### Aims of Workshop

In the past decades, the aim of the urologist was to treat the neurogenic bladder dysfunction through antimuscarinics and surgical procedures (e.g. bladder augmentation). More recently, new drugs have been approved and new surgical procedures have been developed, but more importantly a new role for the multidisciplinary approach has been established. We will encourage this new concept of treatment to the audience, taking into account differences in incomes of different societies. This a new workshop based on the state of the art knowledge and latest techniques that are available and with an international panel of experts we will extent our experience in working under different economic circumstances.

### Learning Objectives

1. Identify the different patterns of neurological bladder impacts of neurologic diseases.
2. Transmit the state of the art in treatment and improving quality of life in patients.

### Learning Outcomes

After the course, we will expect that the participants will:

- Identify basic neurological patterns of bladder activity and malfunction.
- Demonstrate technically correct interpretation of urodynamic patterns.
- Understand how a multidisciplinary working team will represent a benefit.
- Identify, according to each economic possibility, how they can improve the quality of life of their patients.

### Target Audience

Urologist, physiotherapist.

### Advanced/Basic

Basic

### Conditions for Learning

Interactive.

### Suggested Learning before Workshop Attendance

- ICS teaching module: Cystometry (basic module).
- ICS teaching module: Analysis of voiding, pressure flow analysis (basic module).

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**Understanding clinical differences in neurodegenerative diseases**

**Dr Christian Cobreros, MD**

Understanding clinical presentations in lower urinary tract dysfunction due to neurological disorders is very challenging. Nevertheless, we do know that a wide variety of neurological conditions, acute or chronic, may affect the functionality of the bladder, or sphincter, or the pelvic floor musculature innervation resulting in different conditions as well as similar ones. Their clinical presentations is determined by the site and the nature of the lesion.

In a simple classification, but a very useful one, is to base the clinical urodynamic findings in terms of the lesion level, we also expected classical symptoms for each level:

- **Suprapontine lesion**: detrusor over activity due the lack of cortical inhibition, so storage symptoms are to be expected.
- **Pontine micturition**: if its preserved the control of the coordination of detrusor–sphincter mechanism will be preserved, as this center is the responsible for the coordination of the relaxation of the sphincter and pelvic floor musculature during bladder contraction
- **Infrapontine-suprasacral lesions**: this patient may present with a variety of clinical presentations due to a complete or partial lesion, in case of cortex and coordinated signal from the pontine center are injured the patient could present with neurogenic and detrusor over activity and sphincter dyssynergia
- **Sacral micturition center**: when this center is compromise we should expect involuntary contractions of the bladder as if it is a reflex center for bladder contractions
- **Infrasacral lesions**: In these lesions, even the reflex bladder contractions are lot due to and interruption of the signals between the bladder and all micturition centers, which will result in a clinical manifestation of a neurogenic detrusor underactivity or arreflexic detrusor or even a sphincter deficiency.

Although this systematic and practice review of lesion level of neurogenic urological disease the clinical presentations in neurogenerative diseases may vary form presented above, and this classification although its more useful in traumatic lesions but in the clinical practice in neurogenerative diseases we should expected some evolution of the clinical presentations and in some cases a completed different pattern within the clinical evaluation due to a progressive neurological disease
Suprapontine Lesion (Brain)

Cerebrovascular Accident (Stroke)
- acute phase of CVAs patients
- post-acute (chronic) phase of stroke
- LUT dysfunction following stroke

Degeneration disease and syndromes
- Parkinsonian Syndrome
- Multiple System Atrophy
- Alzeihemer disease
- Intracranial tumors

Spinal cord: Infrapontine-Suprasacral lesions
- Demyelination (multiple sclerosis, transverse myelitis)

Spinal Cord and Peripheral Nervous System: Sacral-Infrasacral Lesion
- Intervertebral Disk Prolapse
- Peripheral Neuropathies (Diabetes Diabetes mellitus, radiation therapy)

References

JacquesCorcos, Mikolaj Przydacz Consultation in Neurourology A Practical Evidence-Based Guide. https://doi.org/10.1007/978-3-319-63910-9 . Springer 2018


Physiotherapy assessment of patients with neurogenic bladder. Keeping the whole patient in mind
Dr Beth Shelly PT, DPT, WCS, BCB PMD

Summary of PT Assessment
- Bladder function and voiding
- Neurological testing
- Mobility and movement
- PFM function
  - Tone
  - Coordination

Intake (Stohrer 1999, NICE 2012, Apostolidis 2017, Unger 2014)
- Social and family - caregiver availability
- Cognitive ability - mini mental test
• Urinary incontinence
  ▪ Predictability of UI
  ▪ Position UI occurs in
  ▪ Other circumstances related to UI
  ▪ Current and past treatments: catheter, pads, pessary, clamp
  ▪ Bother and QOL impact
• Mode of voiding
  ▪ Position
  ▪ Continuous or intermittent stream
  ▪ Hesitancy or weak stream
  ▪ PVR or sensation of incomplete emptying
  ▪ Initiation of voiding
    o Voluntary
    o Increased intra-abdominal pressure: crede, abdominal straining
    o Triggered voiding: tapping, scratching
  ▪ Self-catheterization
• Measured volume bladder diary
  ▪ Record volume of voluntary void
  ▪ Results of any triggered void or bladder expression
  ▪ Record volume of intermittent catheter void
  ▪ Type and volume of fluid intake
  ▪ Success of urge suppression
  ▪ Sensations of bladder filling - urgency, reduced, absent, abdominal fullness, increased spasticity, autonomic dysreflexia
  ▪ Colored urine test - pyridium

Neurological Physical Examination (Stohrer 1999, NICE 2012, Apostolidis 2017)
• Sensation of S2-5: sharp/dull, light touch
• Reflexes: (Drake 2013)
  ▪ S4, 5 - anal wink
  ▪ L5 to S5 - bulbocavernosus reflex
  ▪ L2 to L4 - knee reflex
  ▪ L5 to S2 - ankle reflex
  ▪ L1, 2 - cremasteric reflex

The whole body - mobility and function
• ROM of lower body for positioning on the toilet
• Sitting balance on toilet
• Mobility for ambulation to the bathroom and transfers on and off toilet
• Finger dexterity for undressing, hygiene and catheter use

PT Physical Examination - PFM
• Full digital assessment of PFM per vagina and or rectum
• Tone – esp the ability to relax fully subjectively assessed with manual palpation
• Voluntary contraction - ability to sustain a PFM contraction

Hypertonic PFM
• An increase in muscle tone related to the contractile or viscoelastic components that can be associated with either elevated contractile activity and/or passive tension in the muscle
• Digital testing
  ▪ Relaxation post contraction
  ▪ Ability to maintain relaxation
  ▪ Descent of PFM with bearing down
  ▪ Resting tension
Devreese tone grading scale – good reliability (Devreese 2004)
• Measured superficial and deep
• Hypotonic
  ▪ Wide and weak
  ▪ Reduced mm bulk, easy drop
• Normotonic
  ▪ Index finger can move
  ▪ Normal smooth suspension
• Hypertonic
  ▪ Tightness with firm band
  ▪ Finger cannot move down
De Ridder – used in MS patients (De Ridder 1998)
• 3 - active relaxation after contraction
• 2 - hypertonic with relaxation after manual elongation
• 1 - spasm unable to relax even after passive elongation
• May be difficult to know what normal resting level is

