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5	Introduction	Sanjay Sinha
15	Why intermittent catheterisation is the gold standard for draining a neurogenic bladder	Sanjay Sinha
15	Treatment of recurrent urinary infections in 2020	Charalampos Konstantinidis
15	Neurostimulation for neurogenic bladder - is it an established option now	Desiree Vrijens
15	How to avoid long term complications in neurogenic bladders	Carlos D'Ancona
15	Case based discussion	Sanjay Sinha Charalampos Konstantinidis Desiree Vrijens Carlos D'Ancona
10	Questions	All

#### Aims of Workshop

Neurourology is still an evolving field and healthcare givers often find it challenging to tackle the multifactorial issues faced by people with a neurological abnormality.

This workshop will try to simplify some of the management principles involved in the treatment of neurogenic bladder with emphasis on the latest techniques.

There would be a case based discussion at the end to put the principles into practice to demonstrate the application of management principles.

The aim would be for the participants to establish a clear thought process for managing this complex group of patients with confidence

#### Learning Objectives

Understand the various management principles in Neurourology

#### Target Audience

Urology, Urogynaecology and Female & Functional Urology, Conservative Management

#### Advanced/Basic

Intermediate

#### Suggested Learning before Workshop Attendance

Chapter on Neurourology in 6th ICI Consultation. Abrams, P, Cardozo, L, Wagg, A, Wein, A. (Eds) Incontinence 6th Edition (2017). ICI-ICS. International Continence Society, Bristol UK, ISBN: 978-0956960733  
 EAU guidelines on Neurourology. <https://uroweb.org/guidelines/neurourology>

Neuro-urological disease encompasses a wide-spectrum of conditions with unique challenges for the health care provider. In patients with high-risk neuro-urological conditions, the primary goal is safety unlike patients with low risk diagnoses, where quality of life and symptom resolution are common end-points. This workshop from the Neuro-urological Promotion Committee of the ICS aims to address challenges pertaining to intermittent catheterization, complications including infection and the current status of electrical stimulation therapies.

The emphasis in this workshop will be on tips for practical management. The format includes case-based discussions to clarify key concepts and dedicated time for audience interaction.

#### A. Intermittent catheterization, gold standard for draining neurogenic bladder

Sanjay Sinha, Professor and Consultant Urologist, Apollo Hospitals, Hyderabad, India

Intermittent catheterization (IC) for the management of intractable voiding dysfunction is widely regarded as a landmark in the history of Urology (Guttman 1966; Lapides 1972). To this day, IC remains a key component of the management of patients with high-risk neurogenic bladder such as spinal cord injury, open spinal dysraphism or anorectal malformation. However, there are several aspects of IC-based bladder management that challenge the clinician: (1) Is IC essential (2) Is IC enough (3) How often

should a patient catheterize (4) Is a clean technique acceptable? (5) What about infections? The response to these issues has significant implications for the individual patient as well as for the community. These aspects are covered first as part of the initial lecture and later during case discussions.

#### B. Treatment of recurrent urinary infections in 2020

Charalampos Konstantinidis, Consultant in Urology & Sexual Medicine  
National Rehabilitation Center, Athens, Greece

Urinary tract infections (UTI) are an important issue for physicians and patients. It is even more difficult to diagnose and treat neurogenic patients rather than the general population. The higher frequency of recurrent infections in these patients and resistant microorganisms remain the main problems as for this specific patient group. UTI in the neurogenic patient is considered when there is a positive urinary culture accompanying by symptoms. The range of signs and symptoms includes urinary incontinence, increased spasticity, autonomic dysreflexia, pelvic discomfort, fever, and decreased energy level. Moreover, it has not been shown that the type of microbe isolated in urine culture of an asymptomatic patient is the cause of infection when one symptomatic episode occurs. Patients with UTI should be treated with the most specific antibiotic treatment for the shortest sufficient period. The guidelines for choosing the right antimicrobial treatment are the same as those of the general population. They include the identification of the microorganism, the antimicrobial susceptibility, the location of the infection, its complexity, and the risk factors. Although there are insufficient clinical studies on the duration of treatment for urinary tract infections in neurogenic patients, the duration of treatment varies from 3 to 21 days depending on the microorganism, the accompanying factors of infection and the condition of the patient. When oral treatment is available, it is usually given for a period of 5–7 days, and when intravenous treatment is required, it remains from 7 to 14 days depending on the clinical and laboratory findings.

Based on the criteria of evidence-based medicine, there is currently no preventive measure for recurrent urinary tract infections in neurogenic patients that can be recommended without limitations. Individualized concepts, including immunostimulation, phytotherapy, and complementary medicine, should be taken into consideration. Prophylaxis is important to pursue, but no data are favouring one approach over another. In this case, prophylaxis is essentially a trial and error approach. Nowadays, the quality of life of neurogenic patients is the primary concern. Antibiotics, catheterization techniques and urinary diversions are the main features of treatment applied. The medical community contributes in this direction with the proper diagnosis of the diseases in this group of patients. Individualized physician and patient collaboration and the timely recognition of symptoms by the patient remain the cutting edge of early symptoms relief. The proper and efficient control of the “neurogenic bladder” is essential for the prevention and the management of the UTIs. The controlled bladder pressure and its complete periodical evacuation under a low-pressure environment can ensure that the UTIs will be less frequent and less severe.

