MSA and the Bladder:  
What are the issues and what can be done?

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Urinary Tract Anatomy

Bladder muscle (detrusor) analogous to car engine

Urethral sphincter muscle analogous to car brake
Bladder Has Simple Functions

Urine storage (hold it in)
- Bladder muscle relaxes
- Sphincter muscle contracts

Urine emptying/voiding
- Bladder muscle contracts
- Sphincter muscle relaxes

*This process is under complex regulatory control by the nervous system (central and autonomic - brain and spinal cord)*
Nervous System control of the urinary tract is complex and still not fully understood

**Adult Neurogenic Lower Urinary Tract Dysfunction (ANLUTD) – formerly neurogenic bladder (NGB)**

- Nervous system is like the circuitry in your house and the bladder and sphincter are appliances (e.g., microwave and toaster).

- Pathology in the nervous system (brain, spinal cord, nerves) can result in abnormal functioning of the bladder and sphincter.

*When there’s a problem with the circuitry in your house are you surprised when your appliances don’t work properly?*
Urine Storage Dysfunction (bladder doesn’t hold urine well) aka Overactive Bladder (OAB)

➢ Urinary Frequency (day/night)
  – Influenced by urine output
    • Fluid intake
    • Edema (eg ankle swelling)
    • Diuretic medication
    • Sleep apnea

➢ Urinary Urgency

➢ Urinary Incontinence (accidental wetting)
  – Urge incontinence
  – Bed wetting (nocturnal enuresis)
Urinary Emptying/Voiding Dysfunction
(bladder doesn’t empty well)

Weak (underactive) Bladder

Voiding difficulty
- Weak stream
- Hesitancy, straining

Retained urine in bladder
- Risk for infection (UTI)
- Risk for stones (bladder)
- Risk for kidney dysfunction
- Frequent urination (bladder always partly full)

Urethral Obstruction (e.g., prostate, hyperactive sphincter)
MSA Affects the Brain and Spinal Cord

→ Urinary Tract Dysfunction

• Lower urinary tract symptoms (LUTS) very common in MSA
  – >90% of patients
  – May precede the onset of other neurologic and orthostatic symptoms
  – May progress with time
• Urine storage dysfunction and/or emptying dysfunction

~40-50% have daytime urinary frequency
~60-70% have nighttime urinary frequency (nocturia)
~65-75% have urinary urgency and even urge incontinence

~60-70% have voiding difficulty
→ Incomplete bladder emptying/retention

Sakakibara et al. Clin Auton Res 2018
How Are Patients Assessed?

- Symptom assessment and physical exam
  - Questionnaires
- Urine testing
  - Rule out infection/blood
- Bladder scanner (ultrasound)
  - Assess emptying
- Bladder diary/pad tests
  - Assess urine production, urinary frequency, incontinence
- Urodynamic testing
3 Tiered Management of Overactive Bladder

1. Behavior Modification
   Pelvic Floor Therapy

2. Medication

3. Procedural
Behavior Modification/Pelvic Floor Therapy

**Fluid management**
- *Avoid excessive urine production*
  - Appropriate intake/timing of fluids
  - Management of leg edema/swelling
    - Timed diuretics
    - Compressive stockings
    - Afternoon lie downs
  - Treat sleep apnea
- *Avoid bladder irritants*

**Pelvic floor therapy**
- Kegels
- Physical therapy
  - Biofeedback
  - Electrical stimulation

**Bladder retraining**
- Timed urination (prompted)
- Delayed urination

**Manage constipation**
Bladder Irritants

- Alcoholic beverages, including beer and wine
- Citrus juices and fruits
- Highly spiced foods
- Carbonated beverages (e.g. soft drinks)
- Caffeine (coffee, tea, chocolate)
- Sugar, honey
- Milk/milk products
- Corn syrup
- Artificial sweetener -- Nutrasweet (Equal)
- Smoking
Behavior Modification/Pelvic Floor Therapy

• Fluid management
  – Avoid excessive urine production
    • Appropriate intake/timing of fluids
    • Management of leg edema/swelling
      – Timed diuretics
      – Compressive stockings
      – Afternoon lie downs
    • Treat sleep apnea
  – Avoid bladder irritants

• Pelvic floor therapy
  – Kegels
  – Physical therapy
    • Biofeedback
    • Electrical stimulation

