Neurology for the Gynaecologist
Workshop 14
Monday, 23 August 2010, 14:00-17:00

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<td>Chris Smith</td>
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**Aims of course/workshop**

Neurogenic bladder is a finding that is obvious in patients with Spinal Cord Injury, and Multiple Sclerosis, however the neurogenic bladder may also be found in patients with prior pelvic, or vascular surgery, or may have occult neurological disease presenting with incontinence or urinary retention. The aim of this course is to provide urologists and gynecologists, who are not familiar with managing neurogenic bladder, the information to recognize, diagnose and the principals of management of a neurogenic bladder.

**Objectives:**
1. Recognition the characteristics of a neurologically injured bladder.
2. Correct diagnosis a neurogenic bladder and its complications.
3. Outline the primary principles of neurogenic bladder management

**Educational Objectives**

Since the 2010 meeting is a joint ICS & IUGA meeting, this program would be useful to urologists and gynecologists and also the allied health professionals dealing with generally able bodied patients. The primary purpose of the workshop is to help these physicians recognize the hallmarks of neurological injury to the bladder and to provide clear and concise information about the principles of management of the neurogenic bladder. It is intended to be a practical workshop with clinical examples of the various conditions and their manage

**Key Learning Points and Take home messages:**
1. Neurogenic bladder findings may occur in patients, without devastating neurological disease or injuries
2. Neurogenic bladder may lead to significant morbidity in affected patients.
3. The management of neurogenic bladder follows a series of clear principles
Workshop 17: Dr. John Lavelle

Discussion of Cases: Topics in presentation and consideration during the workshop.

1. Painful voiding
2. Severe incontinence
3. Urinary retention
4. “Stress Incontinence” after the Pubo-vaginal Sling.
Presentations of the Neurogenic Bladder

Case Scenario #1

58yo woman underwent radical hysterectomy for cancer. She required indwelling foley catheter for 1 week due to inability to urinate. She was able to urinate more spontaneously after the first week, but the stream was weak and slow. It is now 9 months after surgery and she is becoming more bothered by her incontinence and has been referred to you for further evaluation and possible anti-incontinence procedure.

Symptoms in patients with neurogenic bladder can include all of the following:
- Frequency
- Urgency
- Nocturia
- Urinary incontinence
- Weak stream
- Hesitancy
- Incomplete Emptying
- Retention

The past medical history should identify any neurologic condition (congenital, traumatic, metabolic, degenerative) that can affect lower urinary tract function. Patients should therefore be questioned about low back pain, previous spinal cord injury or surgery, Parkinson's disease, multiple sclerosis, cerebrovascular accident, diabetes and other pelvic surgeries. The use of medications that can affect lower urinary tract function, particularly those with anticholinergic or α-adrenergic effects, should be documented. A family history should question for such disorders as epilepsy, Huntington's disease, and degenerative conditions of the CNS.

It is important to elicit associated neurologic symptoms such as visual changes, sensory changes, motor weakness, or gait abnormalities because they may suggest a neurologic cause for the urinary symptoms (e.g., multiple sclerosis).

The motor examination primarily evaluates motor strength, but the presence of abnormal movements and signs of denervation (e.g., muscle atrophy) should also be assessed. Generally, muscle hypotonicity results from peripheral nerve injuries and myopathies, whereas hypertonicity results from suprasegmental lesions.

Sensory alterations in the genital or perianal area, fecal incontinence or constipation, Patterns of sensory loss are important because they often follow the segmental distribution of one or more spinal nerve roots and therefore may help to localize the level of neurologic deficit. Important dermatomes to remember are T10, umbilicus;
L3, front of knee; and S3–S5, perineal/perianal skin. The anterior portions of the labia are supplied by roots from the thoracolumbar spinal cord, whereas the posterior portions of the labia and perianal area are supplied by sacral roots. Disorders of orgasm may be suggestive of impairment in the innervation of the pelvic organs and the lower urinary tract.

Discrete neurologic lesions generally affect the filling/storage and emptying/voiding phases of lower urinary tract function in a relatively consistent fashion. This fashion is dependent on the area(s) of the nervous system affected; the physiologic function(s) and the contents and location of the area(s) affected; and whether the lesion or process is destructive or irritative. The acute dysfunction produced may differ, for a variety of reasons, from the chronic one.

Voiding dysfunction after pelvic plexus injury occurs most commonly after abdominoperineal resection and radical hysterectomy. The true incidence of neurogenic vesicourethral dysfunction after various types of pelvic surgery is unknown, because there are no prospectively studied series of patients with preoperative and postoperative urodynamic evaluation. The incidence has been estimated to be 20% to 68% of patients after abdominoperineal resection, 16% to 80% after radical hysterectomy, 20% to 25% after anterior resection, and 10% to 20% after proctocolectomy (1). These are estimates drawn from past literature, and the current incidence is most likely significantly lower, owing to the use of nerve-sparing techniques during these types of pelvic surgery. It has been estimated, however, that in 15% to 20% of affected individuals, the voiding dysfunction is permanent (2).

When permanent voiding dysfunction occurs after radical pelvic surgery, the pattern is generally one of a failure of voluntary bladder contraction, or impaired bladder contractility, with obstruction by what seems urodynamically to be residual fixed striated sphincter tone, which is not subject to voluntarily induced relaxation. Often, the smooth sphincter area is open and nonfunctional. Decreased compliance is common in these patients, and this, with the "obstruction" caused by fixed residual striated sphincter tone, results in both storage and emptying failure. The patient often presents with urinary incontinence that is characteristically most manifest with increases in intra-abdominal pressure, and suggestive of stress urinary incontinence. Alternatively, patients may present with variable degrees of urinary retention.