Hypotonic PFM
• An decrease in muscle tone related to the contractile or viscoelastic components that can be associated with either decreased contractile activity and/or passive tension in the muscle
• Voluntary contraction
  ▪ Strength
  ▪ Endurance
  ▪ Motor control and coordination

Surface EMG (sEMG) assessment of PFM - diagnosis
• Surface EMG measures muscle activation patterns
• Intramuscular or concentric needle EMG would be necessary to diagnose
  ▪ Normal
  ▪ Denervated
  ▪ Reinnervated
  ▪ Myopathic

Surface EMG assessment of PFM
• Ability of the PFM to relax fully when needed – defecation and urination
• Ability of the PFM to contract fully standard contract relax test

Surface EMG (sEMG) assessment of PFM - tone
• Ideally tools such as intra-vaginal pelvic floor dynamometry or Myotonometer are best for full assessment of tone however they are not easily clinically available
• Only the contractile competent of hypertonic PFM can be measured by sEMG
• Amount of muscle activity registered in sEMG signal is limited by adipose tissue, hair, and other factors of skin conductance

Bearing down test
• Bearing down with abdominal bulge = PFM relax
• Bearing down with inward abdominal contraction = PFM contraction
• Paradoxical PFM contraction – PFM contracts during proper bearing down
• Leads to obstructed defecation and urination
• Performed with external peri-rectal electrodes
• Lying down or sitting on a commode
Not a perfect test
• Fear - Patients are reluctant to bear down and fully relax for fear of passing gas
• Position - Lying down on a table and bearing down is not natural
• EMG artifact – skin electrode shear resulting in increased EMG signal

EMG during voiding
• Arrive to clinic with full bladder
• Place external peri-rectal electrodes
• Patient sits on commode with external EMG
• Leave the room and allow machine to save data
Perineal Surface Electromyography Does Not Typically Demonstrate Expected Relaxation During Normal Voiding. (Kirby 2011)
• 6.5% had EMG signal at 0 for the entire study
• 88.2% had EMG activity during flow

Many neurological conditions result in combinations of dysfunctions and various intensities of dysfunctions
It is essential to consider all dysfunctions and work closely with medical professional to determine the correct treatment approach.
More comprehensive chart provided in Unger 2014

<table>
<thead>
<tr>
<th>Location of Lesion</th>
<th>Type of dysfunction</th>
<th>Simple description</th>
<th>Therapy directed toward</th>
</tr>
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<tr>
<td>Supraspinal lesions - lesions above the brain stem</td>
<td>Neurogenic detrusor overactivity (NDO) with normal sphincter</td>
<td>Bladder is squeezing too much</td>
<td>Decrease overactive bladder</td>
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<tr>
<td>Spinal lesions</td>
<td>NDO with detrusor sphincter dyssynergia (DSD)</td>
<td>Sphincter is squeezing too much</td>
<td>Increase bladder contraction during voiding</td>
</tr>
<tr>
<td>Lower motor neuron lesions - lesions of the conus medularis or lower</td>
<td>Neurogenic detrusor underactivity (Areflexic bladder)</td>
<td>Bladder is not squeezing enough</td>
<td>Increase bladder contraction during voiding</td>
</tr>
<tr>
<td></td>
<td>Striated sphincter denervation or weakness</td>
<td>Sphincter is not squeezing enough</td>
<td>Increase sphincter contraction</td>
</tr>
</tbody>
</table>

References


NICE Guideline 148 - Urinary Incontinence in Neurological Disease 2012


Video - Urodynamic value in patients. When? Why? Are there any other diagnostic methods that you should use? Dr Christian Cobreros, MD

We do know that videourodynamics it’s an invaluable helpful study as to be consider the “gold standard” procedure in the investigation of the urinary tract in patients with neurogenic disorder. This study provides an anatomical and functional way to understand the clinical presentations of the urological disease that is almost difficult to replace. But not in all countries, cities or medical insurance this kind of study is available.

We will go in this work shop through formal indications, as well as try to define if there is another studies (less expensive or more available) that could replace video Urodynamics as to give us the more suitable information and the awareness of any complication of our neurological patients in developing countries where this procedure is not always available.

Video Urodynamics

This study as a combination of a urodynamic study and fluoroscopic monitoring in real time helps as to identifies anatomical and functional abnormalities of the urinary tract.

Filling cystometry: the visualization of the bladder neck help to determine the level of continence, if its open it may indicate a disorder of the sympathetic bladder innervation resulting in neurogenic sphincter dysfunction. In combination with multichannel urodynamics detrusor contractions can be measured as well as con be detected by the images and any leakage of
urine can be detected at earlier time points using fluoroscopy rather than the standard uroflow sensor.

Pressure flow studies: is absolutely helpful in detecting the point of obstruction when high pressure/low flow exist. In patients that are suspected to have sphincter dyssynergia this study combined with electromyography helps in accurate diagnosis. As well as to identify vesicoureteral reflux.

**Case presentations**

- Patients with Retention Due to Detrusor- Sphincter Dyssynergia DSD
- Intrinsic sphincter deficiency (leakage without urethral hypermobility) in neurological patients
- Peripheral neuropathy
- Vesicoureteral reflux

**References**


**It is always easy to differentiate urgency from another clinical presentation of these patients (e.g. pain, hypersensitivity, bladder irritation, infection)? How can we avoid over medication?**

David Castro Diaz, MD, PhD

Many different conditions affecting the lower urinary tract function origin in the nervous system and it is important to recognise that lower urinary tract symptoms (LUTS) may be one of the first signs of neurodegenerative disorders such Alzheimer’s disease (AD), Parkinson’s disease (PD), dementia and PD-related disorders, Huntington’s disease (HD), Spinocerebellar ataxia (SCA) or Spinal muscular atrophy (SMA).

The symptom “Urgency”, defined as “the complaint of a sudden compelling desire to pass urine, which is difficult to defer”, is sometimes one of the first symptoms indicating a neurodegenerative disorder which may later lead the patient to a fatal outcome. PD patients and others with neurodegenerative disorders, suffer loss of dopaminergic neurons inducing deficit or abnormality of the neurologic control of micturition. More than 60% of patients with PD have LUTS and 30 % refer urinary incontinence. Patients suffering neurodegenerative disorders often express LUTS and its onset may even serve as a diagnostic marker. Patients with bladder pain syndrome/Interstitial cystitis (BPS/IC) and those with hypersensitive bladder, usually refer the symptom of urgency as linked to
fair to pain while patients with neurodegenerative disease or overactive bladder may express urgency as linked to fair to incontinence. However, differentiating urgency from another clinical presentation is not easy particularly in patients with cognitive disorders.

The onset of disease and timescale of symptoms may give clues to the cause of urinary problems. In some cases, LUTS occur early, in the course of disease, whereas in others they may develop later, and could be confused with dysfunctions of a non-neurogenic origin, such as benign prostatic enlargement or bladder outlet obstruction. The extent to which symptoms ‘bother’ the patient is important and should be determined both subjectively and objectively, through a proper clinical history and the use of a voiding diary, questionnaires and quality of life evaluation. This approach enables us to match therapy with patient’s motivation, and to monitor the success of treatment. The physical status of the patient will have an important influence on the capabilities for maintaining a therapeutic strategy.

