GUIDELINES ON NEUROGENIC LOWER URINARY TRACT DYSFUNCTION

(Text update March 2009)

M. Stöhrer (chairman), B. Blok, D. Castro-Diaz, E. Chartier-Kastler, P. Denys, G. Kramer, J. Pannek, G. del Popolo, P. Radziszewski, J-J. Wyndaele

Introduction

Before the 1980s, considerable morbidity was associated with renal failure in patients with neurogenic lower urinary tract dysfunction (NLUTD). Most patients with NLUTD require life-long care to maintain their quality-of-life (QoL) and maximize life-expectancy. Significant technological developments that have occurred over the last 30 years have helped to achieve these goals.

Methodology

Where possible, the Panel has used a three-tier system (A–C) to grade treatment recommendations and thus assist clinicians in determining the validity of a recommendation.

Terminology

The terminology used and the diagnostic procedures outlined follow the recommendations for the investigation of the lower urinary tract (LUT) published by the International Continence Society (ICS).

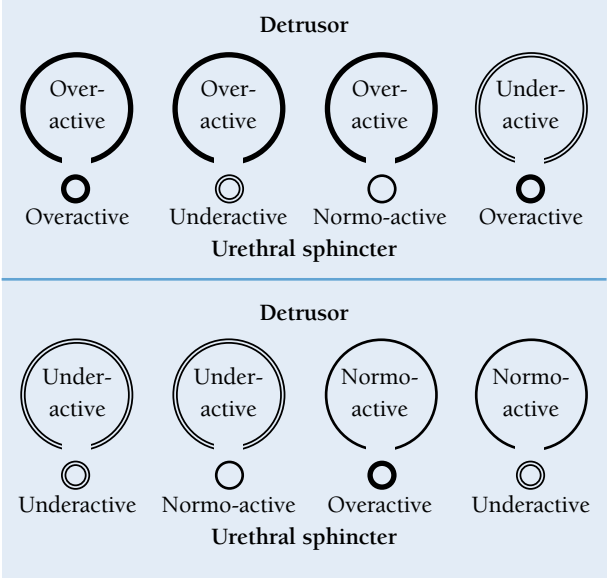
Risk factors and epidemiology

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

Classification

Several classification systems have been proposed for NLUTD. The Panel recommends a functional classification for motor function based on urodynamic and clinical findings (Figure 1).

Figure 1. The EAU-Madersbacher classification system.



Adapted from Madersbacher et al.

Timing of diagnosis and treatment

In both congenital and acquired NLUTD, early diagnosis and treatment are essential, as irreversible changes within the LUT may occur, even when the related neuropathological signs are normal. Also, remember that NLUTD can, by itself, be the presenting feature of neurological pathology.

Diagnosis

Patient assessment

Diagnosis of NLUTD 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 and disorders of the urinary tract, bowel, and 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.

Fig. 2 - The neurological status of a patient with NLUTD must be described as completely as possible (a - dermatomes b - associated reflexes).

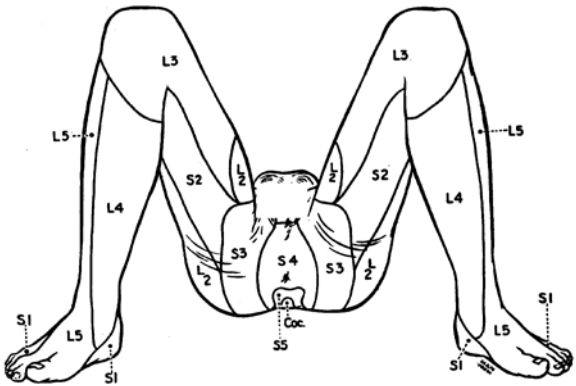


Fig. 2a – Dermatomes of spinal cord levels L2-S4.

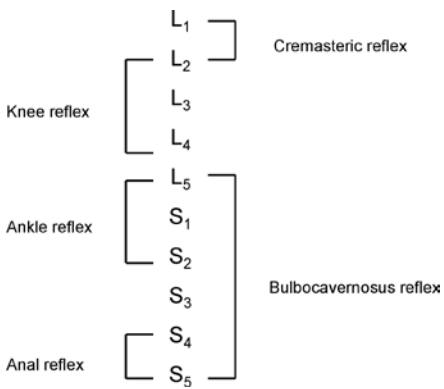


Fig. 2b – Urogenital and other reflexes in lower spinal cord.

