NEUROGENIC BOWEL AND BLADDER MANAGEMENT

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DISCLOSURES

- I have no financial disclosures

OBJECTIVES

- Improved understanding of pathophysiology of neurogenic bowel and bladder injuries
- Review long term complications of neurogenic bowel and bladder injuries
- Develop treatment plans for neurogenic bowel and bladder

ABOUT ME

Medical School

-St George's University

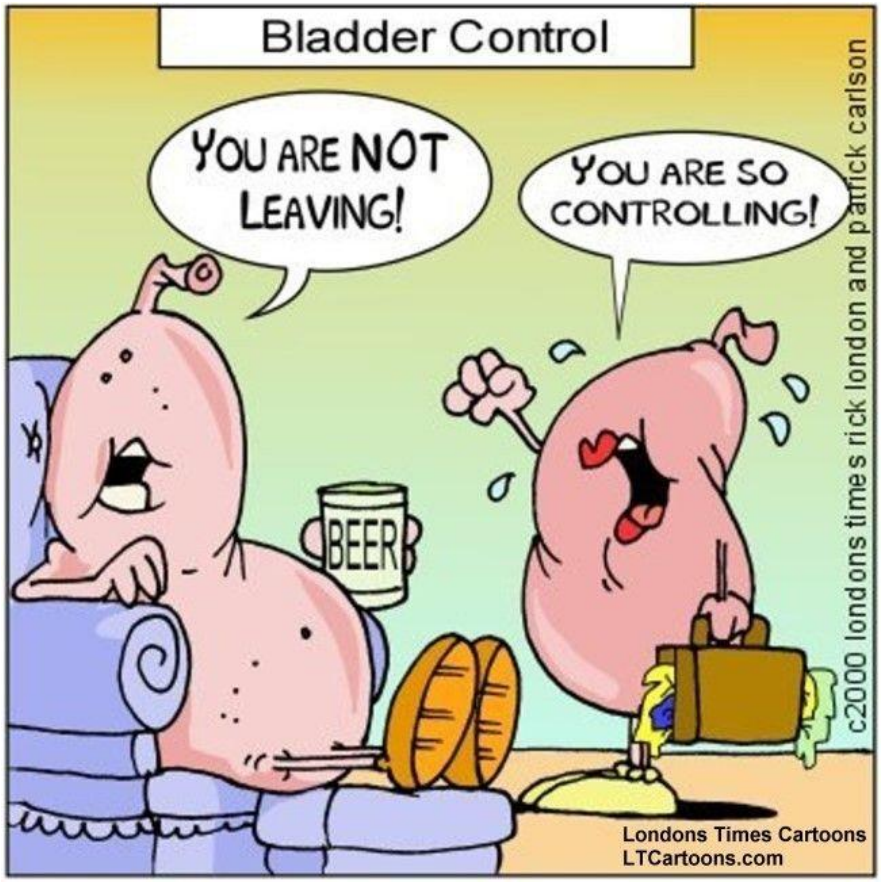
Residency

Physical Medicine and Rehabilitation

East Carolina University

ABOUT ME

- Physical Medicine and Rehabilitation
  - Deal with acute and chronic disability
  - Including neurogenic bowel and bladder and community re-entry


Bladder Control
YOU ARE NOT LEAVING!
YOU ARE SO CONTROLLING!
BEER
c2000 londons times rick london and patrick carlson
Londons Times Cartoons
LTCartoons.com

CASE #1

- 28 yo male s/p MVC with T10 ASIA A SCI on hospital day 10. Foley was removed and patient started on Intermittent catheterization
  - Nursing calls you to tell you despite appropriate catheterization patient remains with urine soaked sheets
    - A)Reinsert foley catheter
    - B)Place condom catheter to keep patient dry
    - C)Check bladder scans to further evaluate bladder residuals
    - D)Continue catheters and change patient frequently

CASE #2

- 50 yo male s/p left MCA stroke with dominant right hemiplegia on hospital day 4 now with complaint of abdominal pain
  - A)have nurse insert foley
  - B)attempt voiding trial, standing at the bedside then check post void residual
  - C)order more pain medication
  - D)discharge to acute rehab and let them deal with it