Attention should be paid to any medications taken by the patient, as several drugs can have detrimental effects on the urinary tract. For example, diuretics prescribed for hypertension are associated with bladder overstretching. Furthermore, the use of any antihypertensive agent in younger patients should alert the urologist to the likelihood kidney dysfunction due to obstructive uropathy. Drugs that can alter the functioning of the urinary tract include opiate-containing painkillers, which reduce bowel motility and antiparkinsonian agents which act as parasympatholytics and so impair detrusor contractility. Muscle relaxants used to treat spasticity may also cause bladder hypocontractility and urinary retention; alternatively, they can induce pelvic floor laxity leading to stress incontinence.

Sufferers of neurodegenerative disorders and elderly people require taking multiple medications which may have side effects and unwanted drug reactions. Muscarinic receptors antagonists have been shown to cause cognitive disorders in elderly patients and should be used with caution in patients with neurodegenerative disorders preferably choosing those drugs which do not cross the blood-brain barrier. As some commonly used drugs have antimuscarinic properties it is important to avoid overmedication that may increase the exposure to side effects. Potential signs of overmedication include drowsiness, physical complications like dry mouth and ulcers, confusion, withdrawal from family or friends, hallucinations, dizziness or falls, fractures and seizures.

**Oral medication. What do we have today? Is combination better? How to decide when to move to another step?**

Dr Christian Cobreros, MD

We will review the most current literature on oral medication for neurogenic bladder to treat not only detrusor overactivity, but also to improve bladder capacity, compliance and to treat urinary incontinence.

This medical therapies will be discuss in this section as we do have another section in wich advances therapies as onatoxinabotulinum will be discuss. At the same time we will go into the improve of quality of life of single drug vs combination and when it's the optimal time to move to the next step.

- **Drugs that have action in the storage phase**
  - Antimuscarinic drugs
    - Choice of Antimuscarinic agents
    - Side-effects
      - Why do they have such a great drop out?
    - Agonist \( \beta_3 \)
    - Its combination better ?

- **Drugs that have action in the pressure flow phase**
  - Alpha blockers
  - Phosphodiesterase inhibitors (PDE5Is)

- **Drugs with different mechanisms of action**
  - Detrusor underactivity
  - Decreasing bladder outlet resistance
  - Increasing bladder outlet resistance

- Its combination better ?

- **When to move to the next step**

References
Surgical approach: neurostimulation, botulinum toxin, neuromodulation, bladder augmentation

Carlos D’Ancona, UNICAMP, Brazil

The surgical approach in neurogenic detrusor overactivity is indicated when failures occur in pelvic floor muscles training and drugs administration. The classification of failure is not well defined but we can consider it to be, when the patient is unsatisfied.

Between neurostimulation, neurotoxin, neuromodulation and bladder augmentation, the question is how to choose one of this? Transcutaneous or percutaneous nerve stimulation is a minimal invasive treatment with good response in patients with multiple sclerosis and Parkinson’s disease. The botulinum toxin has the advantage that is reversible after 8 to 12 months. Can be use as test before a definite treatment. The results of BT are excellent improving in symptoms, in urodynamics and Quality of Life. There is still the question for how long it is possible to use this treatment. Many papers show that it is effective for more than 10 years.

For neuromodulation treatment, there should be some neuronal connections between the bladder and brain. So, patients with complete spinal cord injury are not a candidate for implantation of neuromodulation. However, patients with multiple sclerosis and Parkinson disease present good results with a long follow up.

Performing bladder augmentation decreased much due to the other techniques used. This technique presents some adverse effects such as bladder stone, urinary tract infection, perforation of the reservoir and others. The advantages of this technique are the long-term good results. Myelomeningocele and spinal cord injury patients have a great life expectancy and this technique should be considered.

References


The role of Physiotherapy and a Multidisciplinary team in the daily life of patients. Can we improve their quality of life if we work together?
Dr Beth Shelly PT, DPT, WCS, BCB PMD

Overall Conservative management of neurogenic bladder
- Individualized to the patient in cooperation with caregivers
- Little high level evidence for any one treatment
- NICE guidelines give good outline of evidence related to treatment (NICE 2012)
- Overall goals of treatment is protection of upper urinary tract and improvement in QOL

Therapies to decrease overactive bladder (Wein 2002)
- Bladder training, timed voiding, habit training, prompted voiding, fluid management - a suitable component of a rehabilitation program level C (Drake 2013)
- PFM training with or without biofeedback
- Electrical stimulation

Therapies to decrease PFM tension / spasm and improve PFM relaxation during emptying
- Manual stretching of PFM does not appear to have a lasting impact
- Biofeedback-assisted PFM coordination training
  - PFM relaxation
  - Train on the toilet with external EMG during voiding

Therapies to increase bladder contraction during voiding
- Intermittent catheterization - accepted standard (Drake 2013)
- Triggered Reflex Voiding - Provocation of bladder contraction
  - Attempts to initiate reflex detrusor contraction
  - Inappropriate if urodynamics show
    - Signs of reflux
    - Inadequate detrusor contraction – need some intact muscle fibers to provoke
    - Outlet obstruction of any type including PFM tension
  - Reflex voiding may result in autonomic dysreflexia in patients with neurological disorders: paroxysmal HTN, anxiety, sweating, HA, bradycardia
  - Has a limited role and can be potentially dangerous (Drake 2013)
  - Techniques
    - Suprapubic tapping or percussion: 7-8 percussions with intervals of a few seconds (as fast as you can); gross reflex contraction of the detrusor and EUS, when tapping stops the EUS should relax while detrusor contraction continues
    - Thigh scratching
    - Anorectal manipulation
    - Pubic hair pulling
    - Stroking / tickling lower back
- Bladder expression - Increasing intra abdominal pressure
  - Aggressive techniques and dangerous maneuvers done with caution (Drake 2013)
  - Not used in patients with reflux, PFM spasm or DSD
  - Lean forward - Leaning forwards places slight compression on the abdomen, changes the angle of the bladder and urethra, and may encourage emptying.
  - Gentle whistling, blowing a toy or balloon – pursed lipped exhaling against mild resistance provides gentle increased intra-abdominal pressure and encourages PFM relaxation and urine emptying.
  - Valsalva maneuver – Bearing down with closed glottis significantly increased intra abdominal pressure and may help relax the PFM and encourage bladder emptying. May result in POP or hemorrhoids and should only be used in acute cases with physician monitoring.
  - Credé maneuver – Press down onto the bladder just behind the pubic bone. This can initiate a detrusor contraction but can also increase the chance of POP. It should only be used when other methods fail, with physician instruction, in a patient with hypo or atonic bladder.
- Timed voiding / habit training / bladder training
  - Usually very large voiding intervals need to slowly decrease time between voids
  - Goal is to go to the toilet and try to void every 2 to 3 hours
  - May or may not need to use trigger techniques or catheterization

Ideas and Advice to Help Promote Full Voiding
Privacy – Paruresis, also called shy bladder, is the inability to urinate in public. Maintaining as much privacy as possible increases bladder emptying for most patients.