Urodynamic tests

A bladder diary should be recorded for at least 2–3 days. Uroflowmetry and ultrasound assessment of post-void residual should be repeated at least 2 or 3 times in patients able to void.

Invasive urodynamic studies comprise mandatory assessment tools to determine the exact type of NLUTD (Table 1).

Table 1: Guidelines for urodynamics and uro-neurophysiology tests in NLUTD

Guidelines for urodynamics and uro-neurophysiology tests	GR
• Urodynamic investigation is necessary to document the (dys-)function of the LUT (10)	A
• The recording of a bladder diary is advisable	B
• Non-invasive testing is mandatory before invasive urodynamics is planned	A
• Video-urodynamics is currently the preferred method for invasive urodynamics in patients with NLUTD. If this is not available, then a filling cystometry continuing into a pressure flow study should be performed	A
• For standard urodynamic testing, a physiological filling rate (see Table 1, e.g. not faster than 20 mL/min) and body-warm fluid must be used	A
• Specific uro-neurophysiological tests and provocative manoeuvres (e.g. fast filling cystometry with cooled saline [the 'ice water test'], coughing, tapping, anal stretch) are elective procedures (10, 12)	C

GR = grade of recommendation

Filling cystometry is the only procedure that quantifies the filling function of the bladder. However, when filling cystometry is used alone, the results have limited significance.

Measurement of detrusor leak point pressure (DLPP) has limited diagnostic value; it is not recommended as a stand alone test.

Pressure flow studies: the function of the LUT must also be recorded during the voiding phase.

Video-urodynamics combines filling cystometry and pressure flow studies with radiological imaging. Currently, video-urodynamics is considered to provide the most comprehensive information evaluating NLUTD.

Electromyography (EMG) is a semi-quantitative measure of pelvic floor activity, which can be used to detect DSD and pelvic floor relaxation disorders.

Table 2: Characteristic findings in NLUTD*

Filling phase
- Increased, decreased or absent bladder sensation
- Vegetative non-specific sensations
- Low bladder compliance
- High capacity bladder
- Detrusor overactivity, spontaneous or provoked
- Incompetent urethral closure mechanism

Voiding phase
- Acontractile or underactive detrusor

- Bladder outlet obstruction
- Detrusor/sphincter dyssynergia (DSD)
- Non-relaxing urethral sphincter obstruction

These signs warrant further neurological evaluation, as LUTD may be the presenting symptom of a neurological disease

**modified from ICS publication (6)*

Treatment

Introduction

Treatment of NLUTD aims to protect the upper urinary tract, and improve continence, QoL and, whenever possible, LUT function.

In patients with a high detrusor pressure in the filling phase, the principal aim of treatment is conversion of an overactive, high-pressure bladder into a low-pressure reservoir; even if this should result in a high post-void residual. The patient's QoL is a prime consideration when making any treatment decision.

Conservative treatment

Drug treatment for neurogenic detrusor overactivity (NDO)

Antimuscarinic agents are currently the most widely used treatment, although most of the available drugs have not been registered for the treatment of this patient population. Antimuscarinic agents can also be given intravesically.

Drug treatment for neurogenic detrusor underactivity

There is no evidence of effective drug treatment for detrusor underactivity.

Drug treatment to decrease bladder outlet resistance

Selective and non-selective alpha-blockers have been partially successful in decreasing bladder outlet resistance, residual urine and autonomic dysreflexia.

Catheterization

Intermittent, self- or third-party, catheterization (IC) is the gold standard for the management of NLUTD. Compared to clean IC, aseptic IC, provides significant benefit in reducing the potential for contamination.

On average, catheterization, using a 12–14 Fr catheter, is needed 4–6 times per day.

Indwelling transurethral catheterization and, to a lesser extent, suprapubic cystostomy should be avoided as they are risk factors for UTI and significant long-term complications. If indwelling catheters must be used, empirical evidence and expert opinion suggests silicone catheters provide advantages over latex catheters.

