Urology Nursing Considerations

PENA CONFERENCE 2021

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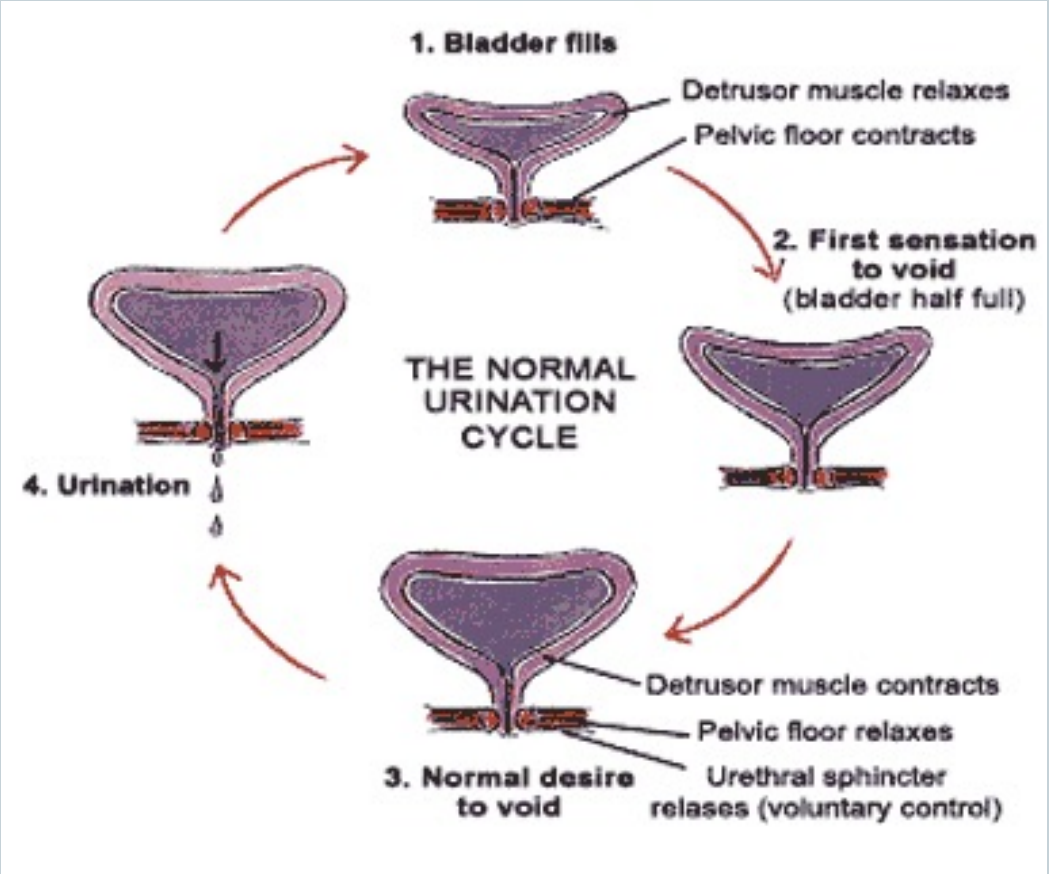
What is Neurogenic Bladder?

A malfunctioning bladder due to neurologic dysfunction or insult as a result of internal or external trauma, disease or injury.

Causes of neurogenic bladder in children:

- Cloaca
- Spinal cord injury/Spina Bifida
- Bladder extrophy
- Congenital bladder obstruction
- ARM

How does the normal bladder work?