Toilet position - sit fully on the toilet
- Full relaxation of PFM overflow muscles (adductors and gluteals in particular) is necessary for full PFM relaxation and will increase bladder emptying
- Sitting relaxed and supported
- Both feet flat on the floor and fully supported
- Adequate hip flexion to encourage PFM relaxation

Relaxation – Take time to fully relax all muscles for full emptying. In some cases it is helpful to distract yourself on the toilet by reading, singing or reciting a poem. This is especially important in patients with anxiety.

Double voiding - After initial void, stand, move, sit down, and attempt to void again.
- Toilet Exercises - ideas to encourage full emptying, Do not valsalva
  - Sit completely on toilet, relax legs
  - Lean forward bending at the hips 3 times
  - Relax and allow urine to come out
  - Stand up then sit down (double voiding)
  - Relax and allow urine to come out
  - Several gentle PFM contractions and large relaxation
  - Relax and allow urine to come out
  - Do not push

Running water - The sound of running water can initiate voiding however over use of the method can lead to OAB and UUI with the sound of water running.

Therapies to increase sphincter contraction
- PFM training with or without biofeedback
- Overflow or functional PFM training
- Electrical stimulation - may be an option in cases of PFM weakness (not in complete denervation) however no research exists (Drake 2013)

Evidence for conservative management of UI in patients after Stroke
- PFM exercises (PT), timed voiding and prompted voiding (RN), functional bathroom activities (OT) - significant decrease in frequency of accidents and need for assistance to toilet in treatment group as compared to control group. (Couran 2012)
- PFM exercises decrease urinary frequency and UI by pad test RCT (Tibaek 2005)
- PFM exercises added to standard rehabilitation decreased UI by RCT (Skin 2016)
- PFM exercises with bladder retraining - systemic review found little evidence in stroke patients (Dumoulin 2005)
- Restoration of functional mobility - RCT shows benefit in stroke patients (Wilkander 1998)
- UI is a strong predictor of discharge status, functional recovery, and return to social activities. (Dumoulin 2007)

Evidence for conservative management of UI in patients with Multiple Sclerosis
- Best candidate for PT - mild MS, without PFM spasticity or dyssynergia (De Ridder 1999)
- Poor success - elevated PVR (McClurg 2008)
- Guideline recommendations for PFM training
  - Fowler 2009 - UK consensus, grade B
  - Pannek 2012 - EAU guideline, no grade given
  - Cetinel 2013 systematic review and consensus report, grade A
- PFM exercises versus sham - decreased pad weight, number of pads and nocturia (Lucio 2010)
- PFM exercises plus EMG and electrical stimulation vs no treatment RCT (Vahtera 1997)
  - Significant improvement in UI, nocturia, and improved bladder emptying.
  - Men > women
- PFM exercises plus EMG and electrical stimulation vs sham electrical stimulation RCT (McClurg 2008)
  - Significant improvement in UI by pad test, I1Q, UDI, IPPS and decreased PVR
  - 85% in the active group, 47% in the control group
  - PFM strength improved equally in both groups
- Biofeedback assisted PFM exercises are not superior to PFM exercises alone (Klarskov1994)
- Transcutaneous posterior tibial nerve stimulation resulted in significant decrease in urgency, frequency and leakage without increase in PVR - no control group (de Seze 2011)
- TENS to sacral dermatomes (Skeil 2001)
  - Mixed neuro diseases, but mostly MS patients
  - Diary showed significant improvement - decrease in 24 hour frequency, UI episodes and clothing changes
  - Risk for increased PVR
References


NICE Guideline 148 - Urinary Incontinence in Neurological Disease 2012


Tibaek S et al. Pelvic floor muscle retraining is effective in women with urinary incontinence after stroke: a randomized, controlled and blinded study. Neurolou and Urodynam 2005;24:348-357.


Understanding urological clinical differences in neurodegeneratives diseases

Dr. Christian Cobreros
Urology Division - Hospital Carlos G. Durand
Buenos Aires - Argentina

NEUROGENIC LOWER URINARY TRACT DYSFUNCTION (NLUTD)
IS ONE OF THE MOST CHALLENGING PROBLEMS IN UROLOGY
THE TYPE OF DYSFUNCTION DEPENDS ON THE LEVEL, INTENSITY, AND EXTENT OF THE INJURY
AND ALSO TIME-LENGTH OF SPECIFIC DISORDER (STROKE, DIABETES, MS)
NEUROLOGICAL CLINICAL PRESENTATION IS NOT AN STATIC CONDITION

SUPRAPONTINE LESIONS: STROKE
SURVIVORS

10% have no residual effects
40% have mild disability
40% have significant disability
10% require nursing home care
90% Survivors who still required attendance

USA (2020) 8 M survivors 72 Billions usd/year
USA (2030) 30 M survivors 183 Billions usd/year

ACUTE UROLOGIC PRESENTATION
Urinary retention may be the first urologic event to occur after a CVA

"Cerebral sock"

THE PATHOPHYSIOLOGY OF THIS MICTURITION DISTURBANCE INVOLVES:
• there is often a decreased sensation and awareness of bladder filling
• there is damage to higher cortical centers, especially in the frontal lobe

SUPRAPONTINE LESIONS: STROKE
CLASSIFICATION SYSTEM FOR DAY TO DAY CLINICAL PRACTICE
EXPECTED SYMPTOMS AND URODYNAMICS FINDINGS


between ischemic and hemorrhagic stroke patients; can we suggest the category of urinary dysfunction in patients with SA. Incontinence among elderly community control of bodies G, A. Post at least 1 L. Incontinence in the elderly: Prevalence and prognosis. supraspinal MB, Goldstein I, function of UI per week AJ, L. Prevalence of bladder dysfunction – supraspinal CA. Z, M, stimulation. 3 episodes per week patients.

Toxicol Suppl 36


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Carlston
In MSA disease Urinary Symptoms preceeds motors manifestations

This indicates that many of these patients seek urological advice early in the course of their disease.

Multiple Systemic Atrophy (MSA) is a neurodegenerative disease that affects the autonomic nervous system. It is characterized by a combination of symptoms that include urinary incontinence, orthostatic hypotension, and other autonomic functions. The symptoms of MSA often precede the development of motor symptoms, which can be a diagnostic clue for the disease. Urinary symptoms, such as urinary incontinence, are common in MSA patients and can be a presenting symptom. Early recognition and intervention are crucial for managing these symptoms effectively.
Physiotherapy assessment of patients with neurogenic bladder. Keeping the whole patient in mind.

