EAU GUIDELINES ON NEURO-UROLOGY

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Introduction

Neuro-urological disorders can cause a variety of long-term complications; the most dangerous being damage of renal function. Treatment and intensity of follow-up examinations are based on the type of neuro-urological disorder and the underlying cause.

Terminology

The terminology used and the diagnostic procedures outlined in this document follow those published by the International Continence Society.

Risk factors and epidemiology

All central and peripheral neurological disorders carry a high risk of causing functional disturbances of the urinary tract.

Classification

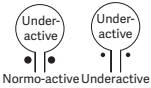
The pattern of lower urinary tract (LUT) dysfunction following neurological disease is determined by the site and nature of the lesion. A very simple classification system, for use in daily clinical practice, to decide on the appropriate therapeutic approach is provided in Figure 1.

Figure 1: Patterns of lower urinary tract dysfunction following neurological disease

Suprapontine lesion
- **History:** predominantly storage symptoms
- **Ultrasound:** insignificant PVR urine volume
- **Urodynamics:** detrusor overactivity

Spinal (infrapontine–suprasacral) lesion
- **History:** both storage and voiding symptoms
- **Ultrasound:** PVR urine volume usually raised
- **Urodynamics:** detrusor overactivity, detrusor–sphincter dyssynergia

Sacral/infrasacral lesion
- **History:** predominantly voiding symptoms
- **Ultrasound:** PVR urine volume raised
- **Urodynamics:** hypocontractile or acontractile detrusor



The pattern of LUT dysfunction following neurological disease is determined by the site and nature of the lesion. Panel A denotes the region above the pons, panel B the region between the pons and sacral cord and panel C the sacral cord and infrasacral region. Figures on the right show the expected dysfunctional states of the detrusor-sphincter system. Figure adapted from Panicker et. al., with permission from Elsevier. PVR = post-void residual.

Diagnostic evaluation

Early diagnosis and treatment are essential in both congenital and acquired neuro-urological disorders, even in the presence of normal neurological reflexes. Neuro-urological disorders can be the presenting feature of neurological pathology and early intervention can prevent irreversible deterioration of the lower and upper urinary tract.

Patient assessment

Diagnosis of neuro-urological disorders should be based on a comprehensive assessment of neurological and non-neurological conditions. Initial assessment should include a detailed history, physical examination, and urinalysis.

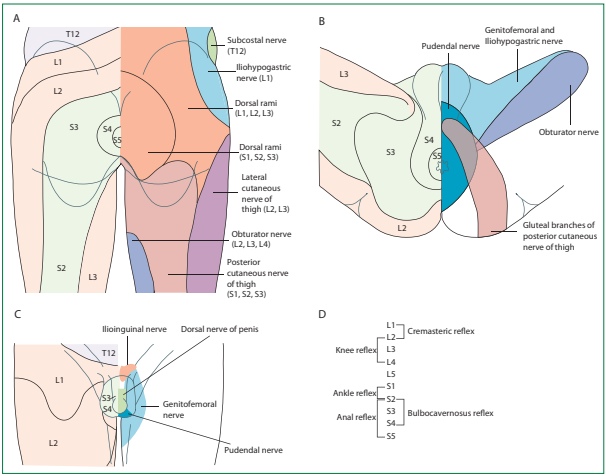
History

An extensive general and specific history is mandatory and should concentrate on past and present symptoms, disorders of the urinary tract as well as bowel, sexual and neurological function. Special attention should be paid to possible warning signs and symptoms (e.g., pain, infection, haematuria, fever) that warrant further investigation.

Physical examination

The neurological status should be described as completely as possible. All sensations and reflexes in the urogenital area must be tested, including detailed testing of the anal sphincter and pelvic floor functions (Figure 2). Availability of this clinical information is essential for the reliable interpretation of subsequent diagnostic investigations.

Figure 2: Lumbosacral dermatomes, cutaneous nerves, and reflexes



The physical examination includes testing sensations and reflexes mediated through the lower spinal cord. Abnormal findings would suggest a lesion affecting the lumbosacral segments; mapping out distinct areas of sensory impairment helps to further localise the site of lesion. Distribution of dermatomes (areas of skin mainly supplied by a single spinal nerve) and cutaneous nerves over the perianal region and back of the upper thigh (A), the perineum (B), male external genitalia (C) and root values of lower spinal cord reflexes (D). Figure adapted from Panicker et al., with parts A-C adapted from Standring, both with permission from Elsevier.