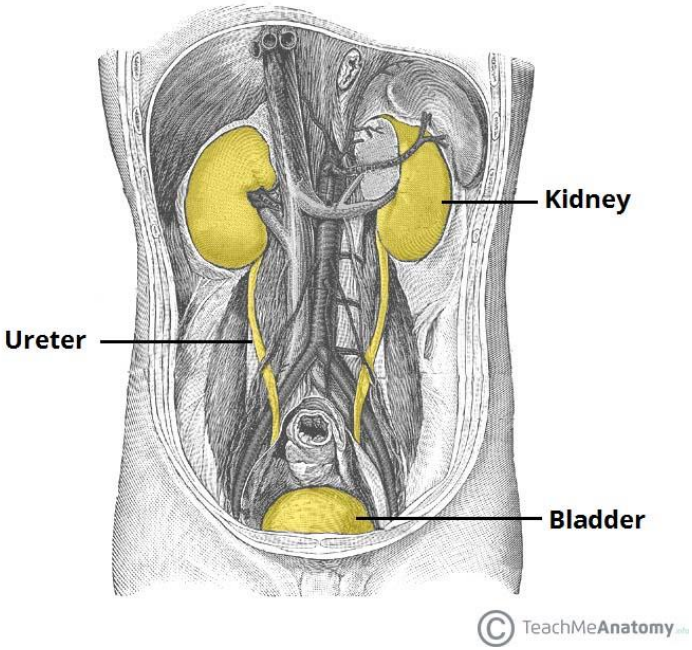
CASE #3

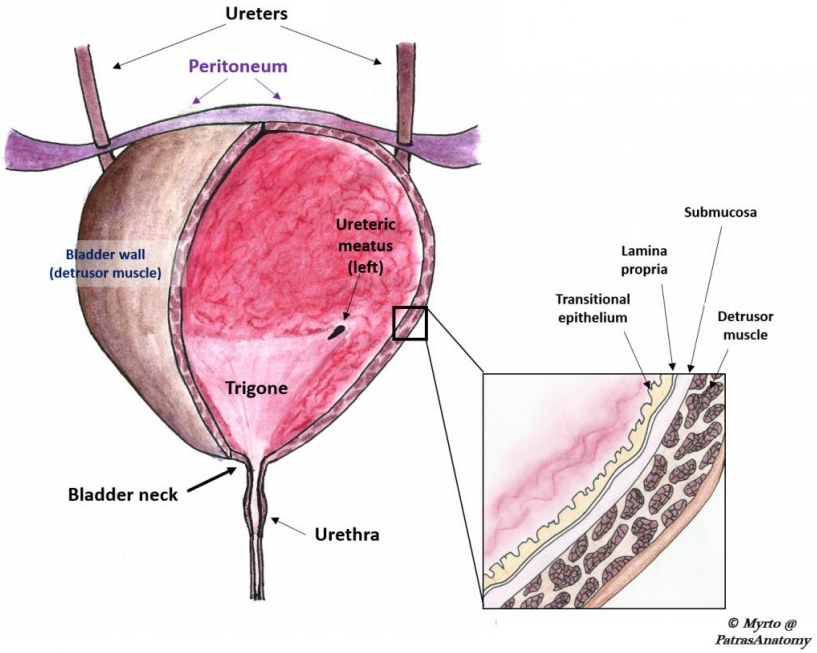
- 45 yo female admitted after a fall and C7 incomplete tetraplegia.
  - Discuss bladder program and plans for DC?

    - A) do nothing, diaper patient
    - B)Long term indwelling foley
    - C)Discuss with patient and family Intermittent catheter schedule

