Neurogenic Bladder

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Disclosure Information
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Disclosure of Relevant Financial Relationships
I have no financial relationships to disclose.

Disclosure of Off-Label and/or investigative uses:
I will not discuss off-label use and/or investigational use in my presentation

Objectives
- Identify symptoms of neurogenic bladder
- Describe how urodynamics are helpful in evaluation of neurogenic bladder
- Describe medical management options for neurogenic bladder
- Describe recommended follow up for patients with previous urologic surgeries/procedures

Neurogenic Bladder
**Neurogenic Bladder**

- Loss of normal bladder function caused by damage to part of the nervous system
- Resulting in the bladder and or the sphincter being:
  - Underactive
  - Overactive

**Symptoms of Neurogenic Bladder**

- Inability to control urination or urinary incontinence
- Dribbling, straining or inability to urinate or urinary retention
- Recurrent urinary tract infections

**Neurogenic Bladder Complications**

- Renal damage/failure secondary to high bladder pressures
- Renal stones or bladder stones
- Vescoureteral reflux (VUR)
- Increased risk for UTIs and pyelonephritis, especially if VUR present

**Assessment Tools**

- Patient History
- Void/cath/leak diary
- Bladder scan (post void residual)
- Renal ultrasound
- Cystometrogram (urodynamics)
- Advanced imaging
What Are Urodynamics?

- Tests to examine voiding disorders
- Focuses on the bladder’s ability to store and empty urine
- Tests may include Uroflow, CMG, EMG and Voiding pressure study

Detrusor Pressure (Pdet)

- \( P_{detrusor} = P_{ves} - P_{abd} \)
- Pressure of bladder muscle
- Reading should be positive number and less than 10 at start of test
- When filling if \( P_{detrusor} > 40 \text{cm/H}_2\text{O} \), upper tracts are at risk.
During Procedure

- Patient asked to report
  - First sensation
  - First desire to void
  - Strong desire to void
  - Capacity

- Patient asked to perform
  - Valsalva
  - Cough
  - Other activities reported to cause leakage
  - Void at end of study

Normal Bladder Function on CMG

Abnormal CMG

EMG

- Sphincter muscles should relax when a patient voids.

- There can be a discoordination between the sphincter and the bladder in myelodysplasia and CP.
  - Destrusor Sphincter Dysynergia or DSD.
**Post-Void Residual (PVR)**
- Performed after a uroflow or urination either by bladder scan or catheterization
- If catheterized, urine is drained and measured
- Estimated Bladder Capacity formula
  - (age in years x 30) + 30
  - (up to age 12 at which EBC is 390ml).
  - Adult bladder 400-500ml
- PVR should be < 10% of bladder capacity

**What Can You Learn From UDS?**
- Sensation
- Detrusor compliance
- Detrusor over activity (uninhibited contractions)
- Leak point pressure
- Capacity
- Sphincter muscle activity

**Neurogenic Bladder Classifications**
- Bladder dysfunction
  - Overactive
    - Uninhibited detrusor contractions
    - Weak/weakness
  - Underactive
    - Retention
    - Overflow incontinence
- Outlet dysfunction
  - Low resistance
    - Incontinence
  - High resistance
    - Retention
  - Mixed

**Bladder, Outlet or Both**
- Bladder dysfunction
  - Overactive
  - Underactive
- Outlet dysfunction
  - Low resistance
  - High resistance
  - Mixed
Management of Neurogenic Bladder

What are the Goals?

- Prevent renal failure (less common in CP compared to patient’s with SB or SCI with neurogenic bladders.
- Maintain low/normal pressure during both filling and emptying
- Minimize UTIs
- Continence
- Means of emptying
- Functional volumes and schedule
- Adequate long term follow up

Consider When Discussing Management Options

- Patient’s goals
- Mobility
- Hand function
- Spasticity and tone management
- Communication
- Availability/scope of care of PCAs/staff
- Environment/Schedule (home, school, day program, work, respite, camp, etc)
- Executive function/memory

Non-invasive incontinence products

| Pads | Briefs |
External Catheters

- Male External Catheter
- Female External Catheter

Indwelling Catheters

- DRAINAGE PORT
- INSERT INTO URETHRA AND INTO URINARY BLADDER
- INFLATABLE BALLOON ANCHOR DEVICE IN BLADDER
- FILL WITH FLUID TO INFLATE BALLOON
- TO COLLECTION DEVICE

Intermittent Catheterization (IC)

- Clean technique & re-use catheter
- Clean technique with single use catheter
- Sterile technique with single use catheter
Complications of Catheterization

- Positioning
- Urethral Events
- Scrotal Events
- Bladder Events
- Pain
- Urinary Tract Infections