Diagnostic Ultrasound Corporation, 2003

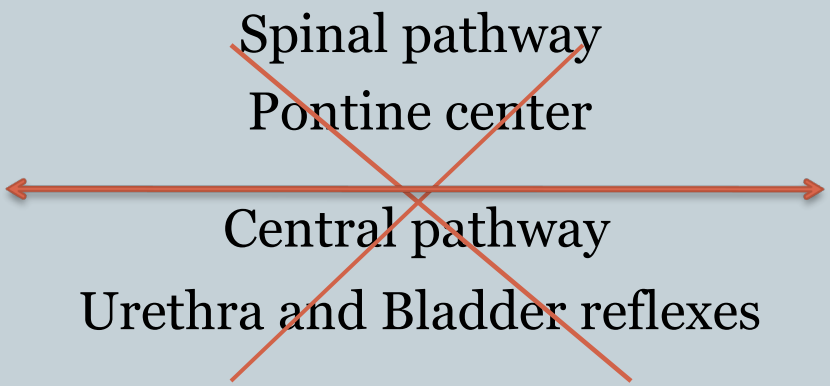
Neural control of the Bladder

- Two discrete phases of micturition:
  - Storage
    - contraction of the striated sphincter (somatic innervation)
    - contraction of smooth muscle sphincter (sympathetic innervation)
    - inhibition of detrusor activity (sympathetic innervation)
  - Emptying
    - relaxation of the striated sphincter (somatic innervation)
    - relaxation of the smooth muscle sphincter and opening of the bladder neck (sympathetic innervation)
    - detrusor contraction (parasympathetic innervation)

Neural Reflex Arcs to Control Bladder Function

- Spinal cord
  - Extends from the brainstem to the lumbosacral spine.
  - Acts as a long communication pathway.
  - An intact spinal cord is critical for normal urination.
  - The sacral spinal cord is a specialized area known as the sacral reflex center. It is responsible for bladder contractions.
  - In infants, the brain is not mature enough to command the bladder, so sacral cord signals to detrusor to contract involuntarily.
  - If the sacral cord is injured, the bladder will not function normally. Urinary retention occurs and the child will not empty completely.

Pathophysiology



Communication pathway is interrupted by injury or defect of the cord.

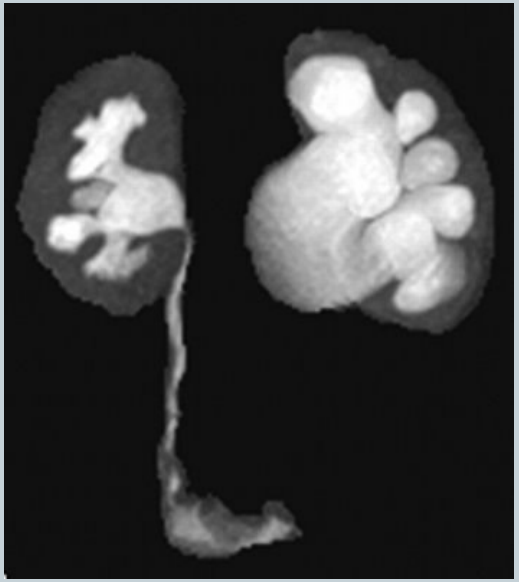
The Neurogenic Bladder

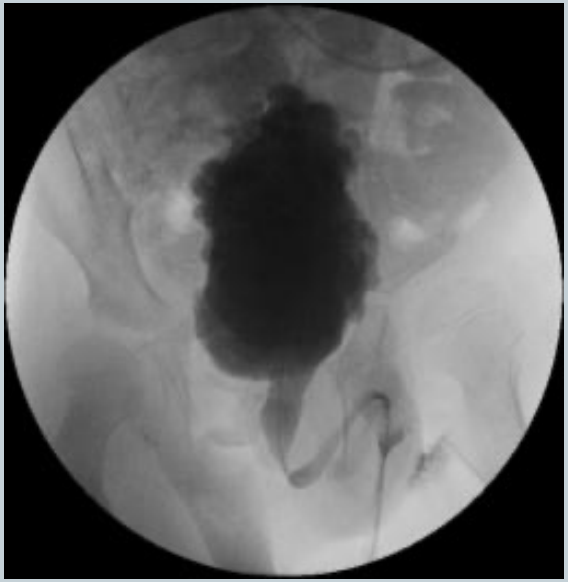
- The flaccid (hypotonic) bladder
  - Large volume
  - Low pressure
  - Uninhibited contractions similar to infantile contractions
  - Incontinence
  - Relatively “safe” bladder (protects kidneys)

- The spastic bladder
  - Normal or small volume
  - High pressure
  - Involuntary contractions with bladder sphincter dyssynergia
  - Incontinence and retention
  - Risk of UTI from increased PVR
  - Risk of VUR causing upper tract deterioration from high pressures