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References

Neurogenic Bladder in Gynecology Patients

Craig V. Comiter, M.D.
Associate Professor
Departments of Urology and Obstetrics and Gynecology
Stanford University Medical School

Neurogenic Bladder—Definition

- neurogenic bladder n. -- Defective functioning of the urinary bladder due to impaired nerve supply.
  - The American Heritage® Stedman's Medical Dictionary
- Neurologic disease can profoundly affect urinary system
  - Bladder and Upper Tracts
- NGB often used loosely to describe abnormal bladder function
- Need to be precise when assessing woman with NGB
  - Diagnostic and therapeutic reasons

Assessing Woman with NGB

- Goals: determine effects of neurologic disease on entire urinary tract
  - Not just the bladder
- Treatment can be implemented to:
  - relieve sx
  - prevent upper and lower urinary tract damage
- NGB can present in a woman:
  - With a known neuropathy
  - Without a known neuropathy
  - but whose history and evaluation suggests occult neurological disease or dysfunction
Effect of NGB on Upper Tracts

- LUT dysfunction may affect upper tract drainage
  - Anatomic or functional obstruction at UVJ
  - Elevated intravesical pressure
  - Poor compliance with competent/overactive sphincter
  - Stretch/stress on ureteral tunnel
  - High pressure bladder contractions with retention
  - Increased ureteral resistance
  - Elevated PVR
  - Less intravesical pressure needed to impair drainage
    - < 40 cm water may be harmful to upper tracts
  - Norris and Staskin, NEED YEAR

Normal Storage and Voiding

- Excellently reviewed by our colleagues
  - Helmut Madersbacher
  - John Heesakkers
  - Jean-Jacques Wyndaele
  - Piotr Radziszewski

Gynecological Patients

- Disk Disease
- Spinal Stenosis
- Radical Pelvic Surgery
- Herpesvirus Infection
- Human Immunodeficiency Virus
- Systemic Lupus Erythematosus
- Reflex Sympathetic Dystrophy
- External Beam Radiotherapy
- Multiple Sclerosis
- Diabetes Mellitus
**Slide 7**

**Suprapontine Lesions**

- Reflex detrusor contractions
  - Loss of cerebral regulation of voiding
  - Normal coordinated sphincter function
  - Incontinence due to bladder overactivity
  - Sensation may be deficient or delayed
- Purposeful increase in sphincter activity during overactive detrusor contraction
  - Pseudo-dyssynergia
- Rarely detrusor areflexia

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**Suprasacral Spinal Cord Lesion**

- Detrusor Overactivity
  - Incontinence from DO – without sensation
- DSD common
  - Smooth sphincter synergy T6-S2
  - Smooth sphincter dyssynergia (above T6)
  - BOO from DSD can cause retention
- Bowel dysfunction
  - Overactive bowel, increased colonic wall activity
  - Anal sphincter tight
  - Stool retention
  - Incontinence due to impaction/constipation
- Autonomic dysreflexia (above T6)

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**Neurogenic SUI**

- Typical of T11-T12 injury
- Intrinsic sphincter deficiency
  - Also pelvic floor muscular weakness
- Treatment to increase resistance
  - Periurethral bulking – poor long term efficacy
  - Especially if CIC performed
  - Urethral sling
    - Fascial sling at bladder neck
    - Spiral sling / wrap-around
  - Expect CIC to continue
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**Disease below S2**
- Detrusor underactivity/areflexia
- Diminished compliance during filling
- Open smooth sphincter
  - Parasympathetic or sympathetic dysfunction
  - Striated sphincter residual resting tone
    NOT under voluntary control
- Lack of SC mediated peristalsis of bowel
  - Mesenteric plexus peristalsis only
  - If pudendal neuropathy
    - Non contractile EAS, puborectalis, loss of rectal angle
  - Constipation and incontinence
- If pudendal neuropathy
  - Non contractile EAS, puborectalis, loss of rectal angle
  - Constipation and incontinence

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** Interruption of peripheral reflex arc**
- Similar to distal cord or nerve root injury
- Detrusor areflexia
- Diminished compliance
- Smooth sphincter incompetence
- Striated sphincter fixed residual tone without voluntary relaxation

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**Subsacral Lesions** *(Cauda Equina or Peripheral Nerves)*
- Detrusor hypocontractility (acontractility)
  - Impaired emptying
- Paralysis of urethral sphincter/PFM
  - Loss of outflow resistance, SUI
- Lack of SC mediated peristalsis of bowel
  - Mesenteric plexus peristalsis only
  - If pudendal neuropathy
    - Non contractile EAS, puborectalis, loss of rectal angle
  - Constipation and incontinence
- Conus Lesion
  - Poor compliance with competent sphincter
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Routine care of the NGB woman

• Outcome of upper tracts related to combination of detrusor and sphincteric function
  – Hyper-reflexic detrusor detrimental to upper tracts when sphincter fails to relax simultaneously
  – Weak sphincter protects kidneys
    • But permits incontinence

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Likelihood of upper tract deterioration

• Suprapontine – rarely
  – Unless significant outlet obstruction
• Suprasacral lesions – at risk
  – Chronically elevated intravesical pressure
  – DSD
• Conus – at risk
  – Poor bladder compliance with competent sphincter

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Occult Neurological Disease

• Woman without history of neuropathy presents for evaluation of voiding dysfunction
• Suspicious if:
  – History of subtle non-urological neurological complaints associated with urinary sx
  – Numbness, tingling, eyesight changes, motor weakness
  – DO on urodynamics in young, multiparous woman
  – Or sx of incontinence in young woman
  – Discordinated detrusor and external sphincter activity
    • Neurological problem
  – Presence of unexplained retention
    • Especially with hypocontractile bladder
Recognition of NGB in woman

- History, neurologic symptoms, neuro-uro exam
  - Sacral reflex examination
  - Sacral sensation
  - Anal tone
  - PF strength
- U/A, creatinine, upper tract study
  - Ultrasound, VCUG, DMSA (function)
- UDS

Disk Disease

- Usually disk prolapse is posterolateral
  - Does not affect majority of cauda equina
  - 1%-15% with central disk prolapse
    - Compression of cauda equina
    - Thus disk prolapse anywhere in LS spine can interfere with parasympathetic and somatic innervation of LUT

- Mostly L4-L5 or L5-S1
- Low back pain radiating in girdle-like fashion
- Loss of sensation/reflexes
  - Especially in perineum/perianal (S2-S4)
  - Lateral foot (S1-S2)
Disk Disease – LUT dysfunction

- Anywhere from 27%-92%
  - Goldman and Appell, 2000
- Detrusor areflexia – 27%
  - Sx: difficulty voiding, straining
  - UDS: detrusor areflexia, normal compliance
    - Rarely DO – likely irritation of nerve roots
  - O’Flynn, 1992
- Treatment – urologic management
  - Laminectomy may not be helpful for LUT function

Cauda Equina Syndrome

- Clinical scenario
  - Perineal sensory loss
  - Loss of voluntary control of anal and urethral sphincters
  - Loss of sexual responsiveness
- Secondary to central disk protrusion, other central spinal canal processes