Dr Beth Shelly PT, DPT, WCS, BCB PMD
www.bethshelly.com
International Continence Society Annual Meeting
August 28, 2018 Philadelphia, PA
Workshop 5

My Practice

Freestanding, out patient PT practice in the Midwest (USA) specializing in PFM dysfunction of all types

- Kids – elderly
- Male, female
- All types of community dwelling patients with neurological conditions that affect the LUT
- Most common dx – MS, Parkinson’s, Alzheimer’s

Summary of PT Assessment – The Whole Patient

- Bladder function and voiding
- Neurological testing
- Mobility and movement
- PFM function
  - Tone
  - Coordination

Social and family – caregiver availability

Cognitive ability - Mini mental test

Urinary Incontinence

- Predictability of UI
- Position UI occurs in
- Other circumstances related to UI
- Current and past treatments: catheter, pads, pessary, clamp
- Bother and QOL impact
Mode of Voiding

Position
Continuous or intermittent stream
Hesitancy or weak stream
PVR or sensation of incomplete emptying

Initiation of voiding
• Voluntary
• Increased intra-abdominal pressure: crede, abdominal straining
• Triggered voiding: tapping, scratching
Self-catheterization

Measured Volume Bladder Diary

Record volume of voluntary void
Results of any triggered void or bladder expression
Record volume of intermittent catheter void
Type and volume of fluid intake
Occurrence of leak - circumstances
Success of urge suppression

Measured Volume Bladder Diary

Sensations of bladder filling
• Urgency
• Reduced
• Absent
• Abdominal fullness
• Increased spasticity
• Autonomic dysreflexia

Colored Urine test – Pyridium

Sensation of S2-5: sharp/dull, light touch
**Reflexes: (Drake 2013)**

- S4, 5 - anal wink
- L5 to S5 - bulbocavernous reflex
- L1, 2 - cremasteric reflex
- L2 to L4 - knee reflex
- L5 to S2 - ankle reflex

**PT Physical Examination – the Whole Body**

- ROM of lower body for positioning on the toilet
- Sitting balance on the toilet
- Mobility for ambulation to the bathroom
- Transfers on and off toilet
- Finger dexterity for undressing, hygiene and catheter use

**PT Physical Examination - PFM**

- Full digital assessment of PFM per vagina and or rectum
- Voluntary contraction - ability to sustain a PFM contraction
- Tone – esp the ability to relax fully subjectively assessed with manual palpation

**Hypertonic PFM**

- An increase in muscle tone related to the contractile or viscoelastic components that can be associated with either elevated contractile activity and/or passive tension in the muscle
- Digital testing
  - Relaxation post contraction
  - Ability to maintain relaxation
  - Descent of PFM with bearing down
  - Resting tension

**Devreese tone grading scale – good reliability**

- Measured superficial and deep
- Hypotonic
  - Wide and weak
  - Reduced mm bulk, easy drop
- Normotonic
  - Index finger can move
  - Normal smooth suspension
- Hypertonic
  - Tightness with firm band
  - Finger cannot move down

**De Ridder – used in MS patients**

- 3 - active relaxation after contraction
- 2 - hypertonic with relaxation after manual elongation
- 1 - spasm unable to relax even after passive elongation

May be difficult to know what normal resting level is
Hypotonic PFM

An decrease in muscle tone related to the contractile or viscoelastic components that can be associated with either decreased contractile activity and/or passive tension in the muscle.

Voluntary contraction
- Strength
- Endurance
- Motor control and coordination

EMG (EMG) assessment of PFM

Intramuscular or concentric needle EMG would be necessary to diagnose:
- Normal
- Denervated
- Reinnervated
- Myopathic

Surface EMG measures muscle activation patterns.

Surface EMG assessment of PFM

Ability of the PFM to relax fully when needed – defecation and urination
Ability of the PFM to contract fully - standard contract relax test

Hypertonic PFM

Bearing down test ? utility

Normal -
Bearing down with abdominal bulge = PFM relax

Paradoxical PFM contraction -
PFM contracts during proper bearing down

Leads to obstructed defecation and urination
Bearing down test - utility

Performed with external peri-rectal electrodes
Lying down or sitting on a commode

Not a perfect test

Fear - Patients are reluctant to bear down and fully relax for fear of passing gas
Position - Lying down on a table and bearing down is not natural
EMG artifact – skin electrode shear resulting in increased EMG signal

EMG during voiding - utility

Arrive to clinic with full bladder
Place external peri-rectal electrodes
Patient sits on commode with external EMG
Leave the room and allow machine to save data

Not a perfect test

Perineal Surface Electromyography Does Not Typically Demonstrate Expected Relaxation During Normal Voiding. Kirby 2011

6.5% had EMG signal at 0 for the entire study
88.2% had EMG activity during flow

Summary of PT Assessment

Bladder function and voiding
Neurological testing
Mobility and movement
PFM function
  • Tone
  • Coordination

Diagnosis made by the Physician

Neurogenic detrusor overactivity (NDO) with normal sphincter
NDO with detrusor sphincter dyssynergia (DSD)
Neurogenic detrusor underactivity (Areflexic bladder)
Striated sphincter denervation or weakness

Physicians should provide information on pathophysiology and exact nature of voiding dysfunction
Questions
beth@bethshelly.com
www.bethshelly.com
Video - Urodynamic value in patients. How? When? Why? Are there any other diagnostic methods that you should use?

Dr. Christian Cobreros
Urology Division - Hospital Carlos G. Durand
Buenos Aires - Argentina

Various goals of treatment of patients With NLUTD

✓ Upper urinary tract preservation or improvement
✓ Absence of control of infection
✓ Minimal or no incontinence
✓ Low storage pressures with adequate bladder capacity
✓ avoidance of indwelling catheter or stoma
✓ Low voiding pressures with adequate emptying ability if not performing intermittent catheterization
✓ Social acceptability and adaptability of bladder management.
✓ Vocational acceptability and adaptability of bladder management.

Videourodynamic
Definition

Video-urodynamics is a combination of urodynamic study with imaging. It is considered the optimum procedure for urodynamic investigation in patients suffering from neurogenic lower urinary tract dysfunction NLUTD

Video-urodynamics
WHEN?

Video-urodynamics (VID) can be defined as the combination of filling cystometry and pressure flow study with imaging. It is the gold standard for urodynamic investigation in neurological disorders.

Videourodynamic
GOALS OF TREATMENT

Video-urodynamics
2018

Guideline Statement 18. When available, clinicians may perform fluoroscopy at the time of urodynamics (uroflowmetry) in patients with recurrent urinary tract infections or in patients with chronic neurogenic disease and delayed PVR or urinary retention. (Recommendation: evidence strength: driven C)
Neurogenerative diseases

- Elderly
- Carry multiple comorbidities
- Well, poor, or no mobility
- Inability to communicate
- Impaired bladder sensations
- Inability to express or understand their needs or sensations

CHALLENGING

POSITION
Anteroposterior
Lateral
Cephalocaudal

Sitting position

PROPER RECTAL PREPARATION

Neurogenic bowel
Stool impaction
Proper rectal preparation
Other patient is in a bowel program

Electromyography

Analysis

Filling rate:
10 mL/min
Or less possible
Below 100 mL/min

Body warm saline solution

More dilution possible of contrast solution

Electromyography

Less possible exposure to radiation

International Continence Society: Guidelines on Electromyographic Equipment Performance

Immunosorbent methods: Solid-phase, immunoassay

Electromyographic investigations in patients with spinal cord injury should include or serve as an aid to standard filling cystometry or provide for standard filling cystometry.
CONCLUSIONS

➢ immensely helpful in localization of the site of obstruction when high pressure/low flow state exists

➢ should be done at baseline and might be incorporated into follow-up for individual cases

➢ strongly considered in patients with impairment of renal function or structural change in the upper urinary tract, particularly in SCI patients
Neurodegenerative disorders

- Alzheimer's disease (AD) and other dementias.
- Parkinson's disease (PD) and PD-related disorders.
- Prion disease.
- Motor neurone diseases (MND).
- Huntington's disease (HD).
- Spinocerebellar ataxia (SCA).
- Spinal muscular atrophy (SMA).