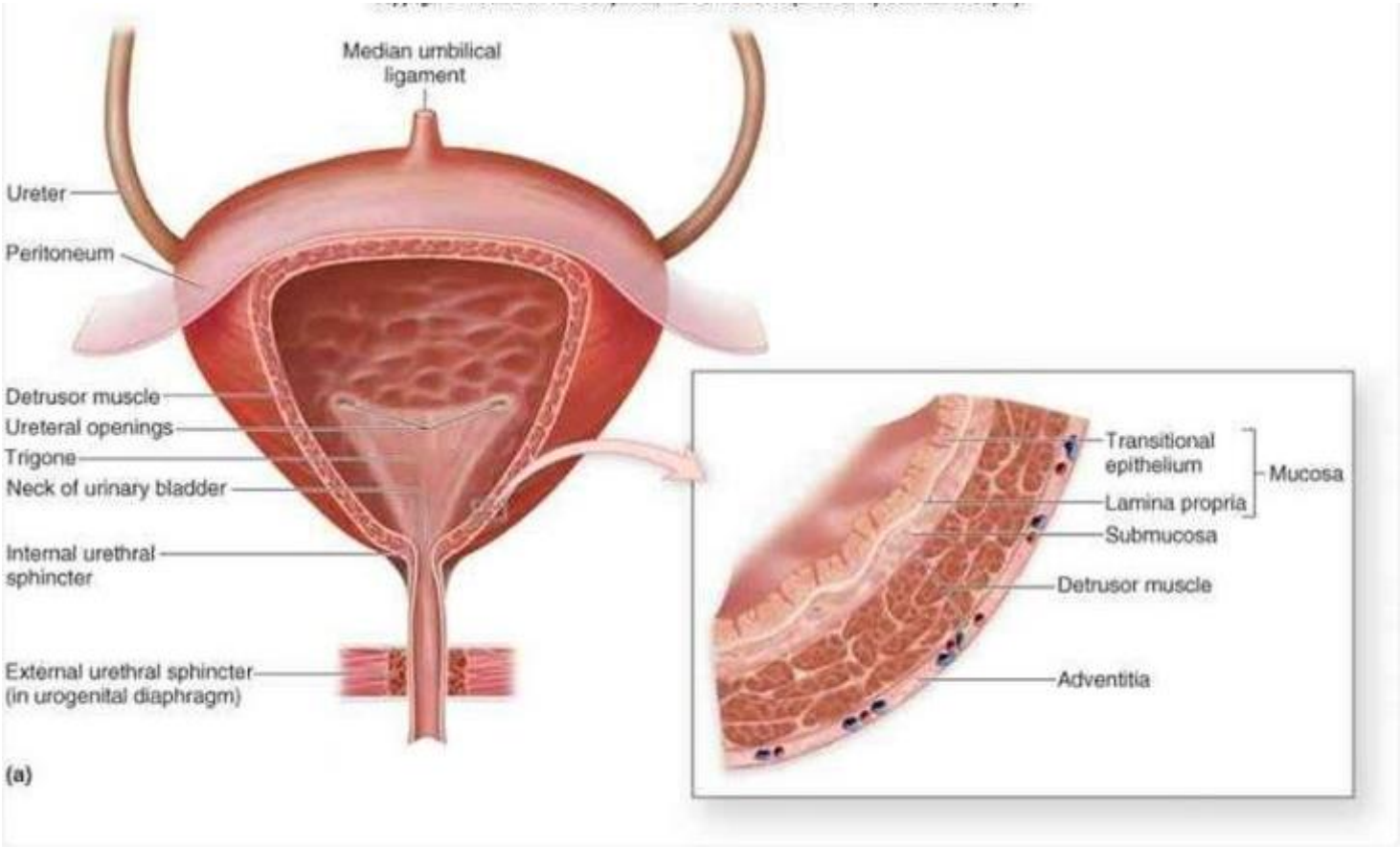
NORMAL ANATOMY

- Bladder





NORMAL ANATOMY



NORMAL FUNCTION

- Bladder
  - Acts as a storage organ for urinary waste from the kidneys/ureters

NORMAL FUNCTION

- Innervation
  - Micturition is a spinal reflex facilitated and inhibited by higher brain centers
    - Also subject to voluntary facilitation and inhibition

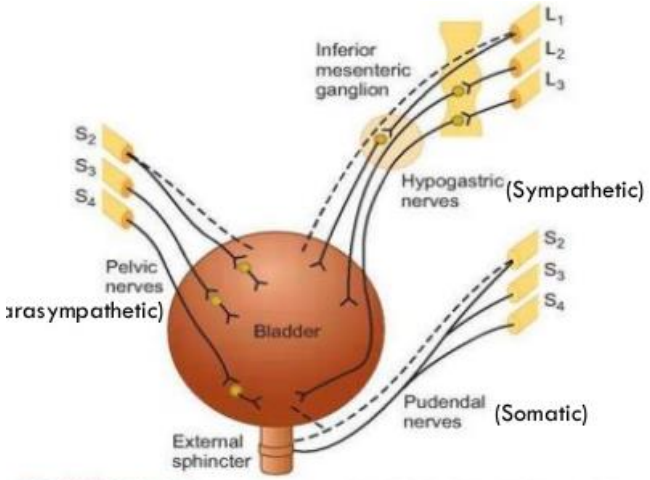


FIGURE 38–20 **Innervation of the bladder.** Dashed lines indicate sensory nerves. Parasympathetic innervation is shown at the left, sympathetic at the upper right, and somatic at the lower right.