LUTS with central disc protrusion

- The classical features of acute cauda equina compression may be absent in patients with central lumbar disc protrusion.
- Painless urinary retention may be the only physical sign.
  - Often no other signs or symptoms suggesting an underlying neurological insult.
  - 2/3 recover urinary function with early intervention
  - Mosdal et al, Acta Neurochir, 1979
- High level of suspicion is necessary
  - Failure to intervene can lead to progression to full blown cauda equina syndrome
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**Spinal Stenosis**

- Narrowing of spinal canal, nerve root canal, intervertebral foramina
  - Nerve damage, ischemia, edema
  - Cervical cord compression to cauda equina syndrome
- Symptoms and UDS usually correspond to level and amount of spinal cord or nerve root damage
  - Cervical spondylitic spinal stenosis, DO or DUA
  - Depends on primary pathology affecting micturition neural axis compresses inhibitory reticulospinal tracts of myelopathy in posterior funiculus (proprioception)
- 50% improvement in LUT function with laminectomy

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**Peripheral Neuropathy due to Iatrogenic Lesion (focal neuropathy)**

- LUT dysfunction from damage to nerves innervating pelvic organs
  - Course of nerves through cauda equina, spinal nerve roots, sacral plexus, peripheral nerves
- Extensive pelvic surgery
  - APR, LAR, radical hysterectomy, Aorto-iliac surgery
- Damage to pelvic parasympathetic nerves
  - To bladder, genitalia

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**Radical Pelvic Surgery**

- Pelvic Plexus Injury
  - Radical hysterectomy, abdomino-perineal resection, proctocolectomy
  - 16%-80% with RH
  - 15%-20% with anterior resection
  - 10%-20% with proctocolectomy
    - Blaivas and Chancellor, 1995
  - 15%-20% with permanent LUT dysfunction
Radical Pelvic Surgery

• Parasympathetic decentralization
  – Increase in adrenergic innervation
    – Conversion of β3 relaxation to a-contraction
    – Sundén, 1977
  – Synaptic reorganization with new cholinergic excitatory inputs
    – Hanno, 1988
  – Urethral supersensitivity to α-adrenergic stimulation

Radical Pelvic Surgery – Symptoms

• Storage and emptying failure
• Urinary incontinence
  – Most manifest with SUI
  – Leakage across distal sphincter
• Varying degrees of urinary retention
  – Inability to empty bladder
  – No true bladder contraction

Radical Pelvic Surgery – UDS

• Failure of voluntary bladder contraction or impaired bladder contractility
• Decreased compliance
• Poor proximal urethral closure
  – Sympathetic/parasympathetic damage vs hydrodynamic effects of distal obstruction
• Obstruction by residual fixed striated sphincter tone
  – Loss of voluntary control of striated sphincter
  – Smooth sphincter open and nonfunctional
• Positive bethanechol supersensitivity test
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**Radical Pelvic Surgery - Treatment**
- Targeted history and PVR
  - to avoid secondary myogenic damage due to chronic retention/bladder distention
- Most dysfunctions are transient
- CIC is best initial treatment
  - Resist temptation to do something
  - Early rehab of LUT may improve voiding
- Normalization by 6-12 months
  - Blaivas and Chancellor, 1995

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**Herpesvirus Infections**
- Invasion of sacral DRG and posterior nerve roots
- Sx: urinary retention
- UDS: detrusor areflexia
- Ryttov, 1985
- Sx: Urinary incontinence
- UDS: detrusor overactivity
- Overall 4% with LUT dysfunction

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**Herpesvirus Infections - Pathophysiology and Treatment**
- Cystitis associated
  - Dysuria, frequency, retention, pyuria, hematuria
- Neuritis associated (sacral motor neurons)
  - Retention with detrusor areflexia
- Myelitis associated (meninges, SC)
  - Detrusor overactivity
  - Chen, 2002
- Treatment: supportive, reversible (CIC, pharmacotherapy)
- All patients returned to normal voiding within 2 months
Herpes Zoster

- Urinary retention
  - Detrusor acontractility and lack of sensation
  - +/- overflow incontinence
  - Return to normal over 3 months
- Treat retention with CIC or foley
  - Avoid infection, chronic distention
  - Natural history is to regain bladder function during quiescent phase

HIV

- Central/peripheral nervous system involvement
- Neurogenic voiding dysfunction = poor prognosis
- Sx vary with neural involvement
  - Retention with areflexia
  - OAB with detrusor overactivity
  - DSD from CNS involvement
- Overall, voiding symptoms are a modest problem in women with HIV, neuropathic dysfunction is rare and mostly in late stages of disease

HIV suprapontine dysfunction

- HIV encephalopathy –
  - part of the acute HIV syndrome during seroconversion.
  - Associated with detrusor overactivity
- ADC (HIV-associated dementia complex, HAD)
  - Characterized by cognitive, motor, and behavioral features in adults
  - usually develops in advanced AIDS when CD4+ lymphocyte counts fall below 200 cells/ mm³.
  - Associated with detrusor overactivity
- Minor cognitive motor disorder (MCMD) is now more common than ADC.
  - Since use of antiretroviral therapy
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**SLE**

- Inflammation in connective tissues and small vessels of skin and systemic organs
  - Autoimmune in origin
  - Sakakibara, 2003
- Nervous system involvement in half (18%-75%)
  - Subacute myelopathy
  - Subacute and chronic encephalomyelopathy
- Sx and UDS depend on site of disease
  - Most common findings is detrusor overactivity, but also can see decreased urinary flow, detrusor underactivity, elevated PVR, DSD, sphincter denervation

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**Reflex Sympathetic Dystrophy**

- Severe pain with autonomic changes
  - Vasomotor disturbances
  - Follows traumatic injury
- Sx are variable
  - Urinary retention, UI, SUI, urgency, frequency, nocturia
- UDS: DO, DESD, detrusor areflexia, hypersensitivity upon filling

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**Radiation**

- Voiding dysfunction after XRT
  - Early radiation cystitis
    - 70%
    - 4-6 weeks
  - Mostly storage dysfunction
    - Uds: reduced first desire to void, capacity, DO (33%)
    - Reduced compliance at 4-6 weeks, then recovers, then recurs at 10-12 weeks and persists
    - Fibrotic infiltration of muscle bundles, mast cells, focal SM degeneration, unmyelinated axon degeneration
Multiple Sclerosis