Recommendations for baseline evaluation

Recommendations	Strength rating
Take an extensive general history, concentrating on past and present symptoms.	Strong
Take a specific history for each of the four mentioned functions - urinary, bowel, sexual and neurological.	Strong
Pay special attention to the possible existence of alarm symptoms/signs (e.g., pain, infection, haematuria, fever) that warrant further specific diagnosis.	Strong
Assess quality of life when evaluating and treating neuro-urological patients.	Strong
Use available validated tools for urinary and bowel symptoms in neuro-urological patients.	Strong
Use MSISQ-15 or MSISQ-19 to evaluate sexual function in multiple sclerosis patients.	Strong
Acknowledge individual patient disabilities when planning further investigations.	Strong
Describe the neurological status as completely as possible, sensations and reflexes in the urogenital area must all be tested.	Strong
Test the anal sphincter and pelvic floor functions.	Strong

Perform urinalysis, blood chemistry, bladder diary, post-void residual, incontinence quantification and urinary tract imaging as initial and routinary evaluation.	Strong

MSISQ 15/19 = Multiple Sclerosis Intimacy and Sexuality Questionnaire 15/19 question version.

Urodynamic tests

Bladder diaries are considered a valuable diagnostic tool in patients with neuro-urological disorders. A bladder diary should be recorded for at least two to three days. Uroflowmetry and ultrasound assessment of post-void residual should be repeated at least two or three times in patients able to void. Invasive urodynamic studies comprise mandatory assessment tools to determine the exact type of neuro-urological disorder. Video-urodynamics combines filling cystometry and pressure flow studies with radiological imaging. Currently, video-urodynamics is considered to provide the most comprehensive information for evaluating neuro-urological disorders.

Recommendations for urodynamics and uro-neurophysiological tests

Recommendations	Strength rating
Perform a urodynamic investigation to detect and specify lower urinary tract (dys-)function, use same session repeat measurement as it is crucial in clinical decision making.	Strong
Non-invasive testing is mandatory before invasive urodynamics is planned.	Strong

Use video-urodynamics for invasive urodynamics in neuro-urological patients. If this is not available, then perform a filling cystometry continuing into a pressure flow study.	Strong
Use a physiological filling rate and body-warm saline.	Strong
Perform blood pressure and heartrate monitoring during urodynamic investigation and other invasive procedures in patients at risk for autonomic dysreflexia.	Strong

Disease Management

The primary aims and their prioritisation when treating neuro-urological disorders are:

1. protection of the upper urinary tract;
2. achievement (or maintenance) of urinary continence;
3. restoration of (parts of) LUT function;
4. improvement of the patient's quality of life (QoL).

Further considerations are the patient's disability, cognition, social support, caregiver support, cost-effectiveness, technical complexity and possible complications.

Conservative treatment

Assisted bladder emptying

Triggered reflex voiding is not recommended as there is a risk of pathologically elevated bladder pressures. Only in the case of absence or surgically reduced outlet obstruction it may be an option.

Caution: bladder compression techniques to expel urine (Credé) and voiding by abdominal straining (Valsalva manoeuvre) create high pressures and are potentially hazardous, and their use should be discouraged.

Rehabilitation

In selected patients, pelvic floor muscle exercises, neuromodulation, and biofeedback, might be beneficial.

External appliances

Social continence for the incontinent patient can be achieved using an appropriate method of urine collection.

Medical therapy

A single, optimal, medical therapy for patients with neuro-urological symptoms is not yet available. Muscarinic receptor antagonists are the first-line choice for treating neuro-urological disorders.

Recommendations for drug treatment

Recommendations	Strength rating
Use antimuscarinic therapy as the first-line medical treatment for neurogenic detrusor overactivity.	Strong
Do not use mirabegron with the intention of reducing urodynamically proven neurogenic detrusor overactivity.	Strong
Prescribe α-blockers to decrease bladder outlet resistance.	Strong
Do not prescribe parasympathomimetics for underactive detrusor.	Strong

Recommendations for catheterisation

Recommendations	Strength rating
Use intermittent catheterisation as a standard treatment for patients who are unable to empty their bladder.	Strong
Thoroughly instruct patients in the technique and risks of intermittent catheterisation.	Strong
Avoid indwelling transurethral and suprapubic catheterisation whenever possible.	Strong

