Bowel and Bladder Considerations for the Patient with Spinal Cord Injury

Carina Siracusa, PT, DPT, EdD, WCS, OncCS

BELIEVE IN WE™ OhioHealth

Objectives

- Identify the relevant bowel and bladder complications from spinal cord injury
- Create an appropriate program for bowel and bladder success across the continuum of care
- Evaluate the need for outside referrals in bowel and bladder care

BELIEVE IN WE™ OhioHealth

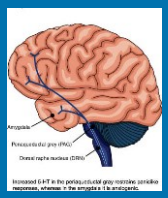
Central Nervous System

BELIEVE IN WE™ OhioHealth

3

Brain

- Control center
- Cognitive center is controlled by periaqueductal gray
- Exerts control over the pontine micturition center
- Suppresses or triggers voiding reflexes

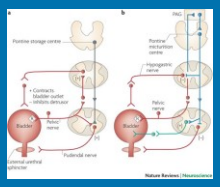


Increased 5-HT in the periaqueductal gray restores penile responses, whereas in the amygdala it is antierogenic.

BELIEVE IN WE OhioHealth

4

Brain



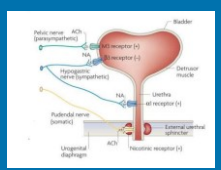
- Afferent fibers supply information on the relative fullness of bladder
- Signal is routed through brainstem and sacral spinal cord
- Cerebral cortex and higher brain centers then decides if it is an appropriate time to trigger the bladder reflexes or suppress them

BELIEVE IN WE OhioHealth

5

Brain

- Loss of function at these higher brain centers can be the cause of bladder issues in neurologic dysfunction
  - Loss of voluntary control
  - Heightened sense of urgency

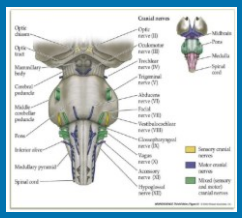


BELIEVE IN WE OhioHealth

6

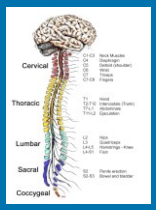
Brainstem

- Base of the brainstem is the pons
  - Within the pons is the pontine micturition center
    - Pons is responsible for controlling urinary sphincters
    - Coordination of sphincter relaxation and detrusor contraction
      - Emotions from higher level brain centers can affect the PMC
      - Ability to control the PMC is where children learn to toilet train



BELIEVE IN WE OhioHealth
7

Spinal Cord



- Exists as the communication pathway between the bladder and pons
  - Info from the bladder and then info from pons back down to the bladder and urinary sphincters
  - Essential for normal micturition
  - Sacral spinal cord is responsible for reflex bladder contractions and is a primitive reflex center

BELIEVE IN WE OhioHealth
8

Storage

- Bladder storage is accomplished through reflex inhibition of the parasympathetic innervation of the detrusor muscle
- Bladder also has viscoelastic properties that allow it to stretch in all directions and allow it to fill without increasing pressure

BELIEVE IN WE OhioHealth
9

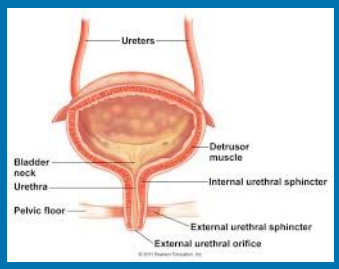
Voiding

- Activation of the PMC also causes relaxation of the external urethral sphincter
- Some debate as to if sympathetic activity decreases in the hypogastric plexus inhibiting storage
- PAG serves as a regulator of the LUT- receives sensory information from the bladder, processes it, and chooses to initiate voiding
- PMC is the switch that initiates voiding, PAG is the operator who decides when it is time to throw the switch

Review

Neuroanatomy

- Coordination between the urinary bladder and urinary sphincter
- Balance of neural signals from excitatory and inhibitory descending pathways and feedback from afferents in the bladder and the urethra



BELIEVE IN WE™ OhioHealth

Neuroanatomy

- Important brain centers in bladder function
  - Frontal lobes of the cortex
  - Hypothalamus
  - Pontine micturition center
    - Located in the brainstem
    - Coordinates micturition with other brain centers
    - Directs excitatory and inhibitory efferent nerves
    - Acted on by suprapontine centers- allow the switch from storage to voiding phases
    - Direct pathways from the PMC project to S2-4 and determine parasympathetic outflow to the detrusor and reciprocal activity of the motor neurons to the striated urethral sphincter

BELIEVE IN WE™ OhioHealth

Neuroanatomy

- Peripheral innervation
  - Hypogastric nerve
    - Sympathetic nervous system
    - Storage of urine
    - Detrusor relaxes as it fills
  - Pelvic nerves S2-4
    - Parasympathetic nervous system
    - Stimulate detrusor to contract