Parkinsonian syndromes include PD and atypical parkinsonism. Atypical parkinsonism includes multiple system atrophy (MSA), progressive supranuclear palsy (PSP), corticobasal degeneration (CBD), and dementia with Lewy bodies (DLB).

Symptoms of advanced disease & comorbidity expected to rise accordingly


Funding for speaker to attend:
- Self-funded
- Institution (non-industry) funded
- Sponsored by:

Neurodegenerative disorders

- Increase number of people with Neurodegenerative disorders due to worldwide aging
- 24.2 million people living with dementia in 2001 & 4.6 million new cases annually
- Predicted to double every year to 80 million cases by 2040
- Total cost of brain disorders in 2010=798 billions€ in Europe (105b for dementia & 14b for PD)
- Need for medical care and hospital visits & reduce QoL among elderly
- High rate of dementia & dependence (PD and ND 70% in within 8 years)

David Castro-Diaz
Spain

Affiliations to disclose:
- Allergan
- Astellas
- Boston Scientific
- Contura

It is always easy to differentiate urgency from another clinical presentation of these patients (e.g., pain, hypersensitivity, bladder irritation, infection)? How can we avoid over medication?

Neurodegenerative disorders

Neurodegenerative disorders

Bladder dysfunction

- Integrated part of the syndrome
- Due to other conditions
- A consequence of the treatment given

Cognitive dysfunction & dementia – LUTS impact
LUT dysfunction rarely link to the neurologic disorder

Multiple phenotypes sharing burden of disease progression without hope for cure
- It is important to identify symptoms & complications leading to further loss of mobility and poorer QoL
- Mixed pathology is common
- Psychological factors & cognitive deficit interfere with copying
- LUTS have major impact on patients to stay independent
Degeneration of dopaminergic neurons of substantia nigra & depletion of striatal dopamine
Dopaminergic striatal activity induces selective disinhibition
Dopaminergic loss leads to hyperactivity of Gpi & excessive input to thalamus & cortex - decrease activity of PAG, thalamic-insula pathway → Neurogenic detrusor overactivity

Neurodegenerative disorders

LUT Symptoms in Parkinson Disease

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nocturia</td>
<td>34.6 - 63.3</td>
</tr>
<tr>
<td>Frequency</td>
<td>16 - 46</td>
</tr>
<tr>
<td>Urgency</td>
<td>12 - 46</td>
</tr>
<tr>
<td>Incomplete Emptying</td>
<td>8 - 40</td>
</tr>
<tr>
<td>Intermitency</td>
<td>6 - 44</td>
</tr>
<tr>
<td>Straining</td>
<td>NA</td>
</tr>
<tr>
<td>Male:Female</td>
<td>M:F = 1:1</td>
</tr>
</tbody>
</table>

Storage Symptoms
Nocturia is the most common complaint = 60%
Urgency = 33% to 54%
Frequency = 16% to 36%
Urinary incontinence = 26% & 28%

Voiding Symptoms
Reported less commonly than storage symptoms
Hesitancy & poor stream 44% to 70%
Straining to void 19%

First symptoms in multiple system atrophy

Number of MSA subjects from the cohort of 30 subjects reporting specific symptoms: as the very first symptom (black), during the first symptomatic year (medium grey), and at the time of evaluation (light grey)

LUT in PD follow the onset of motor disturbances by 4 to 6 years

Storage Symptoms
Nocturia is the most common complaint = 60%
Urgency = 33% to 54%
Frequency = 16% to 36%
Urinary incontinence = 26% & 28%

Voiding Symptoms
Reported less commonly than storage symptoms
Hesitancy & poor stream 44% to 70%
Straining to void 19%

What Causes Urgency?

- Central mechanisms
- LUT mechanisms
  - Myogenic
  - Overt detrusor contractions
  - Micromotions
  - Abnormalities of myofibroblasts
- Neural
- Urothelium
- Viscerocutaneous or pelvic floor causes

OAB vs BPS

Urodynamic findings in PD and BPH/BDO

<table>
<thead>
<tr>
<th>Urodynamic Parameter</th>
<th>Parkinson Disease</th>
<th>BPH/BPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detrusor overactivity</td>
<td>Phasic at low volume</td>
<td>Mostly terminal</td>
</tr>
<tr>
<td>DOA incontinence</td>
<td>More common</td>
<td>Less common</td>
</tr>
<tr>
<td>Pressure flow</td>
<td>Non-obstructed voiding</td>
<td>Obstructed voiding</td>
</tr>
<tr>
<td>Sphincteric activity</td>
<td>Bradykinesia</td>
<td>Normal guarding reflex</td>
</tr>
<tr>
<td>Postvoid residual</td>
<td>Insignificant</td>
<td>Can be elevated</td>
</tr>
</tbody>
</table>

Urodynamic abnormalities may differentiate between MSA and PD

<table>
<thead>
<tr>
<th>Urodynamic Parameter</th>
<th>PD</th>
<th>MSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detrusor overactivity</td>
<td>At small fill more profound</td>
<td>At larger fill less profound</td>
</tr>
<tr>
<td>Sensation</td>
<td>More sensitive</td>
<td>Delayed</td>
</tr>
<tr>
<td>DESD</td>
<td>Rare</td>
<td>Common</td>
</tr>
<tr>
<td>Straining/weak stream</td>
<td>Rare</td>
<td>Common</td>
</tr>
<tr>
<td>Voiding efficiency</td>
<td>Preserved</td>
<td>Impaired</td>
</tr>
<tr>
<td>PVR</td>
<td>Insignificant</td>
<td>High</td>
</tr>
<tr>
<td>Bladder neck on VUD</td>
<td>Closed</td>
<td>Open</td>
</tr>
</tbody>
</table>

Pharmacotherapy for LUTD

- Alpha adrenergic agonists: (Retention & related symptoms)
- Alpha adrenergic antagonist: (SUI)
- Antimuscarinics agents (UR & constipation)
- Angiotensin converting enzyme (ACE) inhibitors (cough)
- Calcium channel blockers (UR & constipation)
- Cholinesterase inhibitors (increase bladder contractility)
- Diuretics
- Psychotropics drugs
- Opioid analogics
- Other drugs (pyridines, gabapentin, glitazones, non-steroidal anti-inflammatory agents)

Older people and patients with neurodegenerative diseases take multiple drugs Many of them are over-the-counter (OTC) medications, vitamins or supplements Adverse drug reactions result in > 700,000 visits to emergency/year

Antimuscarinics & Cognitive Function

Subjects with higher serum anticholinergic activity have lower cognitive performance scores

<table>
<thead>
<tr>
<th>Performance Score</th>
<th>MSA (30%)</th>
<th>PD (30%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate Recall</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Logical Memory</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Composite Score</td>
<td>80</td>
<td>50</td>
</tr>
</tbody>
</table>

Subjects with high MMSE scores

- AC+ participants showed lower mean scores on Weschler Memory Scale-Revised Logical Memory Immediate Recall
- AC+ participants had a longer Trail Making Test
- AC+ participants had a lower executive function composite score test
- AC+ participants had reduced total cortical volume and temporal lobe cortical thickness and greater lateral ventricle and inferior lateral ventricle volumes

Adapted from Defreitas GA 2003

Adapted from Brucker B 2017
Amyloid plaque densities are more than 2.5-fold higher in cases treated with antimuscarinic medication in the long-term compared with untreated or short-term treated cases.