TYPES OF NERVES	NERVE FIBRES	ACTION	COMMENTS
SYMPATHETIC	**HYPOGASTRIC** NERVES(L1,L2,L3) INFERIOR MESNTERIC GANGLION	motor to internal urethral sphincter, **inhibitory to detrusor**	**No significant role** in micturition; along wit IUS prevent reflux of semen into the bladder during ejaculation
PARASYMPATHETIC	**PELVIC** NERVES (S2,S3,S4)	motor to **detrusor** **inhibitory to internal urethral sphincter**	Stretch receptors present on the wall of the urinary bladder → Sensory fibers in the pelvic nerve → intermediolateral column of spinal cord → parasympathetic nerves →**Muscarinic receptors** → emptying of urinary bladder
SOMATIC	**PUDENDAL** NERVES (S2,S3,S4)	Voluntary control of **External urethral sphincter**	This maintains the tonic contractions of the **skeletal muscle fibers** of the external sphincter, so that this sphincter is **contracted always.** During micturition this nerve is **inhibited,** causing relaxation of the external sphincter and voiding of urine.
SENSORY	HYPOGASTRIC, PELVIC AND PUDENDAL NERVES	Cortical sensation	

NORMAL ANATOMY

- Sympathetic Response (encouraged during fight, flight)
  - Sympathetic tone predominates to promote internal sphincter contraction and bladder relaxation and allow for storing urine
- T11–L2 sympathetic efferents
  - Travel through the hypogastric nerves to activate a-1 and b-2 adrenergic receptors
  - Causes sphincter to contract and body to relax.
  - Urine is stored
- Activation of a -1 adrenergic receptors
  - Causes contraction of the internal sphincter at the base of bladder and prostatic urethra, preventing leakage.
  - Promotes storage.
- Activation of b -2 adrenergic receptors
  - Causes relaxation of the body of the bladder to allow expansion
  - Promotes storage

NORMAL ANATOMY

Parasympathetic Response (encouraged during relaxation)

- Parasympathetic tone predominates during normal bladder emptying, causing bladder contraction and emptying.

- *S2–S4 parasympathetic efferents*
  - Travel through the pelvic nerves to activate cholinergic (muscarinic M2) receptor
  - Acetylcholine (Ach) stimulates cholinergic receptors in bladder wall, trigone, neck, and urethra, causing bladder contraction and emptying
- b-*2 adrenergic receptors*
  - Activated by NE upon initiation of voiding to cause relaxation of bladder neck
  - Promotes emptying


NATIONAL TOILET MUSEUM
NO
Public
Restroom
SNAP!
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CARTOONSTOCK
Search ID: awhn364

NEUROGENIC BLADDER

- Neurogenic Bladder
  - Blanket term to address multiple urinary conditions for people that lack bladder control due to an injury to a nerve
    - Can be caused by brain, spinal cord or nerve problem
    - Traumatic Brain Injury, Stroke, Spinal Cord Injury, Multiple Sclerosis, Parkinson's Disease, Diabetes
      - Understanding and treating the cause is the first step in treatment
      - Guide the treatment plan based on patient goals/abilities

NEUROGENIC BLADDER

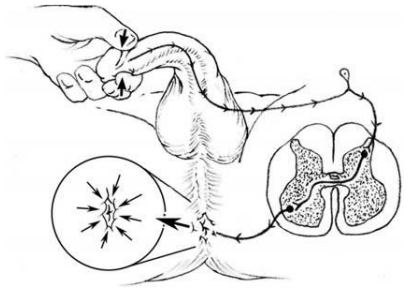
- Symptoms
  - Urinate small amounts more often than usual (spastic bladder or overflow incontinence)
  - Have problems starting to urinate or emptying their bladder
  - Lose bladder control
  - problems knowing if their bladder is full
  - repeated urinary tract infections