Signs and Symptoms

- Overflow incontinence stemming from urine retention and then dribbling
- UTIs
- Urinary calculi
- Hydronephrosis
- Vesicoureteral reflux
- Nephropathy





Assessment

- Diagnosis is suspected clinically
- Post-void residual is measured
- Renal ultrasound
  - performed regularly with follow up in clinic
- Urodynamic evaluation with fluoroscopy
  - Pressures during filling and emptying to determine hypotonic vs. spastic bladder
  - Coordination between detrusor and sphincter
  - Assess contour of bladder and bladder neck (trabeculations)
  - Volume or functional capacity
  - VUR
  - Predicts rehabilitation prospects

Management of the Newborn

- Renal Ultrasound
- Start CIC Q4 hours
  - Adjust interval to maintain cathing volumes <1/2 EBC
  - EBC = [wt (kg) x 7 = X(mL)] ex) 5kg x7 = 35mL
  - Minimum frequency is twice daily even if minimal PVR
- Avoid/manage constipation
  - Hard BMs – use constipation cocktail
  - 4 oz water +2 oz Karo Syrup + 2 oz Apple Juice
  - Call office if under 3 mos of age

Goals of Urological Care

1. Maintain normal renal function
2. Achieve social continence

- Over 90% of infants with spinal cord interruptions have normal renal function at birth. If unattended, about 50% will have renal deterioration.
- Tight bladder outlet and spastic bladder can cause reflux and hydronephrosis which leads to renal damage, especially in cases of UTI.
- Renal damage is the single most common cause of morbidity and mortality in children with spinal cord interruptions patients.

Clean Intermittent Catheterization

Evidence suggests bladder cycling preserves bladder compliance and capacity.

- Teach family clean (not sterile) technique.
- During waking hours, rarely necessary at night.
- Frequency may change; keep routine “normal”.
- Family may schedule visit for CIC teaching if needed.
- Help family order adequate supplies or call Urology or Colorectal clinic RN.

Colonization Versus Infection

- Asymptomatic Bacteriuria (colonization)
  - <100,000 cfu/ml and/or multiple colony types
  - Colonization occurs in all CIC patients
    - Long-term catheterization: 3-6 weeks
    - Clean intermittent catheterization: 2-3 months
  - Prophylactic antibiotics are not indicated
  - Antibiotics limited to symptomatic UTI only
  - Periodic screening with urine culture not indicated
- Acute Cystitis (infection)
  - >100,000 cfu/ml one colony type
  - Antibiotics for acute therapy especially with symptoms
  - Consider prophylaxis and check CIC technique in recurrent UTI patients

Common Additional Interventions

- **Medication** concurrent with CIC to decrease pressure
- **Vesicostomy** decreases bladder pressure
- **Mitrofanoff** offers alternative outlet for independence
- **Bladder augmentation** additional capacity, lowers pressure

- Problematic catheterizations with cloacal anomalies, some ARM patients as well. In order to visualize urethra we often need to do EUA with MD in OR . Teaching parents to catheterize these children often includes catheterizing the vagina and leaving that catheter in place and using a coude catheter to find urethra above the placed catheter.

Plan for Care

- Renal ultrasound
  - At birth
  - Q3 months until age 1
  - Q6 months until age 2
  - Q12 months age 2+
- Video urodynamics evaluation in Urology by 2-3 months, then PRN
- Bladder program: CIC unless otherwise notified
- Bowel program: Constipation prevention and continence

Common Questions

- Why do I need to catheterize if my child is making urine?
  - Neurogenic bladder = abnormal function
  - Protect kidneys and prevent UTI
  - Continence
  - Establish a routine
- What happens if I don't catheterize?
  - Damage to kidneys or bladder
  - UTI risk
  - Surgical intervention (vesicostomy) may be required

Common Questions

- What should we expect during our hospitalization for reconstructive surgery?
- What should we expect after we go home- what kind of instructions will we receive prior to discharge?
- What problems can we expect down the road with catheterizing a Mitrofanoff stoma?

Family Resources

- Support group for ARM/urogenital surgery patients (SURGE)