Conclusions

The S2, S3 and S4 dSEPs are useful neurophysiological diagnostic tools in evaluating CES lesions compared to tibial and pudendal SEPs.

# Abstract for the Poster Session at INUS 2025



Poster ID: 3-04

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## **Normative values of S2, S3 and S4 dermatomal evoked potentials (dSEPs) in healthy controls**

Prasad Malladi, Jalesh Panicker

### Introduction

Tibial and pudendal SEPs and dSEPs from C4 cervical dermatome up to S1 dermatome were well established, and normative values for these tests are available in the literature. To our knowledge, S2, S3, and S4 dSEP normative values are unavailable. Sacral dSEPs were shown as valuable diagnostic tools in the evaluation of sacral root dysfunction. We aim to generate normative values in healthy volunteers and compare these values with tibial and pudendal SEPs in the same subjects.

### Methods

Eleven healthy volunteers and nine non-neurogenic voiding dysfunction patients consented to participate in this study. All volunteers were ruled out of any history or signs or symptoms of sensory or motor disorders. Height, age and BMI parameters were recorded. Tibial SEP, pudendal SEP, S2, S3 and S4 dSEPs were recorded in all twenty subjects. For tibial and pudendal SEPs, all the subjects lay supine, and all dSEPs lay on their left side.

Advanced multilayer hydrogel stimulating electrodes of 5x 5 cm were used to stimulate the S2 dermatome at 2 cm distal to the gluteal fold and the S3 dermatome at 2 cm proximal to the gluteal fold. Two 3.2 cm circular sticker electrodes were attached immediately lateral to the mucocutaneous junction to stimulate the S4 dermatome. Stimulation and recording parameters were similar to the tibial SEPs.

### Results

The linear regression analysis showed that age and height had a combined impact of 18% on the S2 latency but not on the S3 and S4 dSEP latencies. The cutoff value for S2 latency (Mean +2SD) is  $15.9 + (0.049) * (\text{Age}) + (0.117) * (\text{Height}) + 5.9$ . For S3 and S4 the latencies are 42.8 ms and  $42 + (-0.187) * \text{BMI}$ .

A comparative study between dSEPs, pudendal SEPs and the tibial SEP studies showed that the sacral dSEP latencies are always comparable with the female pudendal SEP latency than male pudendal or tibial SEP latencies.

### Conclusions

S2, S3 and S4 dSEP responses were recorded in all healthy volunteers without any difficulty. All sacral dSEP latencies were shorter than tibial or male pudendal SEP latencies.

# Abstract for the Poster Session at INUS 2025



Poster ID: 3-05

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## **Bacteriophage therapy plus fecal microbiota transplantation to treat recurrent urinary tract infection (rUTI): a case series**

Shawna McCallin, Annika Y. Classen, Jens Scheidegger, Sarah Dugas, Oliver Gross, Simone Lieberknecht, Hendrik Koliwer-Brandl, Swenja Lassen, Matthew Dunne, Oksana Chemych, Prossie Lindah Nankya, Sonja Milek, Andre Khales, Thomas M. Kessler, Lorenz Leitner

### Introduction

Recurrent urinary tract infections (rUTIs) are a chronic and debilitating condition characterized by repeated treatment failures with antibiotics. This study explores a novel approach to decolonize intestinal and urinary reservoirs of the causative pathogen, *Escherichia coli*, using a combined phage therapy and fecal microbiota transplantation (FMT) strategy.

### Methods

Three female patients aged 27 to 68 years with a history of recurrent UTIs caused by a stable *E. coli* strain sensitive to lytic phages were included in this study. Each patient underwent oral administration of a two-phage cocktail for 8 days and intravesical (bladder) administration for 6 days, with the aim of reducing bacterial load in both the urinary and gastrointestinal tracts. Two of the three patients also received oral antibiotics in preparation for FMT. Urine samples were taken to monitor bacterial counts and assess the presence of phages. Safety and tolerability were evaluated based on patient reports, and clinical outcomes were assessed during a 9-month follow-up period.

### Results

The phage therapy resulted in varied microbiological outcomes. Two patients showed a significant reduction in urine *E. coli* titers, reaching undetectable or low levels (below 10 CFU/mL) following intravesical phage therapy. However, in one patient, the initial *E. coli* strain was replaced by a new strain resistant to the phages after five days of treatment. Phage detection in both urine and stool was transient, suggesting brief colonization. Despite the absence of microbiological sterilization, two patients reported substantial clinical improvement and remained free from antibiotics throughout the follow-up period. One patient required antibiotic treatment six months after phage therapy. All patients tolerated the phage therapy and FMT without adverse effects.

### Conclusions

Phage therapy initially resulted in a rapid reduction of bacteriuria. Although microbiological sterilization of *E. coli* was not achieved, the combined phage-FMT approach led to marked clinical

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improvement, suggesting potential benefits in reducing symptom burden and antibiotic reliance in rUTI patients.



# Abstract for the Poster Session at INUS 2025



Poster ID: 3-06

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## **Impact of urinary symptoms and sexual dysfunction in patients with neurogenic lower urinary tract dysfunction.**

Laura Coretta Mejía-Rios, Ulises Manguilar, Karla Mayte Ahedo-García, Francisco Hernández-Daniel, Alejandro Rivera-Chairez, Jorge Moreno-Palacios

### Introduction

Sexual dysfunction has been reported in patients with neurogenic lower urinary tract dysfunction (NLUTD).

Objective: Define the impact of the lower urinary tract symptoms and the sexual dysfunction in patients with NLUTD.

### Methods

With the approval of our IRB, a cross-sectional study in patients of our neurourological clinic was performed. All the patients were asked to answer ICIQ-FLUTSsex, ICIQ-MLUTSsex, ICIQ-LUTSQoL and NBSS. A correlation in order to evaluate between sexual and urinary symptoms by sex. A spearman analysis with a  $p < 0.05$  was performed.

### Results

A total of 81 patients (57% women) were included been Parkinson's disease, multiple esclerosis were the most reported diseases. The median of NBSS by sex was 31 (1-66) vs 25 (4-59) and ICIQ-LUTSQoL 53 (19-83) vs 53 (21-76) for women and men respectively. Diabetes mellitus, smoking and obesity were reported in 17.3, 29.6, 12.3%.

ICIQ-MaleLUTS sex reported a median of 5 (0-10) points, being reduced rigidity and anejaculation 37.1 and 34% the most reported problems. ICIQ-FemaleLUTS sex reported 6.5 (0-13) points, being dyspaurenia and leakage during intercourse 21.7% and 19.5% the most reported problems.

A positive correlation between NBSS and ICIQ-MLUTSsex of 0.61 ( $p < 0.000$ ). ICIQ-LUTSQoL and ICIQ-MLUTSsex of 0.64 ( $p < 0.000$ ). NBSS and ICIQ-FLUTSsex of 0.72 ( $p < 0.000$ ). ICIQ-LUTSQoL and ICIQ-FLUTSsex of 0.65  $p < 0.000$ ; was found.

### Conclusions

There is a correlation between urinary reported symptoms by the neurogenic bladder symptoms score and sexual outcomes.

# Abstract for the Poster Session at INUS 2025



**Poster ID: 3-07**

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## **Surgical and Functional Outcomes Following Peno-Scrotal Flap Vaginoplasty in Transgender Women**

Mirko Preto, Ilaria Ferro, Marco Falcone, Lorenzo Cirigliano, Federica Peretti, Natalia Plamadeala, Martina Scavone, Emanuele Zupo, Paolo Gontero

### Introduction

The aim of this study is to evaluate the surgical and functional outcomes of peno-scrotal vaginoplasty in a cohort of patients undergoing genital gender-affirming surgery.

### Methods

A consecutive series of transgender women (assigned male at birth) who underwent peno-scrotal vaginoplasty at a single center were included in this study. Data were collected from a prospective database comprising 41 patients who underwent surgery between April 2018 and April 2024. Functional outcomes were assessed using a validated questionnaire specifically for transgender women (Operated Male to Female sexual function index), as well as two additional validated questionnaires commonly used for cisgender women (Female Sexual Function Index and Female Genital Self Image Scale). Of the 41 patients, functional data were available for 27 patients, as those with incomplete follow-up data were excluded.

### Results

The median age of the cohort was 30 years (range: 26-35), with a median BMI of 22 kg/m<sup>2</sup> (range: 20-25). Fourteen patients (35.9%) were smokers. The median follow-up duration was 18 months (range: 10-26 months).

In terms of surgical outcomes, the median operative time was 305 minutes (range: 280-340), and the median neovaginal depth achieved was 14 cm (range: 12-14 cm). Four patients (4.8%) required additional local skin grafts to improve neovaginal length. The median hospital stay was 8 days (range: 7-9 days). There was one intraoperative complication (2.4%), a urethral injury, which was successfully repaired and required prolonged catheterization for 2 weeks.