NEUROGENIC BLADDER

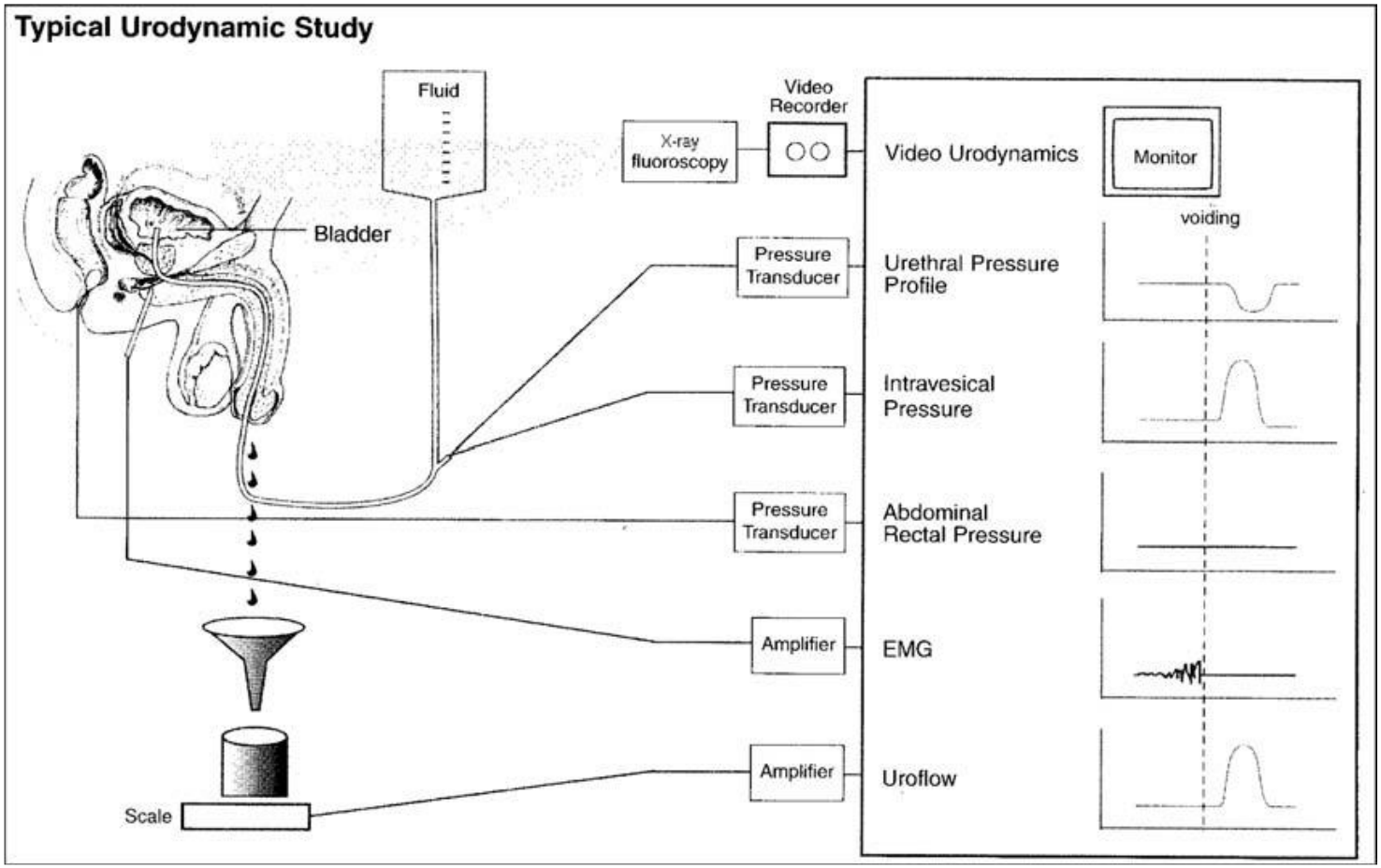
- General Work Up
  - Rule out other etiology
    - UA/Cx (if concern for infection)
    - Ultrasound
    - Urodynamic testing