- Demyelinating process most commonly involves lateral corticospinal (pyramidal) and reticulospinal columns of cervical cord
  - Voiding dysfunction and sphincter dysfunction common
- Demyelination location
  - Cervical - nearly always
  - Lumbar 40%
  - Sacral 18%
  - Blaivas and Kaplan, 1988
- Rare upper tract damage
  - DSD, high Pdet, indwelling catheter
  - Wyndaele, 2005

MS

- 50%-90% with voiding dysfunction
  - Presenting sx in 15%
- 37% - 72% with incontinence
- Symptoms:
  - F/U in 31%-85%
  - Voiding sx, retention 2%-52%
- UDS: DO in 34%-99%
  - DSD in 30% (beware pseudo-dyssynergia – intact sensation)
  - Sphincter dyssynergia in 15%
  - Detrusor underactivity, areflexia in 12%-38%
  - Wyndaele, 2005

MS and urinary retention

- Minority of patients with MS present with or develop urinary retention
  - Detrusor underactivity
  - Detrusor-sphincter dyssynergia
  - UTI
Diabetes Mellitus

- Most common cause of peripheral neuropathy in Europe, North America
  - Prevalence of DM in US: 1%-6%
  - Unselected patients do not report voiding dysfunction
  - When queried, 5%-59% admit voiding dysfunction
    - Wein and Rovner, 1999
  - Unclear if sx caused by DM

“Classic” DM

- Sensory and motor neuropathy
  - Motor neuropathy = impaired detrusor contractility
- UDS
  - Impaired bladder sensation, increased capacity, decreased contractility, impaired uroflow, increased PVR
  - Smooth or striated sphincter dyssynergia not usually seen
    - Erroneous dx: voiding with abdominal straining
    - Interference AMG pattern (pseudo-dyssynergia)
    - Abdominal straining alone does not usually open BN

Treatment of “classic” findings

- Early institution of timed voiding
- Prevent impaired detrusor contractility from progressing to chronic distention and detrusor decompensation.
  - High glucose control can slow progression and slow development of abnormal autonomic tests – Clark and Lee, 1999
  - Prevention of urodynamic and histopathologic changes in diabetic rabbits – Ayan, 1999
  - Reversal of urodynamic changes – Cardozo, 2002
DM – changing view

- Traditional recognition of diabetic bladder dysfunction = voiding problem characterized by poor emptying and overflow incontinence
- Recent clinical/experimental evidence indicate storage problems such as urgency and urge incontinence in DM.
- Recent experimental evidence from studies of diabetic bladder dysfunction in small animal models show a temporal effect on diabetic bladder dysfunction.
  - Early phase diabetes mellitus causes compensated bladder function and the late phase causes decompensated bladder function.

“Typical” DM voiding dysfunction

- UDS
  - DO 55%-61%
  - Half with DHIC
  - Detrusor underactivity 17%-23%
  - Normal 11%-13%
  - Detrusor areflexia 9%-10%

CIC and UTI

- Certainty of bacteriuria
- Symptomatic UTI
  - Systemic sx rather than GU symptoms
- Preventive strategies
  - Clean technique
  - Maintenance of appropriate bladder volumes
  - Regular emptying intervals
- There are no definitive studies illustrating that incidence of UTIs is affected by sterile single-use or coated catheters compared to clean reused catheters.
  - Moore, Cochrane Database Systemic Review, 2007
UDS
• Most definitive modality to assess dysfunction associated with NGB
  – Filling and storage
    • CMG, sphincter EMG, DLPP, ALPP
  – Voiding
    • PFS, VCUG, sphincter EMG
• Baseline; information guides management
  – Monitoring with follow-up UDS q 2 years or as needed
  – Alter therapy as needed
  – Abrams, 2003

SCI patient with DSD

Video UDS - S/P radical pelvic surgery, poor compliance, VUR
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Summary
- Successful management of NGB is analogous to good parenting
- Have a high level of suspicion of occult dysfunction
- Early evaluation and intervention
- Ask for help when needed
- Be ready to change courses

Go from this: To this:
Principles of Management of Voiding Dysfunction Secondary to MS or Radical Pelvic Surgery

Christopher P. Smith
Associate Professor
Scott Dept of Urology
Baylor College of Medicine
Principles of Management of LUTS in MS

Fowler et al, Postgrad Med J, 2009
Failure to Store

- **Detrusor Cause**
  - Detrusor Hyperreflexia
  - Loss of Detrusor Compliance

- **Sphincter Cause**
  - Denervation
  - Ablation
  - Fixed, open scar
Detrusor Hyperreflexia
35 Year Old Female with MS

Figure 1

FS - 15cc
Urge - 34cc
Cap - 65cc

Qura
5ml/sec

Pves
10cmH2O

Pabd
10cmH2O

Pdet
10cmH2O
Poor Compliance with OAB Meds

% Still on Therapy

- Tolterodine ER
- Oxybutynin ER
- Tolterodine
- Oxybutynin IR

Base: 26,200; New Patients: Oct-Dec 2000
# Oral vs Intravesical Treatment

## Table 2. Urinary symptom measures

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
<th>Mean ± SD Change</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bladder capacity (ml)</td>
<td>221.9 ± 106.9</td>
<td>55.5 ± 67.2</td>
<td>79.6 ± 89.6</td>
</tr>
<tr>
<td>No. voiding frequency</td>
<td>8.8 ± 2.9</td>
<td>-1.2 ± 1.8</td>
<td>-1.6 ± 2.0</td>
</tr>
<tr>
<td>No. incontinence events</td>
<td>1.7 ± 2.1</td>
<td>-0.9 ± 1.6</td>
<td>-0.9 ± 1.7</td>
</tr>
<tr>
<td>Oxybutynin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atropine</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Table 3. Dry mouth side effect ratings data on each participant

<table>
<thead>
<tr>
<th></th>
<th>No. Oxybutynin</th>
<th>No. Atropine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better (-1)</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Same (0)</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td>Worse:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>0</td>
</tr>
</tbody>
</table>

Total of 57 participants per group.

If dry mouth was rated as 1 (a little) at baseline and then 1 (a little) after atropine arm, change data would show 0, ie the same, and if dry mouth was rated as 2 (a lot) after oxybutynin arm, change data would show 1, ie worse.