Postoperative complications included anemia, with 12 patients (29%) requiring blood transfusions. One patient (2.4%) developed rectovaginal fistula, which necessitated temporary colostomy to allow for proper healing. Late complications included five cases (12.2%) of partial neovaginal

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stenosis, possibly related to improper neovaginal dilation.

Functional outcomes indicated high levels of satisfaction, with progressive improvement over time.

Normal oMtFSFI scores were observed in 31.3% of patients at 3 months, 50% at 6 months, 54.4% at 12 months, and 66.7% at more than 12 months post-surgery.

Multivariate analysis identified BMI as a significant predictor of lower satisfaction (defined as achieving a normal oMtFSFI score at 12 months), while age, smoking status, and postoperative complications were not significantly associated with functional outcomes or satisfaction levels.

### Conclusions

Peno-scrotal flap vaginoplasty is a viable and effective technique for genital gender-affirming surgery in transgender women (AMAB). The procedure is associated with a low incidence of major complications and results in high levels of patient satisfaction, with favorable aesthetic and functional outcomes.

# Abstract for the Poster Session at INUS 2025



Poster ID: 3-08

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## **Urological Outcomes of 5-Year-Old Patients Following Open Prenatal Spina Bifida Aperta Repair**

Antonin Prouza, Luca Mazzone, Beth Padden, Ueli Möhrlen, Maya Horst

### Introduction

Open prenatal spina bifida aperta repair (OPSBAR) has shown a lower incidence of neurogenic lower urinary tract dysfunction (NLUTD) in infants and toddlers. We aimed to determine if this positive effect persists at five years of age, when most healthy children have achieved bladder control. Additionally, we aimed to assess whether outcomes have changed since the introduction of OPSBAR in 2010 and following optimization of the fetal surgical procedure.

### Methods

All OPSBAR patients from our institution are prospectively followed in a standardised way. We reviewed the urological outcomes including bladder diary, urodynamic and ultrasound findings, need for clean intermittent catheterisation (CIC) and anticholinergics. Patients aged five years or older were included in the study. Subgroup analysis of patients operated on before versus after 2018.

### Results

Ninety-one patients were included in the study. Twenty-two percent (20/91) of patients showed a normal bladder function (NBF). NBF was defined as age-appropriate voiding patterns in a bladder diary, age-appropriate bladder capacity, absence of detrusor overactivity, leakage or pressure increase during filling, normal detrusor contractility, absence of detrusor-sphincter-dyssynergia, and voiding without significant residual urine on urodynamic testing including uroflowmetry. All patients with NBF exhibited spontaneous micturition, with 60% (12/20) being fully continent, 30% (6/20) requiring diapers at night, and 10% (2/20) not yet fully toilet trained and using diapers during the day. Seventy-eight percent (71/91) showed NLUTD. CIC was regularly performed by 70% of patients (64/91), and 45% (41/91) required anticholinergic therapy, all of whom also performed CIC. Ultrasound of the upper urinary tract showed no abnormalities in patients with NBF. However, 14% (10/71) of patients with NLUTD presented with upper tract abnormalities, including hydro(uretero)nephrosis, renal parenchymal thinning, hyperechogenicity, dysplastic features, or a combination thereof. A subgroup analysis compared 54 patients operated before 2018 with 37 patients after. A higher percentage of normal bladder function was observed in patients born after 2018 (35% vs. 12%,  $p < 0.05$ ).

### Conclusions

In our cohort, 22% of OPSBAR patients exhibit normal bladder function by the age of five, rising to 35% for those operated on after 2018. Compared to the incidence of NLUTD after postnatal repair, this represents a clear improvement in urological outcome. Further analysis is needed to understand the factors contributing to this improvement over time.

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Poster ID: 3-09

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## **Refractory neurogenic bladder in Children and adolescents**

Cristian Roberto Sager, MD, Yesica Gomez, MD, Carol Burek, MD, Javier Ruiz, MD, Felicita Lopez Imizcoz, MD, Juan Corbetta, MD, Luciana Diaz Zabala, MD, Otilia Blain, MD, Nicolas Rosier, MD, Danel Alberti, MD, Leandro Asen, MD, Santiago Weller, MD

### Introduction

Around 80% of children with bladder dysfunction respond to the first proactive approach with anticholinergics and clean intermittent catheterization (CIC). A number of them will need other second-line treatments and finally some are refractory to all pharmacological therapies, leading to enlargement cystoplasty. The objective of the study is to present this pre-reconstruction subgroup of the lower urinary tract, characteristics and consequences.

### Methods

Retrospective analytical study of children with neurogenic bladder was performed at a tertiary pediatric center from 2003 to 2017. We will define "Refractory phenotype" as the set of neurogenic bladder characteristics that is divided into a subgroup of individuals with insufficient clinical and urodynamic response to high-dose pharmacological therapy. Variables were considered: bladder emptying diary, video urodynamics, renovesical ultrasound, and renal function laboratory. Student's t test was applied for the comparison of means (after Shapiro-Wilks Normality test) and chi2 test in the correlation of categorical variables. The STATA 18 statistical package was used.

### Results

128 children were studied and 54% were boys and the average age was 11 years (4-18). The average follow-up time was 52 months. The most frequent etiologies were: myelomeningocele, anorectal malformation and lipomeningocele (63%, 15% and 6%, respectively). All of them were refractory to medical treatment: oral oxybutynin and/or mirabegron and/or botulinum toxin. 30% were dry, 56% had urinary incontinence and 13% had continent catheterizable channels through ostomies. 44% presented recurrent UTIs, 45% presented ureterohydronephrosis and 31% presented VUR. Bladder capacity was reduced on average by up to 81%. Mean Pdetmax was 47 cmH2O (SD:14) and 71% had DLPP>40. Only 14% persisted with overactivity. Cases with DLPP >40 were associated with greater incontinence (p=0.001) and recurrent UTIs (p= 0.0001). Cases with VUR and recurrent UTIs were associated with kidney disease (n:24) (p=0.043 and p=0.011 respectively). There was no association between Pdetmax/DLPP and hydronephrosis, VUR and impaired renal function.

### Conclusions

Preadolescent patients refractory to bladder pharmacological therapy show the phenotype characterized by urine incontinence, symptomatic/recurrent urinary infections and

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ureterohydronephrosis in almost half of the cases. Almost all of them presented reduced bladder capacity and hypertonia associated with urine leaks.

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Poster ID: 3-10

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## **Cystoplasty and complications in children under 18 years of age.**

Cristian Roberto Sager, MD, Yesica Gomez, MD, Carol Burek, MD, Eliana Poncini, Nurse, Santiago Weller, MD, Luciana Diaz Zabala, MD, Otilia Blain, MD, Danel Alberti, MD, Leandro Asen, MD, Javier Ruiz, MD, Felicita Lopez Imizcoz, MD,

### Introduction

Enlargement cystoplasty is the treatment chosen for patients with neurogenic bladder resistant to medical treatment. The primary objective is to evaluate the incidence of complications in patients with cystoplasty and identify risk factors.

### Methods

A retrospective cohort study that included patients with drug-resistant bladder dysfunctions underwent cystoplasty between 2003 to 2017. Variables included video urodynamics, renovesical ultrasound and renal function laboratory. Irregular bladder washings were defined: not daily, without increasing volumes. CIC was performed in all patients. Student's t test was applied for the comparison of means and chi2 test for the correlation of categorical variables. In addition, survival analysis was used.

### Results

128 children were studied, (54%) were boys and the average age was 11 years (r: 4-18). The average follow-up time was 52 months. The most frequent etiologies were: spinal dysraphisms and anorectal malformation (69% and 15%, respectively). Sigmoid colon was the most used in reconstruction (78%), followed by ileum (22%). The most frequent mediate complications were: urinary fistula (5.5% associated with ileum) and acute occlusive abdomen (4%) within the 1st month, UTI in the 1st year (23%) and lithiasis in the 5th year (20%). The average onset of bladder stones was 51 months (8 to 144). 3 patients presented recurrence at an average of 78 months. Bladder lithiasis was associated with symptomatic UTI during the 1st year ( $p=0.0190$ ), with irregular bladder washings in the third year ( $p=0.0017$ ), as well as in the 5th year ( $p=0.0242$ ). In the univariate analysis, lithiasis was related to children in wheelchairs and constipation. In the cumulative incidence analysis, the marginal probability of stones at 10, 30, 50 and 70 months was 2%, 8%, 12% and 20% respectively. Endoscopic treatment of stones was used in 54% and cystolithotomy in 46%. There were no significant differences in the majority of complications between the intestinal segments used.