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.

Bladder compression techniques to expel urine (Crede) 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, pelvic floor electro-stimulation and biofeedback might be beneficial.

External appliances

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

Minimally invasive treatment

Botulinum toxin A injections in the bladder

Botulinum toxin A causes a long-lasting (approximately 9 months), reversible, chemical denervation.

Intravesical vanilloid treatment

Resiniferatoxin and capsaicin have limited clinical efficacy compared to botulinum toxin A injected in the detrusor.

Bladder neck and urethral procedures

Reduction of the bladder outlet resistance, to protect the upper urinary tract, can be achieved by sphincterotomy or chemical denervation of the sphincter using botulinum toxin A. Insertion of urethral stents is not recommended.

Increasing bladder outlet resistance using bulking agents or urethral inserts, or alternative appliances is not recommended for long-term treatment.

NDO and reflux

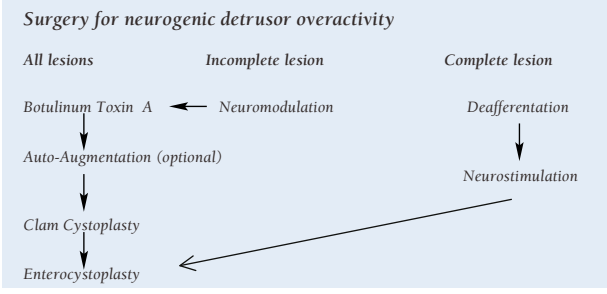
Vesico-ureteral reflux should be managed by lowering intravesical pressure. If reflux is persistent, intervention using bulking agents or ureteral re-implantation can be considered.

Surgical treatment

Overactive detrusor

Bladder augmentation/clam cystoplasty is indicated for an overactive detrusor, when less invasive procedures have failed. Alternative options include: auto-augmentation (myomectomy), dorsal rhizotomy, with or without sacral anterior root stimulation (SARS) (complete lesions), and neuromodulation (incomplete lesions). Substitution, with either continent, or incontinent diversion, is indicated for the small contracted non-compliant bladder.

Fig. 3 – Surgery for neurogenic detrusor overactivity.



Underactive detrusor

SARS (complete lesions) and sacral neuromodulation (incomplete lesions) are effective in selected patients.

Sphincter insufficiency (underactive urethra)

The artificial urinary sphincter is the preferred tried and tested treatment.

Procedures to treat sphincter incompetence are suitable only

when the detrusor activity is, or can be, controlled and there is no significant associated vesico-ureteral reflux.

Quality of life

QoL represents a very important aspect in the global management of the patient who has NLUTD. Restoration and maintenance of the patient's QoL it as much as possible, should be one of the major aims of treatment. QoL should be integral to the evaluation of lower urinary tract symptoms in patients with NLUTD and also, when considering any type of treatment for neurogenic bladder dysfunction.

Follow-up

Meticulous follow-up and regular checks are essential (43). Individualized patient follow-up is imperative to safeguard QoL and life expectancy. The underlying pathology and the state of the urinary tract dictate the frequency of follow-up required.

Table 3: Minimum follow-up required in patients with NLUTD*

Investigation	Frequency	GR
Urinalysis	At least once every 6 months	A
Ultrasound of the upper urinary tract, bladder status, post void residual	Every 6 months	A
Physical examination, blood biochemistry and urine microbiology	Annually	A

(Video-) urodynamic investigations in patients without detrusor overactivity and with normal bladder compliance	Every 2 years	A
(Video-) urodynamic investigations in patients with detrusor overactivity, and/or low bladder compliance	At least once a year	A
The need for detailed special investigations must be determined on the basis of the patient's risk profile (see above), but should, where indicated, include a video-urodynamic study, which should be carried out in an institution with neuro-urological expertise		
**Grades of recommendation assigned on basis of Panel consensus* *GR = grade of recommendation*		

Summary

NLUTD is a multi-faceted pathology. Extensive investigation and a precise diagnosis are required before the clinician can initiate individualized 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 978-90-70244-91-0), available to all members of the European Association of Urology at their website - http://www.uroweb.org.