• Bladder retraining
  – Timed urination (prompted)
  – Delayed urination

• Manage constipation
Overactive Bladder Medications (oral, transdermal)

- Oxybutynin (Ditropan, Oxytrol, Gelnique), Tolterodine (Detrol), Solifenacin (Vesicare), Trospium (Sanctura), Darifenacin (Enablex)
- Mirabegron (Myrbetriq)

- *All roughly equivalent in efficacy (improve urine holding)*

- Some cause more side effects (less with extended release and esp transdermal formulations):
  - Dry mouth
  - Constipation
  - Blurred vision
  - *Potential for cognitive problems (eg memory)*
    - *esp oral Oxybutynin*
Procedural Management

• Nerve stimulation (technically not approved for neurogenic bladder)

  Tibial (aka PTNS)

  Sacral (aka InterStim)

• Botulinum Toxin injection into bladder (Botox)
CAUTION

- Medications and some procedures that reduce bladder hyperactivity (to improve urine storage) have the potential to worsen bladder emptying
  - Akin to taking foot off gas pedal while driving car
    - Car slows down and may come to a stop
This Could Force A Compromise Between Urine Storage And Emptying

Some patients require catheterization to empty their bladders if they take OAB medications or use Botulinum toxin injections to improve urine storage.
3 Tiered Management of Urine Emptying Dysfunction

1. Behavior Modification
   Pelvic Floor Therapy

2. Medication

3. Procedural

At any time one may resort to the use of a catheter for bladder emptying
Medications for Emptying Dysfunction

- **Relax sphincter**
  - Tamsulosin (Flomax), Sildosin (Rapaflo), Alfuzosin (Uroxatral)
  - Baclofen

- **Shrink prostate**
  - Finasteride (Proscar), Dutasteride (Avodart)

- **Strengthen Bladder** (rarely used)
  - Bethanecol (Urecholine)
Procedures to Improve Emptying

- Nerve stimulation
  - Sacral neuromodulation (aka InterStim)

- Botulinum toxin (Botox) injection into sphincter

- Prostate Surgery
Prostate Surgery and MSA

- Prostate surgery (TURP, HoLEP) is used to relieve urinary symptoms in BPH patients with enlarged prostates that obstruct the urethra.

- Generally in MSA the prostate is not the cause of urinary symptoms (it’s a neurological condition affecting the bladder and sphincter).

- Some patients initially thought to have BPH undergo prostate surgery with complications and are then later diagnosed with MSA.

- Prostate surgery doesn’t necessarily improve bladder emptying and carries a significant risk for urinary incontinence in MSA patients.
Catheters

• Can help manage both urinary storage (incontinence) and emptying dysfunctions
  ➢ Lessen incontinence
  ➢ Ensure bladder is empty

• Indwelling vs Intermittent vs External

• Can have down sides (esp indwelling catheters):
  – Bladder irritation
  – Urinary infection
  – Urinary stones
Intermittent (Self) Catheterization

**Advantages:**
- No need to carry drainage bag
- Less irritation than indwelling
- Less infection than indwelling

**Disadvantages:**
- Needs to be done multiple times a day
- Potential for infection
- Discomfort/difficulty with insertion
Indwelling (Foley) Urethral Catheter

Advantages:
- Simplifies bathroom habits
- May lessen incontinence (balloon plugs urethra)

Disadvantages:
- Irritation of bladder
- Infection
- Stones
- Urethral trauma/erosion
Suprapubic Catheter

**Advantages:**
- Avoids urethra (no trauma)
- May be more comfortable
- Less infection
- Larger catheter size drains better

**Disadvantages:**
- Skin irritation (esp if obese)
- Can leak urine per urethra
- Requires minor surgical procedure
External Catheter
Manages Urinary Incontinence (Not Urinary Retention)

- Can be worn as needed
- Less infection than indwelling catheters
- Need to have adequate bladder emptying
- May not stay on well if penis retracts into fat
Keys to Keeping Catheters “Happy”

- High fluid intake – at least 2-3L (70-100oz)/day
  - Irrigation might be needed

- Change catheter regularly
  - At least every 4 weeks for indwelling catheters
  - New catheter each time for intermittent catheters

- More frequent emptying is better than less frequent for intermittent catheterization

- Don’t force it – avoid trauma to urethra