Recommendations for intravesical drug treatment

Recommendations	Strength rating
Offer intravesical oxybutynin to neurogenic detrusor overactivity patients with poor tolerance to the oral route.	Strong

Recommendations for botulinum toxin A injections

Recommendations	Strength rating
Use botulinum toxin injection in the detrusor to reduce neurogenic detrusor overactivity in multiple sclerosis or spinal cord injury patients if antimuscarinic therapy is ineffective.	Strong

Surgical treatment
Recommendations for surgical treatment

Recommendations	Strength rating
Offer bladder augmentation in low bladder compliance and/or refractory neurogenic detrusor overactivity.	Strong
Place an autologous urethral sling as first-line treatment in female patients with neurogenic stress urinary incontinence (SUI) who are able to self-catheterise.	Strong
Place a synthetic urethral sling, as an alternative to autologous urethral slings, in selected female patients with neurogenic SUI who are able to self-catheterise.	Weak
Insert an artificial urinary sphincter in selected female patients with neurogenic SUI; however, patients should be referred to experienced centres for the procedure.	Weak
Insert an artificial urinary sphincter in male patients with neurogenic SUI.	Strong
Consider sacral neuromodulation in selected neuro-urological patients.	Strong

Urinary tract infections (UTI)

Patients with neuro-urological disorders, especially those with spinal cord injury, may have other signs and symptoms in addition to, or instead of, traditional signs and symptoms of a UTI in able-bodied individuals.

Recommendations for the treatment of UTI

Recommendations	Strength rating
Do not use dipstick urine analysis to screen for urinary tract infection (UTI) in neuro-urological patients.	Strong
Do not screen for or treat asymptomatic bacteriuria in patients with neuro-urological disorders.	Strong
Avoid the use of long-term antibiotics for recurrent UTIs.	Strong
In patients with recurrent UTIs, optimise treatment of neuro-urological symptoms and remove foreign bodies (e.g., stones, indwelling catheters) from the urinary tract.	Strong
Individualise UTI prophylaxis in patients with neuro-urological disorders as there is no optimal prophylactic measure available.	Strong

Sexual function and fertility

Patients with neurological disease often suffer from sexual dysfunction, which frequently impairs QoL.

Recommendations for erectile dysfunction

Recommendations	Strength rating
Prescribe oral phosphodiesterase type 5 inhibitors as first-line medical treatment in neurogenic erectile dysfunction (ED).	Strong

Give intracavernous injections of vasoactive drugs (alone or in combination) as second-line medical treatment in neurogenic ED.	Strong
Offer mechanical devices such as vacuum devices and rings to patients with neurogenic ED.	Strong

Recommendations for male fertility

Recommendations	Strength rating
Perform vibrostimulation and transrectal electroejaculation for sperm retrieval in men with spinal cord injury.	Strong
Perform microsurgical epididymal sperm aspiration, testicular sperm extraction and intracytoplasmic sperm injection after failed vibrostimulation and/or transrectal electroejaculation in men with spinal cord injury.	Strong
Counsel men with spinal cord injury, at or above Th 6, and fertility clinics about the potentially life-threatening condition of autonomic dysreflexia.	Strong

Recommendations on female sexuality and fertility

Recommendations	Strength rating
Do not offer medical therapy for the treatment of neurogenic sexual dysfunction in women.	Strong

Take a multidisciplinary approach, tailored to individual patient's needs and preferences, in the management of fertility, pregnancy and delivery in women with neurological diseases.	Strong

Follow-up

Neuro-urological disorders are often unstable and the symptoms may vary considerably, even within a relatively short period. Regular follow-up is therefore necessary.

Recommendations for follow-up

Recommendations	Strength rating
Assess the upper urinary tract at regular intervals in high-risk patients.	Strong
Perform a physical examination and urine laboratory every year in high-risk patients.	Strong
Any significant clinical changes should instigate further, specialised, investigation.	Strong
Perform urodynamic investigation as a mandatory baseline diagnostic intervention in high-risk patients at regular intervals.	Strong

Summary

Neuro-urological disorders present a multifaceted pathology. Extensive investigation and a precise diagnosis are required before the clinician can initiate individualised therapy. Treatment must take into account the patient's medical and physical condition and expectations with regard to his/her future social, physical, and medical situation.

This short booklet text is based on the more comprehensive EAU Guidelines (ISBN 978-94-92671-29-5) available to all members of the European Association of Urology at their website, http://www.uroweb.org/guidelines.