SPINAL CORD INJURY

- Spinal Shock initially present with areflexic bladder
  - Typically present the first 1-2 weeks, can persist for months
- Initial Management
  - Indwelling catheter allowing for urine removal and monitoring of output
    - Once out of spinal shock can begin assessment of bladder function by removal of foley
      - Bulbocavernosus reflex



URONDYNAMICS



POST SCI

- Intermittent Catheterization
  - Shown to reduce many of the associated complications of indwelling catheters
    - Epididymitis
    - Urethritis
    - Urethral erosions
    - Prostatitis
    - Strictures
    - Malignancy
  - Also reduced incidence of UTI, improved self image and more conducive to sexual activity

POST SCI

- Intermittent Catheterization
  - Volumes should ideally be less than 500ml and frequency should be 4-5 times a day (every 5-6 hours)
  - High bladder volumes
    - Overflow incontinence
    - Hydro-ureter
    - Overstretching of the bladder musculatu
    - Autonomic Dysreflexia

POST SCI

- Evaluate post void residuals
  - Bladder scan after toileting/urinary incontinence
  - Typically will show significant post void volumes with incomplete emptying after voiding

POST SCI

TABLE 7–5 Lower Motor Neuron Bladder vs. Upper Motor Neuron Bladder

LMN Bladder (Figure 7–27): Failure to Empty	**UMN Bladder (Figure 7–28): Failure to Store**
Causes: • Commonly results from flaccid bladder and/or spastic sphincter • Spinal shock: reflex arc not functioning due to initial trauma • Conus medullaris syndrome • Cauda equina syndrome • Syringomyelia • Acute CVA (detrusor areflexia)	**Causes:** • Commonly results from spastic bladder and/or incompetent sphincter • SCI: return of reflex arc after initial trauma • Subacute CVA (detrusor hyperreflexia) • Multiple Sclerosis (most commonly see detrusor hyperreflexia)
Lesion: • Lesion involving sacral micturition center (S2–S4) • Lesion exclusively involving the peripheral innervation of the bladder	**Lesion:** • Lesion above sacral micturition center (above S2)
Can Result in: • Large, areflexic, flaccid bladder • Tight, spastic sphincter • **Failure to Empty** **Treatment:** • Intermittent catheterization (IC) • Crede maneuver (suprapubic pressure) • Valsalva maneuver • Drugs to induce urination: – Bethanacol: stimulate cholinergic receptors – Alpha blockers: block alpha adrenergic receptors ▪ Minipress® ▪ Dibenzyline® ▪ Hytrin® ▪ Cardura®	**Can Result in:** • Small, overactive, spastic bladder • Failure to store **Treatment:** • Drugs to store urine – Detrol®, Pro-Banthine®: anticholinergic medications are most commonly used – Ditropan®: Direct smooth muscle relaxor – Tofranil®, ephedrine: Stimulates alpha, beta receptors to allow storage

POST SCI

- Long Term Goals
  - “Balanced bladder” with low bladder pressures
  - Urinary Continence
  - Minimize UTI risk
  - Preserve upper tract (kidneys)
  - Community Re-Entry
  - (Remove foley so your CMO doesn’t bother you every day)

- Urodynamic Studies should be performed to assess function of the bladder neck, external sphincter, and the detrusor

CASE #1

- 28 yo male s/p MVC with T10 ASIA A SCI on hospital day 10. Foley was removed and patient started on Intermittent catheterization
  - Nursing calls you to tell you despite appropriate catheterization patient remains with urine soaked sheets… what is your next step?
    - A)Reinsert foley catheter
    - B)Place condom catheter to keep patient dry
    - C)Check bladder scans to further evaluate bladder residuals
    - D)Continue catheters and change patient frequently

CASE #1

- C)Check bladder scans and further evaluate bladder residuals (post void)
  - It is important to evaluate the reason for leakage
    - Overflow leakage vs spastic bladder
    - Large volumes in between catheters indicate overflow leakage, may need to increase catheter schedule or re-evaluate bladder program
    - Small or low volumes indicate spastic leakage (consider medication to decrease spasticity of the bladder)
      - Drugs to store urine (Detrol, Ditropan), consider Botox