### Conclusions

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Enlargement cystoplasty with intestine continues to take place in the face of pharmacological refractoriness to protect the upper urinary tract, although complications such as UTI and bladder stones developed, especially in those with irregular bladder washings, which require stricter follow-up with adequate adherence.



# Abstract for the Poster Session at INUS 2025



Poster ID: 4-02

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## **Comparison between urethral sphincterotomy and intra-sphincteric botulinum toxin-a in the treatment of sphincteric dyssynergia in spinal cord injured patients**

Enrico Ammirati, Paolo Geretto, Alberto Manassero, Alessandro Giammò

### Introduction

Low evidence is available on the efficacy of sphincterotomy and intra-sphincteric botulinum toxin injection in the treatment of detrusor-sphincteric dyssynergia (DSD) in spinal cord injured (SCI) patients. The aim of the present study is to compare the outcomes of sphincterotomy and sphincteric onabotulinum-toxin-A (BoNT-A) injection in the treatment of DSD in SCI patients.

### Methods

It is a retrospective observational study conducted on consecutive patients affected by neurogenic bladder after SCI subjected to sphincterotomy or intra-sphincteric BoNT-A injection for the treatment of DSD between 2001 and 2024 in a tertiary referral Centre. Included patients underwent previous and subsequent radio-urodynamic studies, demonstrating DSD associated to voiding dysfunction. Residual vesical volume after reflex micturition and maximum detrusor pressure were assessed before and after the surgical procedure. Patients were considered suitable for exclusive reflexed bladder emptying whenever residual volume was <100ml (clinical success). Chi-squared tests and Mann-Whitney's U tests were used for subgroup analysis.

### Results

21 patients subjected to intra-sphincteric BoNT-A injection and 16 subjected to endoscopic sphincterotomy were included. Median age at surgery was 52 (IQR 43-63). Median follow up was 160 months in the sphincterotomy group and 42 months in the BoNT-A group,  $p=0.002$ . No statistically-significant differences were found between groups in baseline characteristics. Clinical success was achieved in 17 patients subjected to BoNT-A (80.9%) and 15 subjected to sphincterotomy (93.7%),  $p=0.28$ . Any significant difference was found between median decrease of residual bladder volume after voiding (100 ml vs 98 ml respectively,  $p=0.85$ ) and of median decrease in voiding detrusor pressure (14 cmH<sub>2</sub>O vs 21 cmH<sub>2</sub>O respectively,  $p=0.58$ ). 2 early complications were observed in the BoNT-A group (urinary tract infection) and in 2 in the sphincterotomy group (persistent hematuria). Median duration of clinical effectiveness was 11 months in the BoNT-A injection group and 78 months in the sphincterotomy group ( $p<0.001$ ).

### Conclusions

Any statistically significant difference between the main outcomes between the two techniques was found. Complication rate was low in both groups, despite sphincterotomy is a more invasive procedure and requires more operative time and postoperative bladder irrigation. The duration of efficacy of the BoNT-A procedure is lower than sphincterotomy and patients usually requires

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periodic reintervention. According to our study, the duration of BoNT-A injection is higher than usually reported.

Both sphincterotomy and intra-sphincteric botulinum toxin injection are reliable techniques to address DSD in SCI patients. Given the limited duration of intra-sphincteric botulinum toxin injection, it could be proposed as a test of efficacy before sphincterotomy.

# Abstract for the Poster Session at INUS 2025



Poster ID: 4-01

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## **Minimal Clinically Important Difference for Percutaneous Nerve Evaluation in Overactive Bladder: a preliminary analysis of a prospective cohort study**

D. Frings, J. de Klerk, B.F.M. Blok

### Introduction

Patient reported outcome measures (PROMs) are valuable tools that express clinically meaningful outcomes. However, the clinical value of relevant PROMs is limited because specific stratification for treatment choice is unknown. To fill this knowledge gap and ensure clinical implementation, Minimal Clinically Important Difference (MCID) has been developed. MCID aims to evaluate the smallest difference in score that is perceived as important or meaningful by patients. In this study, we evaluate the MCID for patients receiving percutaneous nerve evaluation (PNE) for idiopathic OAB for three PROMs: the UDI-6, the OAB-Q SF and the IIQ-7.

### Methods

For this preliminary analysis, the anchor method will be used to calculate the MCID. PROMs were taken both before and during the PNE period. The PGI-I is used as anchor in the calculation of the MCID, where a value of 1 or higher indicates subjective success. Both relative and absolute differences in PROM scores are tested for MCID calculation and chosen based on the area under the curve (AUC) on their receiver operator curve (ROC). Then, the MCID is determined as the value at Youden's index (sensitivity + specificity -1).

### Results

For this preliminary analysis, we included data on 30 patients. Of these patients, 17 had a positive PNE test, meaning they were scheduled for a definitive implantation. All of these patients also had PGI-I scores of 1 or higher. All 13 patients who had a negative PNE test also scored PGI-I scores of 0 or lower.

For UDI-6, the AUC for absolute differences in PROM scores and relative differences was very similar (0.669 vs 0.683 respectively). The Youden's index was the highest for absolute differences in PROM scores ( $J = 0.367$  vs  $0.283$ ), hence absolute differences in PROM scores were chosen to be used. At Youden's index, the MCID for UDI-6 was 16.667, meaning that a difference in UDI-6 scores of 16.667 is deemed as clinically important.

For IIQ-7, the AUC for absolute differences in PROM scores was higher than that for relative differences in PROM scores (0.512 vs 0.494 respectively). The Youden's index for absolute differences in PROM scores was 0.23, which corresponds with an MCID for IIQ-7 being 16.667.

For OABQ-SF, we determined an MCID for the symptom score and QOL score separately. For the symptom score, the AUC for absolute differences in PROM scores and relative differences was very similar (0.578 vs 0.592). The Youden's index was also identical for both relative PROM score differences and relative PROM score differences ( $J = 0.333$ ). MCID was thus calculated for both absolute PROM score differences (30) and relative PROM score differences (49.12%).

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For the QOL score, the AUC for absolute differences in PROM scores was higher than that for relative differences (0.708 vs 0.669). The Youden's index for absolute differences in PROM scores was 0.517, which corresponds with an MCID for OABQ-SF QOL scores of 7.69.

## Conclusions

In this preliminary analysis, we present our results on MCID determination for several clinically relevant PROMs. We hope our results in the final analysis will improve treatment stratification for OAB.

# Abstract for the Poster Session at INUS 2025



Poster ID: 4-03

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## **Urodynamic VS video-urodynamic evaluation in neurogenic bladder: which is the best diagnostic tool?**

Enrico Ammirati, Paolo Geretto, Alberto Manassero, Alessandro Giammò

### Introduction

Videourodynamics is a diagnostic technique that may be essential for the diagnosis of complex urinary pathologies. However, it is not widely available, because of its costs, Rx-ray exposure and the need of specialized urology staff training.

The aim of this study is to compare simple urodynamic examination and videourodynamics in neurological patients, to understand in which cases it contributes to a different diagnosis and a better therapeutic choice.

### Methods

We include a consecutive cohort of patients with a neurological pathology undergoing video-urodynamic evaluation. Neurogenic diseases included spinal cord lesions, cerebral trauma, postnatal encephalitis, Guillain Barré syndrome, multiple sclerosis, medullar ischemia post-aortic dissection, post-infective causes, spina bifida. During the examination two different well-trained urologists separately analyzed the simple urodynamic tracks (blind from x-ray evaluation) and the complete video-urodynamic tracks (with x-ray evaluation). The variables analyzed in the data collection were basic pathology, drugs for urinary incontinence, bladder sensibility, bladder compliance, detrusor overactivity, urinary leaks during the examination, urodynamic stress incontinence, obstruction, detrusor underactivity or acontractility, ureteral bladder reflux, cervical/sphincter dyssynergia.

The results obtained from the comparison between simple urodynamics and videourodynamics were analyzed to understand if there is a diagnostic difference between the two tests and therefore whether the videourodynamics provides effective information that can affect the therapeutic choices.

### Results

We included 51 patients, 14 patients (27.5%) females and 37 (72.5%) males, aged between 18 and 78 years. We found no difference between the diagnosis obtained from videourodynamics and simple urodynamics in 40 cases (78.4%). 21.6% of patients (11 patients), however, received a different diagnosis: 3 (5.9%) were diagnosed with ureteral bladder reflux and 8 cases (15.7%) of cervical/sphincter dyssynergia. In these 11 cases the video-urodynamic evaluation modified the interpretations of the urological symptoms and the subsequent treatment and follow-up.