BELIEVE IN WE™ OhioHealth

Neuroanatomy

- Peripheral Nerves
  - Pudendal nerve- somatic innervation
    - Cell bodies of the nerve originate in Onuf's nucleus which is located in the ventral horn of S2-4
    - Perineal branch innervates the external urethral sphincter
    - Hemorrhoidal branch innervates the anal sphincters

BELIEVE IN WE™ OhioHealth

Bladder Sensation

- Mechanoreceptors in the bladder wall signal distension and filling of the bladder
- Sympathetic nervous system stores urine

BELIEVE IN WE™ OhioHealth

Storage Phase

- Detrusor pressure stays constant with filling until the threshold for micturition is reached
- Bladder compliance is a function of
  - Viscoelasticity
  - The ability of detrusor muscle cells to elongate while maintaining contractility
  - The neurally mediated suppression of signals that promote detrusor contraction

BELIEVE IN WE™ OhioHealth

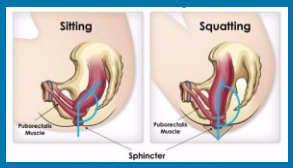
Voiding Phase

- Bladder afferents send signal of fullness and discomfort to the PMC
- Decision is made to void and patient positions over the toilet
- EUS is voluntarily relaxed resulting in increase pelvic nerve activity
- Detrusor contraction occurs
- Contraction continues until only small amounts of urine remain in the bladder
- Facilitated through the premotor cortex

BELIEVE IN WE OhioHealth

Bowel

- Mediated by same pathways as bladder control
- Coordinated between rectal sensation, pelvic floor muscles, and anal sphincters



BELIEVE IN WE OhioHealth

Bowel Control

- Rectum senses that there is matter in it
- Muscles slightly relax in order to decide on urgency
- If time for bowel movement, muscles relax, patient defecates, and then muscles contract to finish

BELIEVE IN WE OhioHealth

Acute Considerations in SCI

BELIEVE IN WE OhioHealth

Acute Phase

- Early after the injury the bladder and bowel both go into a state of areflexia
  - Causes urinary retention in bladder
  - Causes constipation in bowel

BELIEVE IN WE OhioHealth

Acute Phase

- Bladder
  - After 3 days, bladder starts to regain general function depending on the level of injury
  - Generally after 7 days, catheter should be removed
- Bowel
  - Bowel tends to stay inactive while in the hospital
  - Opioids further complicate bowel function

BELIEVE IN WE OhioHealth

Rehab Needs in the Acute Phase

- Bladder
  - Advocate for CIC as early as 7 days after initial surgery
  - Encourage awareness of bladder filling
  - Start assessing hand function in preparation for catheterization education

BELIEVE IN WE OhioHealth

Rehab Needs in Acute Care

- Bowel
  - Bowel massage
  - Positioning for bowel movement
  - Start bowel program within 7 days of surgery
  - Encourage bowel routine

BELIEVE IN WE OhioHealth

Rehab Needs in Acute Care

- Sexual functioning
  - Start the conversation about sexual functioning
  - Encourage urology referral after discharge

BELIEVE IN WE OhioHealth

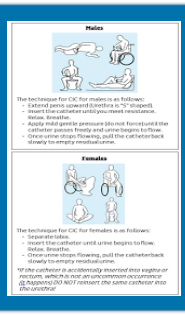
Rehab Needs in Inpatient Rehab

BELIEVE IN WE OhioHealth

Bladder

- Ensure that the CIC regime is being followed and patient has had a urology consult
- Evaluate for CIC positioning
- Evaluate fine motor skills for CIC
- Evaluate sensation

BELIEVE IN WE OhioHealth



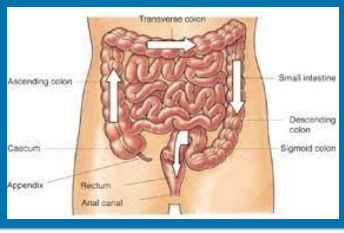
BELIEVE IN WE OhioHealth

Bowel

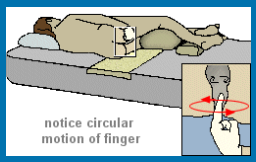
- Emphasize bowel routine
- Monitor bowel consistency
- Determine bowel program
- Continue abdominal massage
- Evaluate toileting positioning

BELIEVE IN WE™ OhioHealth

Abdominal Massage



BELIEVE IN WE™ OhioHealth



BELIEVE IN WE™ OhioHealth

Sexual Functioning

- Emphasize referral to urology
- Monitor sensation/anal wink

BELIEVE IN WE OhioHealth

Equipment Discussion

- Toilet chair
- Fine motor assistance
- Bowel program assistance

BELIEVE IN WE OhioHealth

Bowel and Bladder Issues in the Patient with SCI- Outpatient

BELIEVE IN WE OhioHealth

Types of Neuro Dysfunction

- Neurogenic Lower Urinary Tract Dysfunction- in the presence of neurologic pathology only
- Detrusor Sphincter Dyssynergia- simultaneous contraction of the EUS and detrusor in an attempt to void
- Detrusor Over activity- symptoms of frequency, urgency and urge incontinence

