Neurogenic Bladder: The What and When of Follow-Up

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Objectives

1. Review the common complications associated with neurogenic bladder

2. Discuss a rationale approach to the assessment and followup of the neurogenic bladder patient

What is “neurogenic bladder”?  

Not clearly defined

Generally accepted to mean lower urinary tract dysfunction in a patient with a defined neurologic disease.
What are the urologic consequences?

**Renal dysfunction**
- First and foremost in urologists’ mind, historically a common cause of death.
- Risk of renal dysfunction is about 5% (or 2.5x higher) among contemporary SCI patients.
- Spina bifida: 50% of young adults had no/mild renal dysfunction, only 2% renal failure
- MS patients after a median of 5 years: 5-12% had subtle upper tract changes, none had renal dysfunction

But what about the other consequences?

Renal dysfunction

**Pathogenesis**

1. Poor compliance
2. NDO
3. High PVR (DSD or Underactive detrusor)

Tends to be a problem with SCI and Spina bifida, rare in other diseases (including MS)

**Often has no symptoms!**

Therefore it requires investigation to define: UDS to identify treatable causes, Renal US and 24hr creatinine clearance or nuclear GFR to diagnose
Urinary Tract Infections

Common among neurogenic bladder patients: 30-35% have annual UTIs

Among SCI patients, 10x higher rate of serious infections compared to the general population, and death from urosepsis accounts for 10% of mortality in this population

Etiology:

- Manack, NAU, 2011
- Welk, NUA, 2017
- Kennelly, AU, 2019

Diagnosis is the challenge:

- Symptoms: New/worsening incontinence, increased spasticity, malaise/lethargy, flank pain, increased autonomic dysreflexia, nausea/vomiting (NOT cloudy urine/foul smell)
- Signs: Fever
- Investigations: + Urine culture and leukocytosis

Requires history, physical exam and urine tests to diagnose

Routine/surveillance urine tests are not helpful!

In the setting of recurrent UTIs, requires counselling and investigations (Renal US, UDS, cystoscopy)
Incontinence

Not a specific symptom of a neurologic disease, but common in this patient population

- Mixed neurologic population: 75%
- SCI: 50%
- Spina bifida: 60%
- MS: 30-50%

Etiology

- Neurogenic detrusor overactivity
- Overflow incontinence (reduced sensation, or fixed closed sphincter)
- Stress incontinence
- Poor bladder compliance
- Functional

Can happen with any neurogenic disease

Requires history and physical exam to identify (bladder diary is helpful)

What do the current guidelines tell us to do?

Tang, BMC Neurol, 2014
Noreau, Top Spin Cord, 2014
Massot, Int Neurol, 2016
Verhoef, Spinal Cord, 2005

Vince RA, Urol Clin NA. 2017
Cameron, J Urol, 2012
An evidence-informed strategy

1. Stratify based on etiology of neurogenic bladder
2. Define risk factors during the initial evaluation
3. Identify patients that require urologic surveillance, or those that can be followed by their primary care physician

What can you do for surveillance?
High risk features

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The High Risk Neurogenic Bladder

Start with: history, physical exam, Renal US, UDS or VUDS, assessment of renal function. Cystoscopy only if indicated.

Yearly urology assessment based on history and physical exam. Consider Urinanalysis for proteinuria, hematuria.

- SCI
- Adult Spina bifida
- Wheelchair bound MS?

High risk features?

Yes
Optimize bladder function
Yearly surveillance (Renal US, UDS or VUDS, Renal function)

No
Consider Renal US, UDS or VUDS, and renal function testing when the behavior of the bladder changes, or when the baseline tests are 2-5 years old.
The Low Risk Neurogenic Bladder

Not SCI, spina bifida or wheelchair bound MS!

Initial evaluation: history, physical exam, UA and PVR

Consider Renal US, UDS or VUDS, and assessment of renal function for patients who:

- Have a significantly elevated PVR
- Are considering invasive therapy for their lower urinary tract
- Have significant incontinence
- Are bothered by clinically significant UTIs
- Require catheters for bladder management

In the absence of concerning findings, patients can in many cases be followed by their primary care physician once their bladder management, UTI risk, incontinence and urinary symptoms have been optimized. Repeat urologic assessment and investigation should be driven by history and physical exam.
Conclusions

Rationale followup of a neurogenic bladder patient requires
- Good neuro-urological history and physical exam
- Address renal function, Infections, and incontinence
- Identification of reasons for more extensive investigation based on etiology and risk factors
- Correct identification of high risk patients who are most likely to benefit from surveillance

Spare slides
What do urologists thing they should do?

Survey of Canadian Urologists (CUA)
- 2/3 Yearly US and UDS

Survey of American/International Urologists (SUFU)
- 2/3 Yearly US and VUDS

But the reality is quite different:

Stone disease

Increased risk among SCI and spina bifida patients, and perhaps for others with a neurologic condition and significant bladder dysfunction

Can be asymptomatic, and is associated with an increased risk of sepsis with presentation, and post treatment complications

Etiology
- Urinary stasis
- Infection
- Foreign bodies/catheter usage
- Intrinsic metabolic changes

Requires investigations to identify: Renal US
Bladder Cancer

Increased risk for SCI and spina bifida patients, although still quite rare

More likely to present at a younger age and with a higher stage, as a nonTCC histology, and 7x more likely to be fatal

Etiology: chronic inflammation
  ◦ Long-term catheterization
  ◦ UTIs
  ◦ Bladder stones

Requires investigation to diagnosis: cystoscopy, BUT routine/screening cystoscopy is not helpful
  ◦ Poor sensitivity, Poor compliance, Rare disease (1-2% lifetime risk in contemporary studies)

Evaluate for bladder cancer based on history (new lower urinary tract infections, gross hematuria, new urethral discharge/incontinence, recurrent infections and physical exam (new lower abdominal mass)

Welk, Spinal Cord, 2013
Mirkin, J Ped Rehab, 2013
Dray, Urol Clin of NA, 2017

Urethral Damage

Unique risk to those with neurogenic bladder who use urinary catheters

Up to 20% of male SCI patients develop iatrogenic hypospadius from indwelling catheters.

Wheelchair bound female patients can develop loss of the urethra and sphincter complex

Etiology:
  ◦ Pressure necrosis
  ◦ Tension on an indwelling catheter
  ◦ DSD
  ◦ Poor CIC technique/congenital abnormalities

Requires history, and physical exam to diagnose, and in some cases cystoscopy to confirm

Hunter, NAU, 2013