Fader et al, J Urol 2007
Botulinum Toxin for Overactive Bladder
Rigid Cystoscope Bladder Injection Technique

- Dilute 100-300 U of Botox into 10-30 ml of saline
- Inject targeting the trigone, base of the bladder and lateral walls
- Rigid cystoscope: 25 Gauge Cook® Williams needle, inject approximately 0.5-1.0 ml into 20-30 sites submucosally
Results: UI Episodes

Reduction in number of UI episodes compared to baseline (%)

- 300U BTX
- 200U BTX
- Placebo

- * $p<0.05$ for differences between BTX group and placebo
- † $p<0.05$ for difference within-group changes from baseline
Results: Urodynamics – MCC

* $p<0.05$ for within-group changes from baseline
† $p<0.05$ for pairwise contrasts between BTX groups versus placebo
Results: Quality of Life

*\(p<0.05\) for pairwise contrasts between BTX groups and placebo
*\(p \leq 0.002\) for within-group differences from baseline
BoNT-A for MS

Kalsi et al, Ann Neurol 2007
BoNT-A for MS

Table 3. Changes from Baseline in the Use of Procontinence Medication (Number and Percentage of Patients on Medication, Mean Dose of Anticholinergics Used) at 4 and 16 Weeks after the First Botulinum Neurotoxin Type A Treatment

<table>
<thead>
<tr>
<th>Study Time Point</th>
<th>Patients Taking Procontinence Medication (% of total)</th>
<th>Number of Patients Taking Most Common Types of Procontinence Medication</th>
<th>Mean Dose of Anticholinergic Medication Used ± SEM, mg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anticholinergics</td>
<td>Desmopressin</td>
<td>Oxybutynin (n = 14)</td>
</tr>
<tr>
<td>Pretreatment</td>
<td>33/43 (76.7%)</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>4 weeks</td>
<td>12/43 (27.9%)</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>16 weeks</td>
<td>12/43 (27.9%)</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>( p ) (pretreatment vs 4 weeks)</td>
<td>&lt;0.0001</td>
<td></td>
<td>0.0004&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>( p ) (pretreatment vs 16 weeks)</td>
<td>&lt;0.0001</td>
<td></td>
<td>0.0006&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>\( p \) values refer to statistical comparisons (Fischer’s exact and paired t test) for before botulinum neurotoxin type A (pre-BoNT/A) injection versus 4 weeks and pre-BoNT/A versus 16 weeks. The percentage of patients taking antiincontinence medication was markedly reduced after successful treatment with intradetrusor BoNT/A. A significant reduction was noted in the mean dose of oxybutynin and tolterodine used at both follow-up visits.

SEM = standard error of the mean; NA = not applicable.

Kalsi et al, Ann Neurol 2007
Electrical Neuromodulation
### PTNS for MS

**TABLE II. The Effects of PTNS on Urodynamic Variables for the Comparison of Baseline and After PTNS Data in MS Patients**

<table>
<thead>
<tr>
<th>Urodynamic variables</th>
<th>Baseline value, mean ± SD (range)</th>
<th>PTNS, mean ± SD</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First involuntary detrusor contraction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At volume (ml)</td>
<td>124.2 ± 37.6 (60–185)</td>
<td>217.5 ± 66.4 (94–347)</td>
<td>0.000</td>
</tr>
<tr>
<td>P(<em>{\text{det max}}) (cmH(</em>{2})O)</td>
<td>43.7 ± 20.2 (14–97)</td>
<td>29.7 ± 10.2 (13–51)</td>
<td>0.005</td>
</tr>
<tr>
<td><strong>Maximum cytometric capacity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At volume (ml)</td>
<td>199.7 ± 29.3 (128–263)</td>
<td>266.8 ± 36.9 (198–342)</td>
<td>0.000</td>
</tr>
<tr>
<td>P(<em>{\text{det max}}) (cmH(</em>{2})O)</td>
<td>48.8 ± 21.4 (18–98)</td>
<td>35.8 ± 10.5 (21–59)</td>
<td>0.001</td>
</tr>
<tr>
<td>P(_{\text{det Q max}})</td>
<td>35.8 ± 8.8 (21–53)</td>
<td>24.7 ± 7.6 (10–37)</td>
<td>0.002</td>
</tr>
<tr>
<td>Q(<em>{\text{max}}) (cmH(</em>{2})O)</td>
<td>11.6 ± 2.1 (7–15)</td>
<td>13.2 ± 3.5 (7–22)</td>
<td>0.003</td>
</tr>
<tr>
<td>PVR (ml)</td>
<td>82.9 ± 72.5 (0–276)</td>
<td>48 ± 26.6 (0–107)</td>
<td>0.006</td>
</tr>
</tbody>
</table>

*Kabay et al, Neurourol Urod 2009*
## TABLE 2

**Preoperative and postoperative InterStim trial 4-day voiding diary events**

<table>
<thead>
<tr>
<th></th>
<th>Mean frequency*</th>
<th>Mean nocturia</th>
<th>Mean number of incontinence episodes per 24 h</th>
<th>Mean number of pads per 24 h</th>
<th>Mean number of ISC per 24 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative</td>
<td>10.5</td>
<td>2.6</td>
<td>4.0</td>
<td>3.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Postoperative</td>
<td>6.0</td>
<td>0.8</td>
<td>1.3</td>
<td>1.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Reduction, %</td>
<td>43</td>
<td>69</td>
<td>68</td>
<td>72</td>
<td>58</td>
</tr>
<tr>
<td>SD,</td>
<td>1.4</td>
<td>1.7</td>
<td>2.4</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td><em>P value</em></td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
<td>&lt;.002</td>
<td>&lt;.02</td>
</tr>
</tbody>
</table>

ISC, intermittent self-catheterization.

* Number of daytime voids.
Loss of Compliance

Pdet

EMG

Volume
High Detrusor Leak Point Pressure

BLPP at 225 mL = 63 cm H$_2$O

Pressure at 125 mL = 40 cm H$_2$O

“Danger zone”
Elevated Intravesical Pressure

- In MMC patients: LPP > 40 cmH$_2$O: 68% Reflux 81% Hydoureteronephrosis $^1$
- In SCI patients: Decreased compliance: 39% Reflux 64% Hydoureteronephrosis $^2$
- Reflux resolve spontaneously with normalization of intravesical pressure $^3$

Bladder Leak Point Pressure

- Serves as your guide for storage pressure and indicates the pressure generated to overcome the outlet with voiding
- Store at < 35 cm H$_2$O
- Void at < 40 cm H$_2$O
Poor Detrusor Compliance Before Anti-Muscarinic Treatment

Detrusor Pressure (cm/H₂O)

Infused Bladder Volume (ml)

BLPP = 59 cm/H₂O

maximum safe capacity = 175 ml
Filling Pressures After Antimuscarinic Treatment

Detrusor Pressure (cm H2O)

Infused Bladder Volume (ml)

BLPP = 59 cm H2O

maximum safe bladder capacity = 375 ml
Failure to Empty

Should think of treatment of neurogenic lower urinary tract dysfunction in components:

• Detrusor function - Is detrusor contraction of significant magnitude to achieve emptying?