Comparison of senile plaque in Parkinson's disease cases grouped according to antimuscarinic drug treatment: none, short-term (<2 a), long-term (>2 a).

**Commonly used drugs with anticholinergic properties**

- Ranitidine
- Codeine
- Dipyramidole
- Warfarin
- Iosorbide
- Theophylline
- Nifedipine
- Digoxin
- Lanoxin
- Prednisolone
- Cimetidine
- Furosemide
- Captopril
- Dyazide

Of 25 drugs commonly prescribed to older patients, 14 produced detectable anticholinergic effects.

The drugs in this study that showed no detectable anticholinergic effects were: Hydrochlorothiazide, Propranolol, Salicylic acid, Nitroglycerin, Insulin, Ibuprofen, Dilatazem, Atenolol, Metoprolol, Timiol.

**How to avoid over medication**

**Recommendations of the American Geriatrics Society**

- Ask before taking an OTC
- Make a list and keep it updated
- Review your medications
- Ask questions (why, how, when, etc.?)
- Organize your medications
- Follow directions
- Report problems
- Medication don’t’s

Health in Aging Foundation 2015
AIMS OF ORAL TREATMENT IN PATIENTS WITH NDO

This presentation leads primarily to specific issues in pharmacotherapy in neurogenic patients

IN THIS NEUROGENIC SUBPOPULATION: THE MOST IMPORTANT CAUSE OF UI

NDO
And/or
INCOMPETENCE IN URETHRAL CLOSING FUNCTION

ORAL MEDICATION WILL BE HELPFUL IN MILD DEGREES OF NDO WHEN SYMPTOMS ARE MORE PROFOUND. FURTHER TREATMENTS WILL BE NEEDED

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Buenos Aires - Argentina

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Urology Division - Hospital Carlos G. Durand
Buenos Aires - Argentina

Antimuscarinics

LARGE PLACEBO CONTROLLED STUDIES

• Oxybutynin
• Propiverine
• Tolterodine

30–40% in cystometric bladder capacity
30–40% decrease in maximum detrusor pressure

BASIS
All based on urodynamics measurements
Other parameters were not adequately investigated

• Increased bladder contractility

• Decreased detrusor pressure

Amend et al., 2011
With combined high-dose antimuscarinic medications, 81% of patients who previously demonstrated unsatisfactory results were treated successfully with combination of AM. The appearance of side-effects was comparable to that of normal-dosed antimuscarinics.

Nadeau et al., 2014
Dual therapy in children with mielomeningocele: Between combinations of oxybutynin, tolterodine and trospiumc to be effective and well tolerated in a few patients with NDO

In the study with oxybutynin and tolterodine as a dual therapy, significant decrease of symptoms was observed in patients with NDO. In the study with oxybutynin and tolterodine as a dual therapy, significant decrease of symptoms was observed in patients with NDO.


NEUROMUSCULAR DYSTROPHY

- Early treatment of neurogenic bladder dysfunction by combined high-dose antimuscarinics without increased side-effects

12/09/2018
What about patients with cognitive impairment in this population?

**Antimuscarinics**
- Propantheline
- Tolterodine
- Ofloxacin
- Fesoterodine
- Darifenacine

**What about antimuscarinics drug interactions?**

**Slow Gastrointestinal Activity**
- Potentially can alter the absorption of other drugs

**Cholesterol Synthesis Inhibitors**
- Zakazolide antibiotics: azithromycin
- Vinblastine

Beta 3 adrenoceptor agonist

M of unit: activation of adenyl cyclase with the subsequent formation of cAMP, down-regulation of ACh release, resulting in an inhibitory control of parasym pathetic activity

**What is “refractory to pharmacotherapy” or “drug” ?**

Patients who are refractory to pharmacotherapy.

1. Darifenacine for a period of at least 6 weeks
2. N: 15 NDO SCI
3. Improvements in bladder evacuation per 24 h
4. Incontinence episodes per 24 h
5. Bladder capacity from 105 to 149 ml
6. Storage phase from 36 to 419 ml
7. Qmax from 5.3 to 14 ml/s
8. M: 64 Y, 51 M
9. C: 15 NDO SCI
10. P: 13 Y, 12 M

Clinically significant memory deterioration

Antimuscarinic drugs improve bladder storage function

High incidence of side effects although controlled-released have less side effects that immediare realize presentations

In patients with cognitive impairment, antimuscarinics should be prescribed with a warning, cause there are proves that donebutamine caused significant memory deterioration

Cognitive impairment should not occur
THANK YOU
Neurodegenerative Disease: Surgical Approach
Carlos D’Ancona
Professor of Urology

Affiliations to disclose†:
Ibsen - clinical trial

Funding for speaker to attend:
☐ Self-funded
☐ Institution (non-industry) funded
☐ Sponsored by:

Definition of failure
Quality of Live
Combination of clinical and urodynamics
• Urinary incontinence
• Pdet.max > 40 cmH₂O


Definition of success
1. Protection of upper urinary tract
2. Improvement of urinary incontinence
3. Restoration (or part) of LUT function
4. Improvement of patient’s QoL


Surgical approach
Botulinum toxin
Sacral neuromodulation
Bladder augmentation
• Continent urinary diversion
### Prospective and randomized study of SCI

**Group I**
- 33 patients
- Oxibutinin 5mg three times a day

**Group II**
- 28 patients
- 300 U. Intradetrusor Onobotulinotoxin A

---

### Aetiology

<table>
<thead>
<tr>
<th>Cause</th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car accidents</td>
<td>64.2</td>
<td>38.2</td>
</tr>
<tr>
<td>Gun fire</td>
<td>26.2</td>
<td>1.7</td>
</tr>
<tr>
<td>Falls</td>
<td>9.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

---

### Maximal cystometric capacity

**TBA** vs. **Oxibutinin**

- *Mann-Whitney test, p < 0.001*

---

### Pdet.max

**TBA** vs. **Oxibutinin**

- *Mann-Whitney test, p < 0.001*

---

### UI episodes decreased

**TBA** vs. **Oxibutinin**

- *Mann-Whitney test, p < 0.001*

---

### QoL – ICIQ-SF

**TBA** vs. **Oxibutinin**

- *Mann-Whitney test, p < 0.001*
The oral use of oxybutynin and the intradetrusor injection of BoNT A showed a significant improvement in urodynamic parameters, the number of urinary leakage in 24 hours and a lower impact on the quality of life of patients with spinal cord injury treated in this study.