### Conclusions

According to our results, 21.6% of the video-urodynamic examinations actually affected the therapeutic choices. In the remaining 78.4% of cases, it did not lead to different diagnoses, but allowed to exclude anatomical alterations that could represent a danger for the upper urinary

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tract function. Compared to simple urodynamic, videourodynamics can lead to a different diagnosis and therapeutic choice in more than 20% of the cases in neurogenic patients.

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Poster ID: 4-04

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## **A novel catheter associated urinary tract infection (CAUTI) mouse model to study bladder dysfunction and pain.**

Schillebeeckx Laura, Ashlee Caldwell, Persoons Eleonora, Wouter Everaerts, Thomas Voets.

### Introduction

Bladder pain and hypersensitivity underlie several bladder related conditions. Urinary tract infections (UTIs) and catheter associated UTIs (CAUTIs) are a common cause of bladder pain. Moreover, remaining (chronic) pain after bacterial clearance has been described in multiple cases. These conditions impact patients' quality of life. Nevertheless the underlying mechanisms of hypersensitivity remain poorly understood and current treatments are suboptimal. To combat this, it is essential to develop adequate animal models. Current models are numerous but all have limitations. To this end, we developed a novel mouse model using an implanted catheter infected with bioluminescent E. Coli bacteria (UTI89-lux) and characterized it on a behavioral and molecular level to study bladder pain, inflammation and fibrosis.

### Methods

Female C57Bl6/J mice were catheterized by surgical implantation of a PE50 tube in the bladder dome, via which UTI89-Lux were administered. Bioluminescence imaging (BLI), which measures total photon flux (tpf) emitted by metabolically active UTI89-lux, was performed on a daily basis and used for longitudinal follow-up of bladder infection. Behavioral tests, performed over 14 days post-surgery, include void spot assays, suprapubic von Frey, nesting behavior, open field test (OFT) and dynamic weight bearing. Bladder weight was calculated and bladder tissue was used for hematoxylin and eosin (H&E) and Masson trichome stains. Bladder capacity and voiding efficiency was measured using fluoroscopic volumetry, a non-invasive technique to for bladder imaging. Four groups were assessed (n=9/group): (1) our new catheter model (CAUTI), (2) transurethral UTI, (3) catheter with Enrofloxacin treatment, and (4) sham operated mice. To detect changes in Transient Receptor Potential (TRP) channel activity during bladder inflammation induced by CAUTI, we performed calcium imaging on retrogradely labelled DRG neurons isolated from sham and CAUTI mice. Scanning electron microscopy (SEM) was performed on bladders and catheters.

### Results

H&E stains showed fibrosis and inflammation in the lamina propria, subserosa and detrusor. Bladder/body weight was higher in catheter vs. UTI and sham mice ( $p < 0.0001$ ). BLI showed a high tpf until day 14 in the catheter model, whereas tpf decreased after 5 days in UTI mice. Von Frey tests showed a higher suprapubic sensitivity in the catheter group. Catheter mice had a higher number of total spots and smaller mean area per spot. Open field tests and nesting behaviour was not significantly different between treated groups. Mice with a CAUTI had a smaller bladder capacity and lower voiding efficiency. SEM showed the presence of a bacterial biofilm on the inner surface of infected catheters.

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## Conclusions

We developed and characterized a model in C57BL/6 mice directly linked to an infectious pathology—specifically, CAUTI—in which clinically relevant symptoms such as bladder pain and inflammation were successfully recapitulated. Furthermore, changes in bladder function were observed. This model can be of use to study bladder infections, associated bladder dysfunction and pain signaling instrumental in the development of therapies of bladder pain. Additionally, it can be exploited as an effective and translational in vivo model in the search for new biofilm disrupting treatments.



# Abstract for the Poster Session at INUS 2025



Poster ID: 4-05

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## **Ice water test unmasks detrusor overactivity in apparently normal conventional cystometry**

Lara Stächele, Helen Sadri, Collene E. Anderson, Veronika Birkhäuser, Oliver Gross, Lorenz Leitner, Martina D. Liechti, Ulrich Mehnert and Thomas M. Kessler

### Introduction

Although urodynamic investigation (UDI) is the gold standard for assessing refractory lower urinary tract dysfunction (LUTD), detrusor overactivity (DO) is not revealed in up to 42% of patients complaining about storage symptoms suggestive for DO. We therefore investigated if an additional ice water test could unmask DO in patients with storage symptoms that could not be detected with conventional cystometry even if same session repeat measurements were applied.

### Methods

A consecutive series of 471 patients with storage symptoms and conventional same session repeat cystometry was prospectively investigated. At the end of conventional UDI according to Good Urodynamic Practices recommended by the International Continence Society, patients underwent an additional cystometry using a 4 °C saline solution at a filling speed of 100 mL per minute. The primary outcome measure was DO during the ice water test.

### Results

Of the 471 patients, 248 (53%) were females, and the median age was 56 years (quartile1-quartile3 [Q1-Q3]: 43-68). 371 (80%) had neurogenic (193/248 [78%] women, 178/223 [80%] men) and 100 (20%) non-neurogenic LUTD. Overall, DO was detected during the ice water test in 51% (238/471) of patients who did not have DO with conventional same session repeat filling cystometry. This phenomenon was significantly more prevalent in patients with neurogenic (54%, 199/371) than non-neurogenic (34%, 34/100) LUTD ( $p<0.001$ ). In addition, there were significant gender differences 106/248 (43%) of females and 127/223 (57%) of males had detrusor overactivity only in the ice water test, ( $p=0.002$ ). At the time of UDI 115/471 (24%) of the patients were on antimuscarinic treatment. 77/115 (67%) of patients on antimuscarinic treatment had DO during the ice water test, while 156/356 (44%) of patients not on antimuscarinic treatment had DO during the ice water test ( $p<0.001$ ).

### Conclusions

In both neurological and non-neurological patients with storage symptoms suggestive for DO but lack of proof of DO in conventional cystometry, we highly recommend an additional ice water test, as it unmasks DO in more than 50% of the investigated patients which may help to guide further treatment decisions.

# Abstract for the Poster Session at INUS 2025



Poster ID: 4-06

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**International standards to document remaining autonomic function after spinal cord injury (ISAFSCI) second edition: Reliability of the German version in relation to bladder, bowel, and sexual function in patients with SCI during the sub-acute phase**

Matthias Walter 1, Elena Henes 2, Carole Niederberger 2, Andrei V. Krassioukov 3, Michael Baumberger 2, Jörg Krebs 2, Jürgen Pannek 2,4, Anke Scheel-Sailer 2

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Introduction

Previously, we have shown the feasibility of applying the German version of the "International Standards to document remaining Autonomic Function after Spinal Cord Injury" (ISAFSCI 2021) second edition [1] for the sub-acute phase following spinal cord injury (SCI). Now, we present our results concerning the reliability of assessing bladder, bowel, and sexual function.

Methods

The assessment was conducted according to the ISAFSCI 2021 recommendations in a sub-acute setting. Between August 2021 and December 2023, participants who were more than three months post-SCI and aged 18 years or older were included. Three assessments were randomly performed within 10-14 days (twice by the same examiner and once by a different examiner). The order of the assessments was adjusted to save time (questions were asked first as a resting phase before the clinical examination), and a simplified neurological examination of key dermatomes was conducted (Th11-L2 and S3-S5, including assessment of the anal and bulbocavernosus reflexes). Agreement (reliability) was calculated using Cohen's Kappa. The agreement categories are <0.20 = poor; 0.21-0.40 = fair; 0.41-0.60 = moderate; 0.61-0.80 = good; 0.81-1.00 = almost perfect. [2]

Results

Thirty participants (5 female [17%], median age 49 years [Q1 32 – Q3 62, range 18 – 81]) were included, and all three assessments were completed. Twenty participants had motor-complete SCI [American Spinal Injury Association Impairment Scale (AIS) A=16, AIS B=4], and 10 had motor and sensory-incomplete SCI (AIS C=5, AIS D=5). Fifteen participants (50%) had tetraplegia, and 15 had paraplegia. The agreement (Kappa values) ranged from moderate to good within one examiner [bladder function (0.67-0.69), bowel function (0.56-0.63), and sexual function (0.49-0.69)], and from fair to good between two examiners [bladder function (0.34-0.59), bowel function (0.43-0.68), and sexual function (0.49-0.70)].

Conclusions

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Regarding the reliability of assessing bladder, bowel, and sexual function in patients during the sub-acute phase after SCI, the results within one examiner were comparable to those between two examiners. A limiting factor for reliability is that many questions could not yet be answered or revealed sudden changes due to the short time since the onset of SCI.

#### References:

1. Wecht et al. International Standards to document Autonomic Function following SCI (ISAFSCI): Second Edition. *Top Spinal Cord Inj Rehabil* (2021) 27 (2): 23–49.
2. Ashby, D. Inter-rater agreement, in: *Practical Statistics for Medical Research*. D.G. Altman. Chapman and Hall: London, (1991), pps. 404–405.