BELIEVE IN WE OhioHealth

Bladder Complications with Neuro Conditions

- SCI
  - Suprascal SCI
    - Detrusor hyperreflexia
    - Internal or external sphincter dyssenergia
    - Absent bladder sensation
  - Sacral
    - Detrusor is areflexic
    - Normal or high compliance
    - Fixed sphincter tone

BELIEVE IN WE OhioHealth

Two Types of Bladder Issues in SCI

- Spastic
  - Bladder fills, reflex triggers it to empty
  - Any injury above T12
  - Oxybutynin is generally given
  - Botox may be applicable down the road
- Flaccid
  - Reflexes of bladder are absent and bladder fills too full
  - Flomax is common
  - Catheterization is important

BELIEVE IN WE OhioHealth

Bladder Care

- Early bladder care is focused on bladder emptying
- Catheterization education is key
- Initiating the discussion of catheter care early and often

BELIEVE IN WE OhioHealth

Bowel Care

- Discussion about basics of bowel movements
- Use of suppositories
- Hygiene in bowel care
- Toilet positioning

BELIEVE IN WE OhioHealth

Important things to remember in bladder care for SCI

- Autonomic dysreflexia
  - Can be life threatening
  - T6 or higher
  - Increases blood pressure when bladder becomes to full
  - Can be caused by blocked catheter bag, sexual activity, menstrual cramps, abdominal issues
- UTI

BELIEVE IN WE OhioHealth

Bladder Complications in Neuro

- Cauda Equina Injury
  - Causes retention or incontinence of urine and/or stool
  - May progress into permanent damage of the LUT

BELIEVE IN WE™ OhioHealth

Neurogenic Bowel

- Upper Motor Neuron Bowel Syndrome
  - Above L1
  - Hyper reflexive bowel
  - Constipation and retention of stool
  - Suppository or digital stimulation
- Lower Motor Neuron Bowel Syndrome
  - Injuries below L1
  - Flaccid bowel
  - Loss of stool movement
  - Constipation and incontinence
  - Use stool softeners

BELIEVE IN WE™ OhioHealth

Sexual Dysfunction

- Men
  - Lose the ability to have psychogenic erection
  - Urology will follow
- Women
  - Few options for sexual dysfunction in women

BELIEVE IN WE™ OhioHealth

Physical Therapy Intervention

BELIEVE IN WE™ OhioHealth

Physical Therapy Intervention

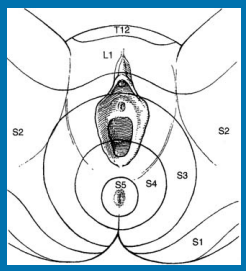
- Urinary Symptoms
  - Position on the toilet
  - Increased bladder sensation leading to urgency and frequency
  - Reduced bladder sensation
  - Absent bladder sensation
  - Sensation of incomplete bladder emptying
  - Strength of flow
  - Nocturia
  - Urge or stress incontinence
  - Initiation of voiding

BELIEVE IN WE™ OhioHealth

Physical Therapy Intervention

- Self Catheterization
- Specific sensations related to bladder fullness
- Bladder diary
- Neuro exam
  - Anal wink
  - Bulbocavernosus reflex
  - Knee and ankle reflex

BELIEVE IN WE™ OhioHealth



BELIEVE IN WE OhioHealth

Treatment of Neurogenic LUT Dysfunction

- Treatment regimes are generally chosen based on whether there is a failure to store or failure to empty
- Goals of treatment
  - Keep bladder pressure low to avoid reflux and upper urinary tract damage
  - Avoid post residual

BELIEVE IN WE OhioHealth

Physical Therapy Treatment

- Evacuation
  - Catheterization
  - Toilet positioning
  - Muscle relaxation
  - Intra-abdominal pressure
- Routine
  - Fluid
  - Timing
  - Bed routine

BELIEVE IN WE OhioHealth

Treatment of Neurogenic Bowel

- Also dependent on storage vs emptying dysfunction
- Structured program is key
- Education
- Positioning
- Goals are to have bowel movements at appropriate time

BELIEVE IN WE OhioHealth

Treatment of Neurogenic Bowel

- Evacuation
  - Enemas
  - Enemeez
  - Suppositories
  - Digital Stimulation
- Bowel program
  - Fiber
  - Fluid
  - Timing
  - Bowel massage

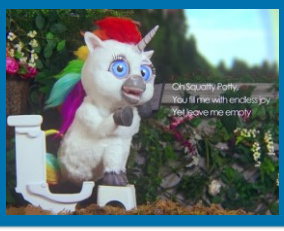
BELIEVE IN WE OhioHealth

Treatment of Sexual Function

- Sexual positioning aids
- Discussion of alternative sexual pleasure
- Connection with providers such as sex therapists and urology

BELIEVE IN WE OhioHealth

Questions?



BELIEVE IN WE™ OhioHealth