CASE #2

- 55 yo male s/p left MCA stroke with dominant right hemiplegia on hospital day 2 now with complaint of abdominal pain. Bladder scan shows over 800cc of urine retained. What is your next step?
  - A)have nurse insert foley
  - B)attempt voiding trial, standing at the bedside then check post void residual
  - C)order more pain medication
  - D)discharge to acute rehab and let them deal with it

CASE #2

- B)attempt voiding trial, standing at the bedside then check post void residuals
  - It is important to make sure you are checking post void residuals. This gives you a better picture of bladder function
    - Use gravity for males (standing), toileting to females
      - It is extremely difficult to urinate laying down in a hospital bed, especially for males with previous BPH issues
    - Attempt double voids if incomplete emptying
    - Retained urine increases risk of UTI

CASE #3

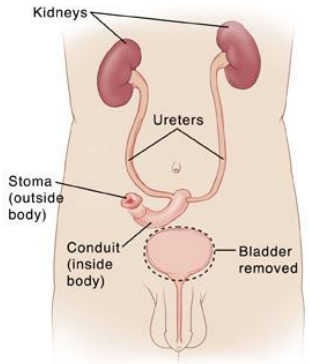
- 45 yo female admitted after a fall and C7 incomplete tetraplegia.
  - Discuss bladder program and plans for DC?

    - A) do nothing, diaper patient
    - B)Long term indwelling foley
    - C)Discuss with patient and family Intermittent catheter schedule

CASE #3

- C)Discuss with patient and family intermittent catheter schedule
  - High level spinal cord injury decreased ability to perform self cath
    - Will need supportive family/care giver to perform cath
    - If unable would consider suprapubic cath

    or conduit surgery to assist with self cath
- When to avoid Intermittent catheterization
  - Inability to self cath, no caregiver, abnormal anatomy
  - Small bladder capacity, painful catheter, AD despite cath

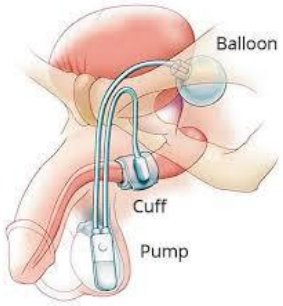


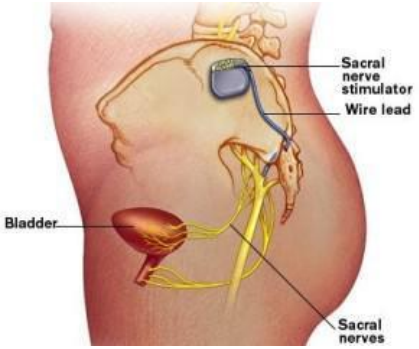
COMPLICATIONS OF LONG TERM FOLEY

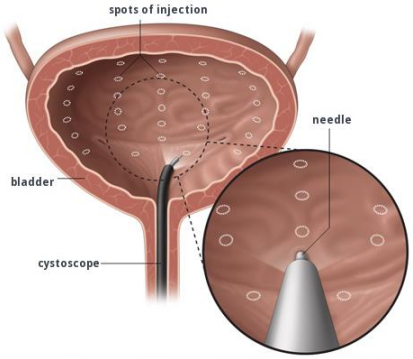
- Skin breakdown
- Socially unacceptable
- Decreased Sexuality
- Bladder Stones
- Increased incidence of UTI
- Squamous Cell Cancer 15x more common
  - 20% of patients with foley in greater than 10 years

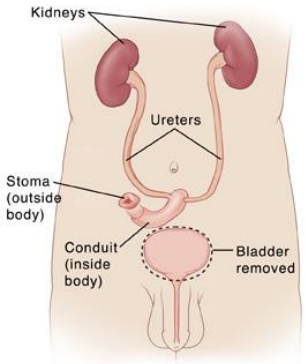
INVASIVE OPTIONS

- Artificial Sphincter
- Implantable devices to stimulate nerves
- Botox
- Conduit Surgery