# Abstract for the Poster Session at INUS 2025



Poster ID: 4-07

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## **Neurogenic bladder symptom score (NBSS) before and after rehabilitation therapy with or without transcranial direct current stimulation (tDCS) in a randomized controlled clinical trial cohort**

Glenn T. Werneburg, Kyle O’Laughlin, Jia Liu, Ela Plow

### Introduction

Transcranial Direct Current Stimulation (tDCS) is noninvasive brain stimulation using 2 mA current delivered transcutaneously. It has demonstrated motor efficacy in Parkinson’s disease and stroke. We sought to analyze spinal cord-injured patients within a larger clinical trial using the neurogenic bladder symptom score (NBSS, a validated patient reported outcome measure) before and after intervention with physical therapy with or without tDCS. We were interested in better understanding the effect of the intervention with neurogenic bladder symptoms in those with spinal cord injury, and change in NBSS over time.

### Methods

A randomized controlled clinical trial was undertaken in patients with cervical spinal cord injury at least six months prior. Participants were randomized to an experimental group that participated in a standardized rehabilitation regimen as well as noninvasive brain stimulation with tDCS or a sham control group that received the same rehabilitation, but sham tDCS. We analyzed an 11 patient subset of this trial. In a prospective manner, the NBSS questionnaires were completed before and after intervention. Given the investigators remained blinded to the experimental versus control groups at the time of this study, the cohort was analyzed as a whole.

### Results

Mean age was 48 years (SD 17). 7 patients were male and 4 were female. For bladder drainage, 3 had indwelling catheters, 4 intermittently catheterized, and 4 voided. Mean NBSS before intervention was 17.7 (SD 9.9), and scores by domain were 4.7 (SD 7.1), 5.2 (SD 2.9), 6.3 (4.2) for “incontinence”, “storage and voiding”, and “consequences”, respectively (Figure). 3 months following intervention, the mean total NBSS score was 16.5 (SD 12.0), and the domain mean scores are indicated in the Figure. No differences were detected among total or domain scores before, 1 month, and 3 months after intervention ( $p>0.05$ ).

### Conclusions

In this exploratory analysis of a randomized clinical trial of physical therapy with or without tDCS, we did not detect differences in neurogenic bladder symptoms before and after intervention. Future analysis upon unblinding will consider NBSS measures by experimental versus sham control group. The results support the feasibility of a future trial designed to assess individuals with neurogenic lower urinary tract dysfunction, using tDCS targeted at areas associated with storage and micturition, and NBSS and urodynamics assessments before and after intervention.

# Abstract for the Poster Session at INUS 2025



Poster ID: 4-08

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## **Innovations to resist catheter-related complications: bio-inspired zwitterionic surface treatment for indwelling catheters**

McVerry B, Rao E, Polasko A, Chen Y, He N, Kwok I, Matinyan S, Kreydin E, Werneburg G, Goldman H, Flores-Mireles A5, Ton-That H, Mahendra S, Kaner R

### Introduction

Indwelling urinary catheters (IUCs) are one of the most commonly used medical devices, with up to a quarter of all hospital patients being catheterized at any given time. In a meta-analysis of 37 studies, 30% of long-term catheterized patients were found to suffer from complications associated with catheterization. Catheter-associated urinary tract infections (CAUTIs) are the most common of any hospital acquired infection, occurring in over 1 million cases in the United States annually. In addition, non-infectious complications associated with IUCs are up to 4 times as common as infectious complications. Latex and silicone-coated latex materials used for conventional IUCs create a perfect nidus for biofilm growth. These rubbers attract organic material to the catheter surface, and initiate biofilm formation within minutes. Biofilm is the primary cause of reoccurring infection and is directly linked to encrustation/calcification/occlusion of catheters. The tacky, rubber catheter surface also causes microtrauma to the urothelial tissue lining the bladder walls and urinary tract, inducing inflammation. As inflammatory factors are secreted in response to catheter placement, pathogenic microbes can use these factors as “scaffolding” to strengthen the biofilm, causing pathogens within biofilms to be approximately 1,000 times more resistant to antibiotics than non-biofilm pathogens. For the past 20 years, zwitterion chemistry has been identified as one of the most powerful technologies to resist the deposition of organic materials on synthetic surfaces. The technology has been intensively studied during this period, resulting in more than 600 peer-reviewed publications on the properties, clinical benefits and potential applications of zwitterions in the medical field. Emulating the chemistry of the phospholipid bilayer that encompasses every cell in the body, zwitterionic polymers bind to water electrostatically to create an extremely thin hydration layer on the surface of materials. This unique property enables zwitterions to resist biofilm adherence, inflammation/the foreign-body response, and blood coagulation on device surfaces. However, due to the complexity and high cost of the deposition process onto large surfaces, utilization and demonstration of zwitterionic coatings have been previously constrained to academic settings with highly specialized equipment on small samples. Recently, multidisciplinary research among material scientists, chemists, microbiologists, and biomedical engineers at the University of California, Los Angeles has led to the development of a scalable manufacturing process that enables the broad-based use of zwitterionic chemistry on implanted medical devices, such as Foley catheters.

### Methods

The aim of the studies are to investigate the clinical improvement of zwitterion-treated catheters compared to non-treated, standard of care latex and silver-coated catheters. Two randomized

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clinical studies are being conducted on long-term catheterized patients that measures biofilm adherence and encrustation on explanted catheters, as well as UTIs, patient quality of life, and complications rates in catheterized patients enrolled in the study.

## Results

As of September 3, 2024, there is an observed reduction in biofilm by 60% in the zwitterion-treated catheter group compared with the non-treated and silver-coated catheter groups across 96 patients. In the second, randomized crossover study, there is a 68.4% and 68.2% reduction in encrustation and UTIs, respectively, when patients are using the zwitterion-treated catheters versus the standard of care catheter in 76 enrolled patients. Additionally, 24 out of 25 patients who have completed the six-month study have selected the zwitterion-treated catheter as their preferred catheter.

## Conclusions

Our study presents a comprehensive view of the potential benefits of using a zwitterion treated silicone catheter. Due to the sheer volume of catheter-related complications, these early encouraging results demonstrate the large clinical impact that zwitterion technology can have on the chronic-catheter population, a population that suffers from the vast majority of catheter-related complications.

# Abstract for the Poster Session at INUS 2025



Poster ID: 4-09

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## **Comparison of the effects of tissue engineering bladder enlargement and enterocystoplasty on the treatment of neurogenic bladder - a summary of single-center experience**

Fan Zhang, Limin Liao

### Introduction

To compare the long-term effects of enterocystoplasty and small intestinal submucosa (SIS) tissue engineering patch bladder augmentation for patients with neurogenic bladder, and to provide a clinical reference for further treatment.

### Methods

A total of 40 patients' data were retrospectively analyzed. All patients were diagnosed with neurogenic bladder and underwent bladder augmentation in our center from July 2012 to July 2016. The average age of the patients was 38.9 years old, with 14 females and 26 males. Among them, 15 patients underwent tissue engineering patch bladder augmentation (group A) and 25 patients underwent enterocystoplasty (group B). All patients were advised to undergo regular intermittent catheterization after surgery. The surgical methods, perioperative examination results (urodynamic parameters, renal function and upper urinary tract morphological changes), complications, and postoperative recovery of the two groups were compared. The visual analog score (VAS) bladder symptom impact on life index was used to compare and evaluate the improvement of bladder function by different therapies, and regular follow-up was performed.

### Results

In group A, 7 cases underwent ureteral anti-reflux reimplantation surgery at the same time; in group B, 20 cases underwent sigmoid colon bladder enlargement, 5 cases underwent ileal bladder enlargement, and 18 cases underwent ureteral anti-reflux reimplantation surgery at the same time. Compared with enterocystoplasty, tissue engineering patch bladder augmentation had significantly shorter average operation time ( $166.8 \pm 42.5$  mins vs.  $240.5 \pm 60.8$  mins,  $p < 0.05$ ), no significant difference in average intraoperative blood loss ( $257.5 \pm 125.8$  mL vs.  $276.8 \pm 65.5$  mL,  $p > 0.05$ ), significantly shorter postoperative intestinal recovery time ( $1.5 \pm 1.6$  days vs.  $6.8 \pm 5.4$  days,  $p < 0.05$ ), and no significant difference in average hospital stay ( $32.2 \pm 4.5$  days vs.  $35.6 \pm 5.6$  days,  $p > 0.05$ ). The two groups of patients were followed up for an average of 6.8 years after surgery. As of the most recent follow-up, the incidence of postoperative complications in group A was higher than that in group B (46.7% vs. 29.8%  $< 0.05$ ). In terms of urodynamic parameters, both types of surgery could significantly increase bladder capacity and reduce the maximum bladder pressure during the storage period compared with preoperatively, creating bladder conditions for intermittent catheterization for patients. Postoperative VAS scores showed no significant difference: VAS (group A  $3.8 \pm 1.3$ , group B  $4.1 \pm 1.2$   $P > 0.05$ ). A comprehensive comparison of the

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upper urinary tract protection of the two groups after 5 years of treatment showed that the incidence of progressive renal function decline or recurrence of ureteral reflux in group A was higher than that in group B, but there was no statistical difference (group A 20%, group B 15.6%,  $P>0.05$ ).