• Sphincter function - Is sphincter creating excessive outlet resistance?
Detrusor-Sphincter Dyssynergia
Detrusor External Sphincter Dyssynergia (DESD)
Detrusor – Sphincter Dyssynergia
Indwelling Catheterization

Risks

- Chronic infection, stone formation
- Tissue erosion (traumatic hypospadias, bladder neck/urethral destruction)
- Bladder wall fibrosis, urothelial neoplasia
- Vesicoureteral reflux, hydronephrosis
- Nephrolithiasis, renal failure

Avoid indwelling catheterization except as last resort
Indwelling Catheterization

• McGuire and Savastano (1986)
  – 22 women with SCI managed with indwelling catheters
  – 54% - IVP changes
  – 54% - autonomic dysreflexia
  – 100% - recurrent stones
  – 54% - non-functional urethra
  – 46% - urethral erosion
  – 92% - febrile UTI’s
  – 92% - leakage around the catheter
Squamous Cell Carcinoma

- Represents 3 - 6% of all bladder tumors
- 20X risk of SCCa in patients managed with chronic catheters
- Tumors in patients managed with chronic catheters are usually diagnosed at a more advanced stage and do not respond well to chemo or XRT
Intermittent Catheterization

- Need to assure low-pressure storage
- Urodynamics essential to check compliance and leak point pressure
- Hydronephrosis and reflux may resolve
- Urinary tract becomes colonized
- Treat only clinical UTI (fever, hematuria, epididymitis)
- Complications of strictures, false passages

Intermittent Catheterization

Foley catheter for 5 years
Leak around the catheter at 180 mls.

Intermittent self-catheterization
Normal compliance and total capacity > 400 mls.
CIC for MS

Vahter et al, MS 2009
Surgical Alternatives

- Suprapubic Catheterization
- Suprapubic Catheterization with Urethral Closure
- Bladder Augmentation
- Bladder Augmentation with Continent Catheterizable Stoma
- Incontinent Ileovesicostomy
- Continent Urinary Diversion
- Ileal Conduit Urinary Diversion
Surgical Alternatives: Failure to Store
Augmentation Cystoplasty

- Can use small or large bowel
- Transverse bladder incision facilitates placement of the augmentation
- Reflux - consider reimplantation for high grade reflux, +/- grade 3, grades 4 or 5
- Small but real risk of carcinoma in the augmented bowel segment
Cutaneous Ileocystostomy

- Tetraplegic male who cannot maintain condom cath because of penile retraction
- Women without dexterity to self-cath
- An ileal conduit “bladder chimney” provides low-resistance to outflow
- Avoids complications of foreign body
- Risks less than cystectomy with ileointestinal anastomoses
Ileovesicostomy
Continent Augmentation Cystoplasty

- Utilize ileocecal segment
- Continent cutaneous stoma
- No ureteral reimplantation if no reflux
- Preserves fertility potential
- No transfer needed to do self cath
- No need for urethral catheterization although it’s still available
ileocecal segment
clammed bladder
Lateral view
Surgical Options Failure to Store Due to Outlet Failure

- Urethral implants: Injectables
- Bladder Neck Sling
- Artificial Urinary Sphincter
- Closure of Bladder Neck/Urethra
Surgical Alternatives: Failure to Empty
BLPP After Sphincterotomy

Detrusor Pressure (cm/H₂O)

Infused Bladder Volume (ml)

BLPP = 12 cm/H₂O
Leaks at 50 ml
UroLume™ for DESD

- 160 patients (18-74 yrs) from 15 SCI Centers
- SCI (94%), MS (5%), Spinal Cord ischemia (0.5%), Spinal Cord tumor (0.5%)
- Mean SCI duration - 9 years (1-19 yr)
- Cervical (74%), Thoracic (22%), Lumbar (2%), Sacral (2%)
- 45/160 (28%) at least one TRUS
Urolume™ Stent for DESD
Voiding Pressure: Matched Data

- 3-month: N=123
- 6-month: N=114
- 12-month: N=98
- 24-month: N=22

Pre vs. Follow-up:

- Voiding Pressure cmH\textsubscript{2}O

p<0.001 Pre-Insertion vs. each follow-up period
Botulinum Toxin for Detrusor Sphincter Dyssynergia
Sphincter Injection Technique

Men

- Dilute 200 units BTX (Botox) with 4 ml saline
- **Men:** transurethral injections in the striated sphincter (25-G Cook® Williams needle at the 3, 6, 9 and 12 o’clocks)
- Flush with 0.3 ml of saline to not waste any toxin in needle
## Urethral Treatment Outcome

<table>
<thead>
<tr>
<th></th>
<th>Pre treatment</th>
<th>Post injection (6 months)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retention require catheterization (percent)</strong></td>
<td>41 (60%)</td>
<td>7 (12%)</td>
<td></td>
</tr>
<tr>
<td><strong>Residual urine volume (ml) (n=32)</strong></td>
<td>240±51</td>
<td>88±53</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Maximal voiding pressure (cmH$_2$O) (n=27)</strong></td>
<td>81±35</td>
<td>52±21</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Cystometric capacity (cmH$_2$O) (n=27)</strong></td>
<td>198±79</td>
<td>241±61</td>
<td>0.54</td>
</tr>
<tr>
<td><strong>Number of patients with stress urinary incontinence requiring pads</strong></td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

n= patients of patient with data before and 6 months after BTX-A

Smith, Nishiguchi, O’Leary, Yoshimura, Chancellor: Urology, 65:37-41, 2005
Questions?
How Do We Promote Office-Based Care of the Neurological Patient

Michael J. Kennelly, MD, FACS
Carolinas Rehabilitation
Carolinas Medical Center
Charlotte, NC

Office-Based Neurourology
Overview
- Epidemiology
- Evaluation
- Barriers to Care
- Office Promotion
- Resources

Neuroanatomy of the LUT
Autonomic and Somatic
Urologic Recommendations

- Patients with known neurologic disease should be evaluated for NLUTD.
- Evaluation should be made not only when urinary symptoms occur but also as a standard diagnostic approach if prevalence of a neurologic bladder is known to be high.
- If "idiopathic" LUTD occurs, acknowledge that unknown NLUTD is possible and consider diagnostic steps.