Catheters

Open vs Closed Catheters for IC

- Open
  - Sterile catheter is packed separately

- Closed System
  - Catheter drainage bag is connected in one entire sterile system

Catheter Tips

- Straight
- Coude
- Olive
Catheter Options
- Coating:
  - Uncoated latex free
  - Silicone (Latex free)
  - Uncoated Red rubber
  - Latex
  - Hydrophilic
  - Antibiotic

Catheter Sizes
- Sized in French (FR)
  - FR=diameter (mm) * 3
  - Small FR number = small diameter
- Pediatric
  - 5FR-10FR
- Adult
  - 8FR-18FR

Medical Management Options

Timed Toileting
- Schedule time to toilet to routinely empty bladder

Catheter Sizes
- Lengths
  - 14”-16”
  - 6” = Female
- Foley balloon size
  - 5-30ml
Functional Toileting Evaluation

- Environmental
- Communication
- Spasticity and tone management
- Equipment
- Bracing

Medications

- Anticholinergic Medications:
  - Reduce uninhibited bladder contractions; improves bladder storage and pressures.
  - Routes: oral or topical (patch & gel)

Considerations When Prescribing

- Side Effects
  - Safety vs tolerability
  - Worsening conditions

- Frequency/Route
  - Memory/executive function concerns
  - Dexterity

Common Antimuscarinics: Receptor

- Darifenacin (Enablex): M3
- Fesoterodine (Toviaz): M2 & M3
- Oxybutynin (Ditropan) M2 & M3
  - Ditropan IR
  - Ditropan XL
  - Oxytrol patch
  - Galantame 10% transdermal gel

- Solifenacin (Vesicare): M2 & M3
- Tolterodine (Detroil): M2 & M3
  - Detrol IR
  - Detrol LA
- Trospium (Sanctura): M2 & M3
  - Sanctura IR
  - Sanctura XR
- Mirabegron (Mybetril) Beta 3 Agonist

Older Antimuscarinics

- Propazoline
- Hyoscymine
Purpose

- Evaluation and management of NGB in adults is complex due to their past urologic history and surgeries.
- Identify patients at risk of upper tract damage and connect with appropriate urology resources.
Background
- GLSHC provides services for adults with childhood onset disabilities.
- Majority of patients have transitioned from Gillette Children's Specialty Healthcare.
- Urologic services at GLSHC include:
  - Urologist
  - Medical Urology (PM&R physician & NP)
  - RN
  - Imaging
  - Urodynamic

Methods
- Review of literature and recommendations from urologic surgeons who specialize in NGB.
- Resulted in a guideline outlining recommended urology services based on past medical/surgical history.
  - Research is lacking to support some screening/surveillance for patient increased risk of bladder cancer

<table>
<thead>
<tr>
<th>Urologic services at GLSHC</th>
<th>Screening/Recommended</th>
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</thead>
<tbody>
<tr>
<td>Neurourologic bladder:</td>
<td>Annual: Renal/Bladder US (RBUS)</td>
</tr>
<tr>
<td>with voiding retention and/or on catheter program, and/or medications for bladder spasms, and/or recurrent UTIs</td>
<td></td>
</tr>
<tr>
<td>Bladder augmentation</td>
<td>Annual: RBUS, Cr, BUN, Electrolytes, Vitamin B12</td>
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<tr>
<td>Bladder augmentation-ileal conduit</td>
<td>Annual: RBUS, Cr, BUN, Electrolytes, Vitamin B12</td>
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<tr>
<td>Nephrectomy: solitary or horseshoe</td>
<td>Annual: RBUS &amp; Cr</td>
</tr>
<tr>
<td>New hydrourephosysis</td>
<td>Annual: RBUS, Cr &amp; UTI</td>
</tr>
<tr>
<td>Incidental between catheterization or voids</td>
<td>Annual: RBUS, Cr &amp; UTI if UAUC positive</td>
</tr>
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Results

Distribution and implementation of the guideline:
- Increased awareness
- Provided structure to annual follow up
- Helped nursing staff prepare patients for upcoming visits
- Coordinate services: imaging, labs, and records
- Identified patients who need to re-establish adult urologic care
  - (2006-2008) increased from 106 to 154 out of a total of 178 adults with SB receiving other services at GLSH
- Guided a patient education resource comparison and gap analysis
  - Created eight new urology patient education pages

Discussion/Conclusion

- Recommendations will change based on new research developments and individual patient presentation/symptoms/needs.
- The tool helped providers to identify patients who require close urologic follow up
- Adult patients benefit from learning the potential risks they face based on their past surgeries and medical histories.
- May increase their understanding of the importance of ongoing urologic follow up and increase adherence to the guidelines in medical management and self-care.

Thank you!

PLEASE WELCOME
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