## Conclusions

Both bladder enlargement surgeries can improve patients' bladder function for the regularly intermittent catheterization. Among them, enterocystoplasty has lower complications, and tissue engineering patch bladder augmentation persists with shorter operative duration and postoperative recovery period. At present, tissue engineering patch bladder augmentation cannot replace traditional intestinal bladder augmentation.



# Abstract for the Poster Session at INUS 2025



Poster ID: 4-10

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## **Similar artefact susceptibility for water- and air-filled urodynamic systems: a non-inferiority randomized controlled trial**

Kasten Madlen, Gross Oliver, Wettstein Marian S., Anderson Collene E., Birkhäuser, Veronika, Borer Joëlle, Koschorke Miriam, Liechti Martina D., McCallin Shawna, Mehnert, Ulrich, Röthlisberger Raphael, Sadri Helen, Stächele Lara, van der Lely Stéphanie, Ke

### Introduction

Urodynamic investigation (UDI) is the gold standard to assess refractory lower urinary tract symptoms. Water-filled systems (WFS) are the method of choice for UDI pressure measurements according to the International Continence Society (ICS). However, air-filled systems (AFS) are widely used as convenient alternative to WFS, although it is unclear whether these systems produce comparable measurements.

### Methods

From April 2021 to January 2022 patients (n=490) undergoing UDI at the Department of Neuro-Urology, Balgrist University Hospital Zurich Switzerland, were included in this randomized controlled non-inferiority trial. Inclusion criteria were age  $\geq$  18yr with competent German language skills who gave informed consent and suffer lower urinary tract symptoms (LUTS).

The patients were allocated by block randomization in a 1:1 ratio to undergo UDI using a WFS (n=244) or an AFS (n=246). UDI consisted of same session repeat filling cytometry and pressure flow study. A telephone follow up was performed 7-14 days after the examination.

The primary endpoint was artefact susceptibility evaluated by a modified Bristol UTraQ quality scoring scale (ref) ranging from 0 to 18, with higher scores indicating a better quality. Urodynamic traces were assessed by an expert in functional urology blinded to the measurement system used. Patients and clinicians were not masked to the diagnostic assignments. A clinically meaningful non-inferiority margin was pre-specified as -2 points on the quality scoring scale (AFS-WFS).

### Results

The median overall quality score was 14.5 points (Q1-Q3: 13.5-15.5) for the WFS and 15.5 (Q1-Q3: 14.5-16.5) for the AFS. Inferiority of AFS could be rejected at the pre-specified non-inferiority margin (0.96 (95% confidence interval 0.68-1.25,  $p < 0.001$ ). Typical artefacts consisted of repeated relevant (i.e.,  $\geq 5$  cmH<sub>2</sub>O) rectal contractions (WFS vs AF: 57% (138/244) vs 68% (166/246),  $p = 0.015$ ), poor pressure transmission during cough test at empty bladder (WFS vs AFS: 38% (93/244) vs 4% (10/246),  $p < 0.001$ ), and detrusor resting pressure outside of the physiological range at empty bladder (i.e.,  $\geq 5$ cmH<sub>2</sub>O or  $\leq -5$ cmH<sub>2</sub>O) (WFS vs AFS 16% (40/2044) vs 42% (104/246),  $p < 0.001$ ). Overall, AFS revealed higher resting pressures at start of UDI (vesical pressure WFS vs AFS:  $19.8 \pm 7.1$  vs  $26.1 \pm 8.4$  cmH<sub>2</sub>O; abdominal pressure WFS vs AFS:

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21.4±7.6 vs 30.7±9.2 cmH<sub>2</sub>O,  $p < 0.001$ ). UDI installation time were similar between groups (WFS vs AFS: 27±7.6 vs 27.1±7.9 min,  $p = 0.913$ ).

Self-limiting pain (30%; 146/490), increased urgency (18%; 90/490), self-limiting macrohematuria (8%; 41/490), and urinary tract infections (6%; 28/490), were the most commonly reported examination-related adverse events (AE) during the follow-up interview 7-14 days after examination. Except for pain, which occurred significantly more often after using the AFS ( $p = 0.014$ ), AEs were similar between groups ( $p > 0.18$ ).

## Conclusions

Our results demonstrate that AFS are non-inferior to WFS regarding overall quality of urodynamic traces. However, both measurement systems have particular pitfalls that need to be known for problem solving during UDI and require awareness for accurate interpretation of UDI.

# Abstract for the Poster Session at INUS 2025



Poster ID: 4-11

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## **Is sacral neuromodulation effective and safe in patients with neurogenic lower urinary tract symptoms? A systematic review and meta-analysis** Juan Carlos Castaño, Catalina Barco-Castillo, Gina Ocampo Florez, Alexander Chincovsky Ríos

### Introduction

Neurogenic lower urinary tract symptoms (nLUTS) occur after the abnormal function of the bladder and urethra in the setting of a neurologic disorder. Sacral neuromodulation (SNM) involves the electrical stimulation of the sacral nerve to modulate the neural pathway, and the Neuro-Urology EAU Guidelines, present a strong recommendation to consider it in selected patients with refractory nLUTS. However, there is no standardization to determine which patients will benefit from this treatment. This study aims to determine the effectiveness and safety of sacral neuromodulation in patients with nLUTS according to their neurological pathology and symptomatology.

### Methods

The literature search was performed in the databases OVID, MEDNAR, Embase, Scopus, Web of Science, and PubMed, counting all the studies until March 2024. We included the observational studies that evaluated adults with nLUTS who underwent SNM. Gray literature, case reports, studies on children, and articles written in languages other than English and Spanish were excluded. The meta-analysis of proportions was performed under the model of random effects stratified by neurological pathology, symptomatology, and SNM Phase.

### Results

A total of 1221 patients with nLUTS were included from 45 studies. The global improvement after SNM Phase I was 61%, with better outcomes in patients with multiple sclerosis (75%) and less improvement in Parkinson disease (50%), cerebrovascular disease (50%) and spinal cord injury (39%), regardless the symptomatology. Complications occurred in 8% of cases. After SNM Phase II, the global improvement was 78%, with better outcomes in patients with multiple sclerosis (84%), spinal cord injury (82%) and pelvic surgery (82%), and less improvement in Parkinson disease (0%), cerebral palsy (0%) and spinal disc disease (0%). All symptomatology improved and complications happened in 26% of patients.

### Conclusions

Sacral neuromodulation must be offered to all patients with multiple sclerosis, spinal cord injury, pelvic surgery, and other causes different than Parkinson's disease, spina bifida, cerebrovascular disease, cerebral palsy, and spinal disc disease, with refractory neurogenic lower urinary tract dysfunction regardless their symptomatology.

# Non-discussion abstracts at INUS 2025



Poster ID: ND-1

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## **Posterior Tibial Nerve Stimulation for the Treatment of Neurogenic Detrusor Underactivity in Multiple Sclerosis Patients: Insights from a Single-Center Experience**

Nader A Aldossary, MD , Riyad T Almousa, MD

### Introduction

Patients affected by multiple sclerosis (MS) often present Lower Urinary Tract Dysfunction, mainly storage

LUTS, which significantly affects their quality of life. Percutaneous tibial nerve stimulation (PTNS) is widely used in the treatment of non-neurogenic and neurogenic detrusor overactivity (NDO) in multiple sclerosis (MS); however, few studies have studied the outcome of PTNS on neurogenic detrusor underactivity. The International Continence Society has defined DU as a contraction of reduced strength and/or duration, resulting in a failure to achieve complete bladder emptying within a normal time span. This study aims to report the effect of the PTNS on neurogenic detrusor underactivity in Multiple Sclerosis patients.

### Methods

A retrospective study was conducted between January 2019 and March 2024. It included all patients who were diagnosed with Multiple Sclerosis, who have detrusor underactivity on Video Urodynamics who were refractory to conservative therapy, and who proceeded with PTNS. Patients with Bladder outlet obstruction and other neurogenic causes of detrusor underactivity and those who discontinued PTNS sessions were excluded. We assessed the number of responders (Bladder diary, improvement >50% in symptoms) and those who continued beyond 12 sessions to maintenance sessions (12 sessions, a session every other week for 6 sessions, and a monthly session for the other 6 sessions).