Neuourological Evaluation

- History
- Neurologic Focused Exam
- Diagnostic Tests

History Taking for NLUTD

- Urinary
  - LUTS
  - Previous voiding pattern
  - Urinary incontinence
  - Bladder sensation
  - Mode and type of voiding (catheterization)
- Bowel
  - Anorectal symptoms
  - Previous defecation pattern
  - Fecal incontinence
  - Rectal sensation
  - Mode and type of evacuation
- Sexual
  - Genital or sexual dysfunction symptoms
  - Previous sexual function
  - Sensation in genital area and for sexual functions
  - Erection or arousal
  - Orgasm
  - Ejaculation
- Neurologic
  - Acquired or congenital neurologic condition
  - Neurologic symptoms (somatic and sensory)
  - Spasticity or autonomic dysreflexia
Neurourologic Exam

- Sensation S2-S5 on both sides of the body
- Reflexes
- Anal sphincter tone
- Volitional contraction of anal sphincter and pelvic floor

Office Diagnostic Tests

- Urinalysis
- Blood chemistry
- Urodynamics
- Videourodynamics
- Nerve Conduction
- Ultrasound
  - Renal
  - Bladder
- CT
- MRI
- Bladder diary
- Free uroflowmetry
- Residual urine
- Filling cystometry
- Detrusor leak point pressure
- Pressure flow study
- Electromyography
  - Pelvic floor muscles
  - Urethral sphincter
  - Anal sphincter
    - Pudendal Nerve conduction studies
    - Reflex latency measurements
    - Electromyography
      - Bulbocavernosus anal reflex arcs
    - Evoked responses
      - Clitoris or glans penis
    - Sensory testing on bladder and urethra

Standardization of terminology

- The ICS NLUTD standardization report (39) is addressed specifically at the standardization of terminology and urodynamic investigation in this patient group. Other relevant definitions are found in the general ICS standardization report (42).
Classification of NLUTD

- NLUTD is dependent on the location and the extent of the lesion:
  - suprapontine or pontine
  - suprasacral spinal cord
  - subsacral and peripheral

Classification systems
- Neuro-urologic
- Neurologic
- Urodynamic
- Functional

NLUTD Treatment Goals
- Protection of the upper urinary tract
- Improvement of urinary continence
- Improvement of the patient’s quality of life
- Restoration of (parts of) the normal LUT function
- Also consider the patient’s disability, the cost effectiveness, the technical intricacy, and the possible complications
Slide 16
What can we do to promote office-based care of the neurologic patient care?
Understand what prevents patients with disabilities from getting appropriate urologic care and then trying to solve those issues.

Slide 17
Barriers to Care: Numerous
- Transportation
- Finances/health insurance
- Inaccessible facilities
- Lack of adaptive equipment
- Lack of attendant services
- Bias/misperceptions of healthcare givers
- Lack of education/opportunity to enhance skills
- Reluctance due to productivity expectations

Slide 18
What Can We Do to Promote Office Based Care?
- Be sensitive
- Train staff
- Anticipate patients needs
- Optimize office environment
- Have adaptive equipment available
- Engage patient as an active participant
- Join and participate in SIG society & activities
Common Courtesy Reminders
Regarding People with Disabilities
- Treat with dignity and respect
- It is appropriate to shake hands - even if a person has limited hand use or without hands.
- Always ask before you assist a person with a disability.
- Speak directly to the person with a disability rather than to a companion or sign language interpreter who may be with you.
- When you talk to a person in a wheelchair, try to sit down so that you will be at eye level with that person.
- Give undivided attention to a person who has difficulty speaking. Don't pretend to understand when you don't – ask the person to repeat what they said.
- Be considerate of the extra time it might take a person with a disability to get some things done.

What Can We Do to Promote Office Based Care?
- Be sensitive
- Train staff
  - Educational aspects of NLUTD
    - Technical skills training
      - Transfer training
      - Catheter skills
      - Bowel program
      - Autonomic Dysreflexia
      - Sexual Devices
    - Referral Network

Education Areas for Office Neurourology Staff
- Bladder and LUT function
- Bowel management
- Sexuality and Reproductive Health
- Secondary Complications
  - Hydronephrosis
  - Autonomic Dysreflexia
  - UTI and pyelonephritis
  - Bladder and Renal stones
  - Urethral erosion/skin breakdown
**Staff Knowledge Base**

**Bladder and LUT function**

- **Behavioral Therapy**
  - Crede, Valsalva, Triggered reflex voiding
  - Prompted voiding, timed voiding (bladder training)
- **Catheters**
  - I&O, intermittent, SPT
- **External Appliances**
- **Drug Treatment**
  - Antimuscarinics, alpha-blockers, DDAVP
- **Electrical Simulation**
  - SNS, PNS, PTNS, IVES, DBS

**Bladder neck/urethral procedures**

- Botulinum toxin sphincter injection
- Bladder neck incision
- Sphincterotomy
- Urethral bulking agents
- Urethral Inserts
- Urethral drapes

**LUT procedures**

- Denervation, deafferentation, neurostimulation, neuromodulation
- Sacral rhizotomy
- Sacral anterior root stimulation

**Bladder augmentation**

**Urinary diversion**

**Undiversion:**

---

**Slide 23**

**What Can We Do to Promote Office Based Care?**

- **Train staff**
  - Educational aspects of NLUTD
  - Technical skills training
  - Transfer training

---

**Slide 24**

**Transferring Patients Safely**
Slide 25

Transfer Training Classes
- Helps prevent caregiver back injury
- Assists in the safe transfer or ambulation of patients.

Slide 26

What Can We Do to Promote Office Based Care?
- Train staff
  - Educational aspects of NLUTD
  - Technical skills training –
    - Transfer training
    - Catheter skills training
      - Foley
      - SPT
      - Condom Cath
      - Collection Devices

Slide 27

Catheterization Skills Training
What Can We Do to Promote Office Based Care?