Comparing the objective response (urodynamic study) and subjective (quality-of-life questionnaires) of the two drugs, BoNT A proved to be more effective than oxybutynin in all evaluated parameters, as well as having a better tolerability profile.

Patients with low detrusor compliance and loss of contractility was considered as fibrotic bladder did not respond well to BoNT A.

BoNT A declines the rate of augmentation cystoplasties
Decreases intravesical pressure while increases storage capacity
Urodynamic evaluation to prove that the detrusor pressure returns to a safe level
BoNT A injection into the detrusor muscle improves clinical and urodynamic parameter. LoE 1 and QoL LoE 1
Second line treatment
Increase PVR, need CIC, higher incidence of UTIs
Grade of recommendation A

Sacral neuromodulation: an effective treatment for lower urinary tract symptoms in multiple sclerosis

Wollner J, Krabs I, Pannek J.
Spinal Cord 2018, 54: 137-140

Incomplete spinal cord injury
Low risk upper urinary tract damage
MS patients should be carefully selected
Regular urodynamics follow up needed

Limited available data
Can have a inhibitory effect on NDO
Grade of recommendation B
Elevated filling pressure
Diminished bladder capacity
Not responsive to other treatments


It is very effective
88% satisfaction score in spinal cord injury and multiple sclerosis
Failure of conservative treatment
Onabotulinumtoxin A failure
More permanent solution

Change in bladder capacity | +130%
Change in bladder compliance | +87%
Change in presence of detrusor overactivity | -54%

CIC to empty the bladder (72.5%)
UTI episodes (65%)
Urinary incontinence (10%)
Stones in the reservoir (32.5%)
Upper tract stones (22.5%)
>90% achieved nocturnal continence
91-100% achieved diurnal continence
QoL improved rates 90%
92% satisfaction in long term follow up

Great benefit in wheelchair women patients
The role of Physiotherapy and a Multidisciplinary team in the daily life of patients. Can we improve their quality of life if we work together?

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International Continence Society Annual Meeting
August 28, 2018 Philadelphia, PA
Workshop 5

Overall Conservative Management of Neurogenic Bladder

Individualized to the patient in cooperation with caregivers
Little high level evidence for any one treatment
NICE guidelines give good outline of evidence related to treatment (NICE 2012)
Overall goals of treatment is
• protection of upper urinary tract
• improvement in QOL
PT best with incomplete lesions

Individualized Treatment

Therapies to decrease overactive bladder
Therapies to decrease PFM spasm
Therapies to increase bladder contraction
Therapies to increase PFM contraction

Therapies to Decrease OAB

Bladder drills and fluid management - suitable component of a rehabilitation program level C (Drake 2013)
• Bladder training
• Timed voiding
• Habit training
• Prompted voiding
PFM training with or without biofeedback
Electrical stimulation

Therapies to decrease PFM tension / spasm and improve PFM relaxation during emptying

Manual stretching of PFM does not appear to have a lasting impact
Biofeedback-assisted PFM coordination training
• PFM relaxation
• Train on the toilet with external EMG during voiding

Therapies to increase bladder contraction during voiding

Intermittent catheterization - accepted standard (Drake 2013)
Triggered Reflex Voiding - Provocation of bladder contraction
• Suprapubic tapping, pubic hair pulling
• Thigh scratching, stroking lower back
• Anorectal manipulation
Bladder expression - Increasing intra abdominal pressure
• Lean forward, gentle whisling
• Valsava, Crede
Timed voiding / habit training / bladder training
Ideas and Advice to Help Promote Full Voiding

Privacy – Paruresis, also called shy bladder, is the inability to urinate in public. Maintaining as much privacy as possible increases bladder emptying for most patients.

Toilet position - sit fully on the toilet

- Full relaxation of PFM overflow muscles (adductors and gluteals in particular) is necessary for full PFM relaxation and will increase bladder emptying
- Sitting relaxed and supported
  - Both feet flat on the floor and fully supported
  - Adequate hip flexion to encourage PFM relaxation

Relaxation

Take time to fully relax all muscles for full emptying.

- Distract yourself on the toilet by reading, singing or reciting a poem.
- This is especially important in patients with anxiety

Double voiding

- After initial void, stand, move, sit down, and attempt to void again.
- Sit completely on toilet, relax legs in abduction
- Lean forward bending at the hips 3 times
  - Relax and allow urine to come out
- Stand up then sit down (double voiding)
  - Relax and allow urine to come out
- Several gentle PFM contractions and large relaxation
  - Relax and allow urine to come out
- Do not push

Running Water

The sound of running water can initiate voiding however over use of the method can lead to OAB and UUI with the sound of water running.

Therapies to increase sphincter contraction

- PFM training with or without biofeedback
- Overflow or functional PFM training
Therapies to increase sphincter contraction

Electrical stimulation - may be an option in cases of PFM weakness (not in complete denervation) however no research exists (Drake 2013)

Evidence for conservative management of UI in patients after Stroke

Significant decrease in frequency of accidents and need for assistance to toilet in treatment group as compared to control group. (Couran 2012)
- PFM exercises (PT)
- Timed voiding and prompted voiding (RN)
- Functional bathroom activities (OT)
PFM exercises decrease urinary frequency and UI by pad test RCT (Tibaek 2005, Tibaek 2017)

Evidence for conservative management of UI in patients after Stroke

PFM exercises added to standard rehabilitation decreased UI by RCT (Skin 2016)
Restoration of functional mobility - RCT shows benefit in stroke patients (Wilkander 1998)
PFM exercises with bladder retraining - systemic review found little evidence in stroke patients (Dumoulin 2005)

Evidence for conservative management of UI in patients with Multiple Sclerosis

Best candidate for PT - mild MS, without PFM spasticity or dyssynergia (De Ridder 1999)
Poor success - elevated PVR (McClurg 2008)

Guideline recommendations for PFM training
- Fowler 2009 - UK consensus, grade B
- Pannek 2013 - EAU guideline, no grade given
- Cetinel 2013 systematic review and consensus report, grade A

Evidence for conservative management of UI in patients with Multiple Sclerosis

PFM exercises versus sham - decreased pad weight, number of pads and nocturia (Lucio 2010)
PFM exercises plus EMG and electrical stimulation vs no treatment RCT (Vahtera 1997)
- Significant improvement in UI, nocturia, and improved bladder emptying.
- Men > women
PFM exercises plus EMG and electrical stimulation vs sham electrical stimulation RCT (McClurg 2008)
- Significant improvement in UI by pad test, ITQ, UDI, IPPS and decreased PVR
- 85% in the active group, 47% in the control group
- PFM strength improved equally in both groups

Evidence for conservative management of UI in patients with Multiple Sclerosis

Biofeedback assisted PFM exercises are not superior to PFM exercises alone (Klarskov 1994)
Transcutaneous posterior tibial nerve stimulation resulted in significant decrease in urgency, frequency and leakage without increase in PVR - no control group (de Seze 2011)
Evidence for conservative management of UI in patients with Multiple Sclerosis

TENS to sacral dermatomes (Skeil 2001)
- Mixed neuro diseases, but mostly MS patients
- Diary showed significant improvement - decrease in 24 hour frequency, UI episodes and clothing changes
- Risk for increased PVR

Questions

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