### Results

A total of 6 patients with Multiple Sclerosis and neurogenic detrusor underactivity were found based on video urodynamics. 4 patients were diagnosed with Relapsing Remitting Multiple Sclerosis (66.6%) and 2 patients with stable Multiple Sclerosis (33.4 %). Age ranged from 38 to 51 years of age (Mean 40.83 +/- 10.46 ). 5 were female (83.3%) and 1 male (16.7%). All the patients had voiding LUTS. One patient had frequency and urgency in addition to retention. One patient was dependent on self-catheterization. All patients received 12 sessions of PTNS. 5 patients (83.3%) patients responded well with improvement >50% and 1 (16.7%) patient did not respond, and who has stable Multiple Sclerosis. The patient who is Self-catheterization dependent abandoned CISC and started to void with PVR< 100 ml. All 5 responders proceeded to 12 maintenance sessions. 4 out of 5 maintained good responses>50% and 1 patient had his symptoms worsened.

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This study showed PTNS improved outcomes and quality of life in Multiple Sclerosis patients with detrusor underactivity. The majority of patients went further to 12 maintenance sessions. Interestingly enough, all the Relapsing-Remitting Multiple Sclerosis patients maintained a good response even after the maintenance sessions.

## Conclusions

This study suggests that PTNS may have the potential for substantial good outcomes in Multiple Sclerosis patients with detrusor underactivity. Prospective studies of extended duration and larger sample sizes are needed to determine optimal candidates and assess long-term outcomes, & potential complications.

# Non-discussion abstracts at INUS 2025



Poster ID: ND-2

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## **Pediatric Sacral Neuromodulation: Insights from a Single-Center Experience in patients with Lower Urinary Tract Dysfunction.**

Nader A Aldossary, Riyadh T Almousa

### Introduction

Although sacral neuromodulation is widely acknowledged as a third-line treatment for adult patients with various Lower Urinary Tract and Bowel Dysfunctions, its application in children under 16 years old lacks FDA approval and is relatively novel. Nevertheless, SNM has been progressively explored in pediatric patients with voiding and bowel dysfunction showing encouraging results. Here we report our SNM experience in pediatric patients with LUTD.

### Methods

A retrospective cohort study was conducted between March 2019 and March 2024. It included all patients aged from 10 to 16 years of age who were diagnosed with various Lower Urinary Tract Dysfunction refractory to conservative therapy and who proceeded with the Sacral neuromodulation test phase. We assessed their pre-op UDS diagnosis, conversion rate to permanent implantation, response rate (>50%) and the need for re-programming at 6 weeks and 6 months post-operatively. Any surgical revisions during the 6 months post-operatively was reported.

### Results

A Total of 5 patients with age ranging from 10 to 16 years (Median 11). All patients are female and were diagnosed with chronic urinary retention (2 patients with non-obstructive urinary retention, 1 with Spina bifida, 1 with Miningomeylocele and 1 with non-neurogenic neurogenic bladder) with respective UDS diagnosis as follows: Idiopathic DU (2 (40%)) and Neurogenic DU (3 (60%)). All patients were refractory to conservative therapy. None of them had Bowel dysfunction. All were ambulatory and had normal sacrum on pre-op x-ray. They underwent Stage I MRI-compatible lead insertion under GA (Medtronic). All patients showed a response >50% and had permanent implants (4 InterStim micro, 1 InsterStim II). All patients started to void freely and abandoned Self-catheters (response >50%) at 6 weeks post-op without re-programming. The response was maintained at >50% in all patients at 6 months post-op without the need for re-programming except for 1 patient had reprogramming for lower limb pain. No surgical revision was done in the first 6 months post-implantation.

These results suggest that Sacral Neuromodulation has the potential for encouraging outcomes in pediatric patients with LUTD. Six months is a relatively short period. Therefore, will follow the future effect of somatic growth on the outcome and the lead location at 1 and 2 years. Prospective studies of extended duration and larger sample sizes are needed to determine optimal candidates and assess long-term outcomes, and potential complications.

### Conclusions

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Sacral Neuromodulation has the potential for a substantial improvement of LUTD in pediatric patients. Prospective studies of extended duration and larger sample sizes are needed to determine optimal candidates and assess long-term outcomes, and potential complications.

# Non-discussion abstracts at INUS 2025



Poster ID: ND-3

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## **Case report: an unusual artefact observed during video-urodynamics**

Katharina Böhler, Daniel Frauenfelder, Hubert John, Jure Tornic

### Introduction

A 74-year-old female patient with urge incontinence was assessed for bladder dysfunction using video-urodynamics. Prior to this, the patient underwent a series of preliminary investigations, including uroflowmetry, post-void residual measurement and cystoscopy. These investigations revealed no abnormalities.

### Methods

Video urodynamics were conducted in accordance with the recommended standards of the International Continence Society (ICS). Measurements were obtained in a seated position using a water perfusion system (Sedia S1 Urodynamic System, Sedia Medizintechnik SA, Givisiez, Switzerland).

### Results

Initial cystometry (filling rate 25 mL/min) revealed the presence of a hypocapacitive bladder (260 mL) with normal compliance (100 mL/cmH<sub>2</sub>O) and detrusor overactivity incontinence was detected. Complete bladder emptying was observed during the subsequent pressure-flow-study. At the outset of the second measurement, repetitive pressure waves were observed in the vesical pressure trace (pVes). Despite repeated flushing of the measurement catheter, the artefact persisted.

Assuming that the catheter was correctly positioned, and that the artefact was indeed due to detrusor overactivity, the second filling-cystometry was started with a reduced filling rate of 12 mL/min. Vesical pressure remained constant up to a filling volume of 20 mL, but the pressure waves persisted. With an additional 10 mL filling, vesical pressure increased abruptly by 70 cmH<sub>2</sub>O. Simultaneously, the patient reported an abrupt onset of pain in the right renal region.

Consequently, bladder filling was immediately ceased and fluoroscopy performed, which revealed isolated contrast of the right upper urinary tract without visualizing the bladder. Pain relief was achieved immediately after the pressure in the system was released. Following careful retraction of the pVes catheter by 10 cm, pressure waves were no longer detectable. The second filling cystometry was then completed without incident.

### Conclusions

Measurement catheter dislocation into an ureteric orifice may occur as a rare event. In our case, unusual waves in the vesical pressure trace despite of an empty bladder indicated an incorrect catheter position. Therefore, repositioning of the urodynamic measuring catheters or even



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exchanging them should always be considered for troubleshooting if unusual pressure patterns persist.

Poster ID: ND-4

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**Botulinum Toxin A Injections in Patients after Augmentation Cystoplasty or Total Bladder Replacement: A Literature Review**

B.Breu; I.Lucca; N.Grilo

Introduction

The efficacy of intra-detrusor injections of Botulinum Toxin A (BTXA) has been well documented, but it has yet to be explored in patients with residual high detrusor pressure or overactivity within a urinary reservoir after augmentation cystoplasty or total bladder replacement (neobladder or continent pouch).

Methods

We performed a non-systematic review of the literature through the electronic databases MEDLINE, EMBASE, Web of Science, using the keywords "Botulinum Toxin", "overactive", "neobladder", "urinary diversion" and "augmentation cystoplasty". We included case reports and retrospective studies with emphasis on studies published between 2014 – 2024. Older studies were included if relevant. Outcomes of interest were injections sites (native residual detrusor and/or enteroplasty muscularis), resolution of urinary discomfort (improvement of incontinence, frequency, urgency, urinary infection, bladder pain), urodynamic changes and an overall positive clinical response sufficient to merit repeat BTXA injections. Exclusion criteria encompassed pediatric papers and non-English language articles.

Results

Initial searches yielded 171 articles, with 43 articles undergoing full review. Most articles described BTXA injections as either an alternative or preceding therapy to cystoplasty/bladder replacement in patients with high detrusor pressure/overactivity. However, only a limited number of articles addressed BTXA injections as a post-surgical treatment. Nonetheless, 11 studies meeting inclusion criteria were identified, comprising additional relevant references extracted from initially selected articles. The articles included found a significant improvement after BTXA injections in 59% of the treated patients (range 43 - 86%, n = 11). The significant improvement was variably defined, either as symptomatic improvement measured with questionnaires or patients requesting further injections, overall patient response or urodynamic changes. Urodynamic follow-up after BTXA injections was only performed in three studies with increase of cystometric capacity in 39% (range 28 -50%, n=3) and reduction of maximal detrusor pressure in 46% (range 43-50%, n=3). Results were heterogeneous but with a clear trend in favor of this treatment strategy.