#### References

1. Kennelly M, Thiruchelvam N, Averbeck M, Konstantinidis C, Chartier-Kastler E, Trøjgaard P, et al. Adult Neurogenic Lower Urinary Tract Dysfunction and Intermittent Catheterisation in a Community Setting: Risk Factors Model for Urinary Tract Infections. *Adv Urol.* 2019 Apr 2; 2019: 2757862. doi: 10.1155/2019/2757862.
2. Charalampos Konstantinidis and Achilleas Karafotias (November 5th 2018). Urinary Tract Infections in Neuro-Patients, Microbiology of Urinary Tract Infections - Microbial Agents and Predisposing Factors, Payam Behzadi, IntechOpen, DOI: 10.5772/intechopen.79690. Available from: <https://www.intechopen.com/books/microbiology-of-urinary-tract-infections-microbial-agents-and-predisposing-factors/urinary-tract-infections-in-neuro-patients>
3. B. Blok , D. Castro-Diaz, G. Del Popolo, J. Groen, R. Hamid, G. Karsenty, et al. EAU Guidelines on Neuro-Urology. ISBN 978-94-92671-07-3. EAU Guidelines Office, Arnhem, The Netherlands. <https://uroweb.org/guideline/neuro-urology/>

#### C. Neurostimulation for neurogenic bladder; is it an established option now?

Desiree Vrijens, Urologist, Maastricht University Medical Centre, Netherlands

In this presentation the different forms of neurostimulation are discussed. The working mechanism of tibial nerve stimulation is explained. The indications for tibial nerve stimulation in neurogenic lower urinary tract dysfunction are discussed with presentation of the most recent literature. In addition sacral neuromodulation is addressed, with working mechanism and indication in the past, the present and the future.

#### D. How to avoid long-term complications in neurogenic bladder patients

Carlos D'Ancona, Professor and Chairman Division of Urology, School of Medical Sciences, University of Campinas, SP, Brazil

From child to elderly, we have many etiologies of neurogenic bladder. For an education point of view and to be more concise, I will focus on neurogenic bladder caused by spinal cord trauma. To avoid complications, we need to take into account a different aspect:

1. Early treatment of neurogenic bladder
2. Maintain low bladder pressure
3. Promote a good bladder drainage

#### 4. Long term follows up

1. Early treatment of neurogenic bladder – it is well known the natural history of the neurogenic bladder when left untreated. Nowadays many studies support the early investigation of the urinary tract. Still, now it is not well defined when performing between a few weeks to some months after the trauma. However, the treatment of neurogenic bladder is based on urodynamics. This exam can identify patients with a higher risk to develop upper urinary tract lesions. The diagnosis of risk is low compliance and overactive detrusor with detrusor sphincter dyssynergia.
2. Maintain low bladder pressure - The typical image of Christmas's tree of the bladder is a complication of no treatment of high bladder pressure. To avoid this condition, it is necessary for early treatment with antimuscarinic drugs, botulinum toxin, and other treatments to maintain the low pressure of the bladder.
3. Promote good bladder drainage – to promote bladder drainage the great advance is the intermittent clean catheterization. The method depends on the cognitive impairment, poor hand function, and acceptance of the procedure by the patient.
4. Long term follows up – there is no consensus about what exams performed in the follow-up and in which frequency. These patients are followed up for life. Since the patient is continent and does not present urinary tract infection should perform a urinalysis, kidney function, bladder diary every year. Ultrasound is a non-invasive exam, cheap, and easily performed. The question is when urodynamic should be repeated.

#### References:

1. Unwanaobong Nseyo , Yahir Santiago-Lastra. Long-Term Complications of the Neurogenic Bladder. Urol Clin North Am. 2017; 44: 355-366.
2. Welk B, Schneider MP, Thavaseelan J, et all. Early urological care of patients with spinal cord injury. World J Urol. 2018 ;36: 1537-1544.
3. Hachem LD, Ahuja CS, Fehlings MG.J Assessment and management of acute spinal cord injury: From point of injury to rehabilitation. Spinal Cord Med. 2017; 40: 665-675.
4. Jacinthe J. E. Adriaansen, Floris W. A. van Asbeck, et all. Bladder-emptying methods, neurogenic lower urinary tract dysfunction and impact on quality of life in people with long-term spinal cord injury. The Journal of Spinal Cord Medicine 2017; 40: 43 – 53.
5. Elisabeth Farrelly, Lena Lindbo, Hans Wijkström & Åke Seiger. The Stockholm Spinal Cord Uro Study: 2. Urinary tract infections in a regional prevalence group: frequency, symptoms and treatment strategies. Scandinavian Journal of Urology 2020, 54.