- Be sensitive
- Train staff
  - Educational aspects of NLUTD
  - Technical skills training
    - Transfer training
    - Catheter skills
    - Bowel program

Education Strategies for the Neurogenic Bowel

- Review Anatomy & process of defecation.
- Note differences in Reflexic vs. Areflexic bowels.
- Role of regularity, timing, and positioning in successful bowel management.
- Safe, effective use of assistive devices and equipment.

Education Strategies for the Neurogenic Bowel

- Techniques for manual evacuation, digital stimulation, and suppository insertion.
- Knowledge of various bowel medications.
- Management of emergencies.

www.pva.org
Establishing a Bowel Program

- Encourage appropriate fluids, diet, and activity.
- Evaluate medications that promote or inhibit bowel function.
- Select optimal scheduling and positioning.
- Choose an appropriate rectal stimulant.
- Provide rectal stimulation initially to trigger defecation daily.
- Select appropriate assistive techniques.

What Can We Do to Promote Office Based Care?

- Be sensitive
- Train staff
  - Educational aspects of NLUTD
  - Technical skills training
    - Transfer training
    - Catheter skills
    - Bowel program
    - Autonomic Dysreflexia
    - Sexual Devices
  - Referral Network

Autonomic Dysreflexia

- Condition of uncontrolled sympathetic response that occurs in patients with SCI lesions above T6. It is triggered by noxious stimuli below the level of the lesion.
- Sympathetic outflow below the lesion → Hypertension
- Parasympathetic excitation above the level of the lesion →
  - Nausea
  - Flushing
  - Sweating
  - Spasms
  - Headache
  - Nasal congestion
  - Goose bumps
  - Blurry vision
  - Seeing spots
  - Stuffy nose
Common Causes of Autonomic Dysreflexia

**BLADDER OR KIDNEY**
- Overfull bladder
- Urinary tract infection, or bladder or kidney stones
- Bladder tests, treatments, or surgery, such as cystoscopy and urodynamic tests

**BOWEL OR ABDOMEN**
- Overfull bowel, constipation, or bowel blockage (impaction)
- Problems such as gallstones, stomach ulcer or gastritis, hemorrhoids, or appendicitis
- Bowel or abdominal tests or surgery, such as sigmoidoscopy or barium enema

**SKIN**
- Pressure sores (pressure ulcers)
- Problems such as ingrown toe nails, burns (including sun burns), or insect bites
- Contact with hard or sharp things or other injuries to the skin

**SEXUAL ACTIVITY OR REPRODUCTION**
- Too much genital stimulation
- Men: ejaculation, infection or inflammation of the testicles (epididymitis), or pressing or squeezing of the testicles
- Women: menstruation, pregnancy (especially labor and delivery), or infections of the vagina (vaginitis) or uterus (pelvic inflammatory disease)

---

**Prevention and Management**

**PREVENTION**
- Proactive management of the Uro-Gyn-GI tracts:
  - Anti-cholinergics (ensure low-P filling of the bladder)
  - Intermittent catheterization (avoid over-distension)
  - Empty bladder prior to pelvic exam, cystoscopy
  - Bowel regimens
  - Scrupulous skin care

**TREATMENT**
- Remove stimulus (stop exam)
- Reposition patient
- Loosen clothing
- Check bladder / rectum, using 2% lidocaine jelly
- Short-acting anti-hypertensives (nitrates, nifedipine) if necessary
- Do NOT use beta blockers

---

**What Can We Do to Promote Office Based Care?**

- Be sensitive
- Train staff
  - Educational aspects of NLUTD
  - Technical skills training –
    - Transfer training
    - Catheter skills
    - Bowel program
    - Autonomic Dysreflexia
    - Sexual Devices
Slide 37

Myths About Sex and Disabilities

- People living w/ disabilities…
  - Are perverts
  - Are not sexual
  - Are not desirable
  - Can’t have ‘real’ sex
  - Don’t get sexually assaulted
  - Are pathetic choices for partners
  - Have more important things to worry about

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What’s True?

- People w/ disabilities are:
  - Worthy of feeling pleasure
  - Able to experience sexual pleasure w/ appropriate stimulation and adaptations
  - Sexual pleasure modulates chronic pain
  - Sexual independence is a potent form of empowerment

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What Are the Challenges?

- Adjusting to changed body image
- Learning how ‘new’ body responds
- Being open to trying new positions and making adaptations
- Finding an appropriate partner
- Communicating with partner re: desires, needs, use of safer sex precautions
Management Options

- Basic education and advice:
  - Clitoral, Penile stimulation - More direct, intense, and longer duration
- Psychosexual counseling
- Evaluate meds; change culprits, if possible
- Pharmacotherapy
  - PDE-5 inhibitors, Estrogen, penile injection
- Mechanical devices
  - vibrators, clitoral pumps, VED, penile implants

Assistive Devices

- No-Hands Vibrators
- Finger Strap-On Vibrators

Sexuality Resources

- Online resource for disability and sexuality information: www.sexualhealth.com
- Places to buy adaptable sex toys:
  - www.comeasyouare.com
  - www.goodvibes.com
- Dating service for people with disabilities: www.dateable.org
- American Association of Sex Educators, Counselors, and Therapists (AASECT): www.aasect.org
What Can We Do to Promote Office Based Care?

- Be sensitive
- Train staff
  - Educational aspects of NLUTD
  - Technical skills training –
    - Transfer training
    - Catheter skills
    - Bowel program
    - Autonomic Dysreflexia
    - Sexual Devices
  - Referral Network

Neurogenic Referral Network

- NLUTD
- Patient
- Wound
- Ostomy
- Nurse
- Physical Therapist
- Occupational Therapist
- Psychologist
- Social Worker
- Neurosurgeon
- Neurology
- Orthopedics
- GI
- Plastics
- IM/FP
- Colorectal
- Specialist
- PM&R
- Urology

What Can We Do to Promote Office Based Care?

- Be sensitive
- Train staff
- Anticipate patients needs
- Optimize office environment
- Have adaptive equipment available
- Engage patient as an active participant
- Join and participate in SIG society & activities
Appropriate Stirrups and Support for Exam Tables

Toilet Accessories

What Can We Do to Promote Office Based Care?
- Be sensitive
- Train staff
- Anticipate patients needs
- Optimize office environment
- Have adaptive equipment available
- Engage patient as an active participant
- Join and participate in SIG society & activities
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Consumer Societies

www.nationalmssociety.org
www.pva.org
www.parkinson.org
www.ucp.org

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SCI Professional Societies

www.asia-spinalinjury.org
www.ascipro.org/

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Thank You