Conclusions

BTXA injections after failed augmentation cystoplasty or total bladder replacement may be proposed as a salvage option before complex surgical revision. Further studies with larger cohorts are warranted due to the scarcity of data presently available, including urodynamic assessments post BTXA injection.

# Non-discussion abstracts at INUS 2025



**Poster ID: ND-5**

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## **Multidisciplinary Transition Of Adolescents With Spina Bifida**

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### Introduction

Children with spina bifida (SB) involves multiple organs and systems leading to permanent disability which requires specific and uninterrupted health care. Preparation for the SB transition must include a program focused on family self-management and an available health network with access in each region. Thus it is necessary to implement multidisciplinary transition practices using guides and algorithms adapted to specific regional environments. The objective is to present a strategic planning and recommendations for specialists working closely with urology to help patient access to adult centers and its implementation in young people with SB.

### Methods

A search was carried out for a systematic review on each specialty that treats patients with SB. The experience was examined "for each related specialty", guidelines for transition care and recommendations from experts in each area were given. The instrument Transition Readiness Assessment Questionnaire (TRAQ) 5.0, Spanish version (Argentina), was used.

### Results

Every year 270 patients with SB are treated in a multidisciplinary department and about 5.5% transition to adult centers. According to the algorithm: Neurosurgery: with swallowing disorders, headache and visual alterations: suspicion of valve dysfunction: connection with ophthalmology. Furthermore, if there are changes in MMII muscle tone and urodynamic worsening with difficulty in CIC: suspicion of tethered spinal cord: connection with Urology: if renovesical ultrasound shows hydronephrosis and this is accompanied by UTI, video urodynamics is indicated, which, if positive with reflux vesicoureteral, Nephrological aspect should be investigated: with proteinuria and GFR calculation. Psi sphere provide us with the possibility to achieve independence. Psychopedagogists evaluated 15 patients between 2022 and 2023 with average Traq 5.0 scores of 3.52. Pediatricians in adolescence will make interactions possible with Clinicians from adult centers as feedback for a year.

### Conclusions

This "Integrated Transition" algorithm could help patient access with chronic conditions to the adult health care system, reducing the time at risk without medical care.

# Non-discussion abstracts at INUS 2025



Poster ID: ND-6

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## **A case study of a male patient with detrusor overactivity (DO) provoked by water running sound**

Chiharu Shibata, Ryuji Sakakibara

### Introduction

Detrusor overactivity (DO) is a urodynamic involuntary detrusor contraction either with/without urgency sensation, either with/without preceding external cues. While some cues of externally provoking DO have been reported in some papers, water running sound cue has not been reported. We reported a case study of a patient with DO which was cued by water running sound during bladder filling.

### Methods

We reported a 67-years-old male patient with overactive bladder (OAB) provoked by a running water sound in daily life. He went to see a doctor because of urinary urgency, frequency, and poor urinary stream. The prostate volume was 68.3mL using echography at that time. Other medical history included lumbar vertebrae herniated disk. No brain scan was made.

### Results

To diagnose and assess to lower urinary tract function, he underwent a urodynamics, which showed reduced maximum bladder capacity of 165 ml and spontaneous phasic DO; and additional DO could be provoked by water running sound, urinary leakage at the end of filling in storage phase. In voiding phase, bladder outlet obstruction (BOO), five-grade obstruction at Schafer's nomogram was observed.

### Conclusions

In this study, we reported a male patient with DO provoked by water running sound. As provoking methods of DO, cough, tapping at lower abdomen, and postural change have been known. In addition, the present study result showed that a running water sound can be a cue to provoke urgency and objective DO.

# Non-discussion abstracts at INUS 2025



Poster ID: ND-7

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## **Genital Numbness in demyelinating conditions: Multiple Sclerosis and Myelin Oligodendrocyte Antibody disease (MOGAD)**

SL Wright, P Malladi, S Simeoni, JN Panicker

### Introduction

Urogenital dysfunction is significant in demyelinating conditions (multiple sclerosis, MS and myelin oligodendrocyte antibody disease, MOGAD). Numbness limited to the external genitalia is uncommon but may be reported to Urologists and Uro-gynaecologists and contributes to urinary and sexual dysfunction. Lesions may localise to the conus medullaris, pudendal nerve or can be supraconal. Complex pelvic innervation conveying somatic sensations can be evaluated by pelvic neurophysiology and in the future localisation of the lesion may be important if planning sacral neuromodulation.

### Methods

Consecutive patients with MS or MOGAD referred to the Department of Uro-Neurology with 'genital numbness', between January 2018 and August 2022 were included. Genital numbness and related pelvic (sexual, bladder and bowel dysfunction) and neurological symptoms, contributing factors (medication exposure, cycling), clinical examination findings (Neurotip, and neurophysiology findings (pudendal somatosensory evoked potentials, bulbocavernosus reflex and anal sphincter, and related clinical investigations were recorded.

### Results

Ten patients (4 female; median age 44.2 years (range 29.3-59.6 years) were referred with genital numbness (6=MS, 4=MOGAD). All patients had lower urinary tract dysfunction, and high rates of sexual dysfunction (66.7% MS, 75% MOGAD). All MOGAD patients had abnormal pelvic neurophysiology which localised to the conus medullaris (75%) or supraconal (25%) innervation. 33% of MS patients had either conus medullaris (n=1) or supraconal (n=1) impairment. Pelvic neurophysiology testing was normal in 67% (n=4) of MS patients, and there was additional exposure to serotonin reuptake inhibitors (n=2).

### Conclusions

Isolated genital numbness is an uncommon symptom in MS and MOGAD and is associated with sexual and lower urinary tract dysfunction. Pelvic neurophysiology findings suggest abnormalities in the genital sensory pathways localisable to the supraconal or conus medullaris. Genital numbness in a MOGAD cohort is associated with functional impairment of the conus medullaris, even with normal radiological conus medullaris appearance. A normal clinical sensory examination in MS excludes a peripheral nerve lesion and localises supraconally. Preserved sacral nerve function may be important if considering sacral neuromodulation, however further research is required. Despite a different somatic sacral neurophysiological profile, both cohorts report sexual

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dysfunction. Urogenital symptoms are common in MS and MOGAD and altered genital sensation is under-reported with significant implications on sexual function.

Poster ID: ND-8

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**Long-term functional outcomes of artificial urinary sphincter implantation for the treatment of stress urinary incontinence-a single-center experience of China**

Fan Zhang, Limin Liao

Introduction

To evaluate long-term functional outcomes of artificial urinary sphincter implantation for the treatment of stress urinary incontinence.

Methods

Patients who underwent artificial urinary sphincter implant for non-neurogenic stress urinary incontinence between April 2002 and April 2024 were included in this single-centre retrospective series. A total of 55 patients, ( median age, 45.6 years, range from 19-80 years old, 54 males, 1 female ) with urinary incontinence had accepted artificial urinary sphincter placement. The history of illness was 8 months to 33 years. The patients category were urethral injuries associated urinary incontinence (n=25), neurogenic urinary incontinence (n=9) and post-prostatectomy incontinence (n=21). Assessments included perioperative management, urinary continence, artificial urinary sphincter status, complications. The influences of surgical approaches and cuff size selection on surgical results were compared and the long-term surgical efficacy was evaluated.

Results

The mean follow-up time was 8.1 years ranged from 6 months to 19 years. At the latest visit, 39 patients (70.9%) maintained the primary functional artificial urinary sphincter. Four patients (7.3%) had artificial urinary sphincter revisions. Explantations were performed in 12 patients. Thirty-six patients were socially continent, of which 20 patients were totally dry, leading to the overall social continent rate as 83.7%(36/43). The impact of incontinence on the QoL measured by the VAS dropped from  $7.0 \pm 1.3$  to  $2.3 \pm 2.2$  ( $P < 0.001$ ). Compared with different surgical approaches, there was no statistically significant difference in postoperative complete dry rate (32% in trans-perineal group vs. 40% in trans-scrotal group,  $P = 0.76$ ). There was no statistically significant difference in postoperative device failure free rate between the two approaches (60% vs. 80%,  $P = 0.20$ ). The complication rate was 32.6%; including infections (n=5), erosions (n=5), mechanical failure (n=3), dysurie (n=2) and urethral atrophy (n=2). Compared with subgroups of different etiology, patients in post prostatectomy incontinence had a high rate of postoperative social continent rate (80.9%), lower rate of both perioperative complications (19.0%) and device re-intervention rate (14.3%).

Conclusions

# Non-discussion abstracts at INUS 2025



Artificial urethral sphincter implantation is an effective treatment for moderate to severe stress urinary incontinence. Long-term continence rates are acceptable if patients can maintain a functional AUS in situ.