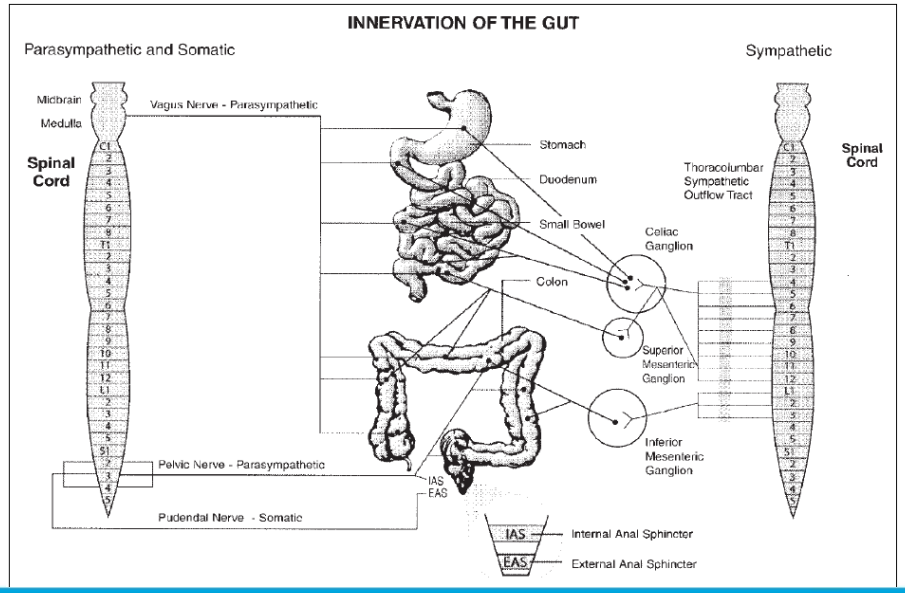


INTERMITTENT CATHETER OPTIONS

NEUROGENIC BOWEL

NORMAL BOWEL ANATOMY

- *Storage*
  - The internal anal sphincter is sympathetically activated (T11–L2), allowing for relaxation with filling of the rectum with stool bolus.
  - External anal sphincter (EAS) tone increases secondary to spinal cord reflexes and modulated action of higher cortical regions, maintaining continence.



NORMAL BOWEL ANATOMY

- Defecation
  - Rectosigmoid distention causes reflex internal anal sphincter relaxation
  - Volitional cortical activity sends signal to pontine defecation center.
  - Volitional contraction of the levator ani muscle allows opening of the proximal canal
  - relaxing the external anal sphincter and puborectalis muscles

NEUROGENIC BOWEL

- *Upper Motor Neuron Lesions (Hyperreflexic Bowel)*
  - Cortical control is disrupted with decreased ability to sense the urge to defecate.
  - External anal sphincter cannot be voluntarily relaxed, and pelvic floor muscles become spastic.
    - However, nerve connections between the spinal cord and colon, as well as Auerbach's (myenteric) plexus remain intact.
    - Stool can be propelled by reflex activity. Possible decreased propulsion in distal colon.

NEUROGENIC BOWEL

- *Lower Motor Neuron Lesions (Areflexic Bowel)*
  - Lesion below conus medullaris
  - Reflex defecation is absent.
  - Auerbach's (myenteric) plexus coordinates the movement of stool. However, movement is slow.
  - Overall, constipation results with incontinence due to flaccid external anal sphincter.

NEUROGENIC BOWEL

- Management of Neurogenic Bowel
  - Establish bowel program
  - Takes time to get the body to adjust
  - Minimize medications that decrease bowel motility (opioids, tricyclic agents, anticholinergics)
  - Get patients out of bed and sitting up
  - Take advantage of intact reflexes

NEUROGENIC BOWEL

- *The Gastrocolic Reflex*
  - Occurs after a large meal
  - Contraction of the colon occurring with gastric distention
  - When feasible, patients should be instructed to perform their bowel programs 20–30 minutes after a meal. Increased colonic activity occurs in the first 30 to 60 minutes after a meal (usually within 15 minutes). Therefore, place the patient on the commode within 1 hour subsequent to a meal.

- *The Anorectal Reflex (Rectocolic Reflex)*
  - Occurs when rectal contents stretch the bowel wall reflexively, relaxing the internal anal sphincter.
    - Suppositories and digital stimulation cause the bowel wall to stretch and take advantage of this reflex.
    - Note this reflex can be manipulated by *digital stimulation* of the rectum.
  - *Digital stimulation* is accomplished by gently inserting a gloved, lubricated finger into the rectum, and slowly rotating the finger in a clockwise circular motion until relaxation of the bowel wall is felt or stool/flatus passes (approximately 1 minute)

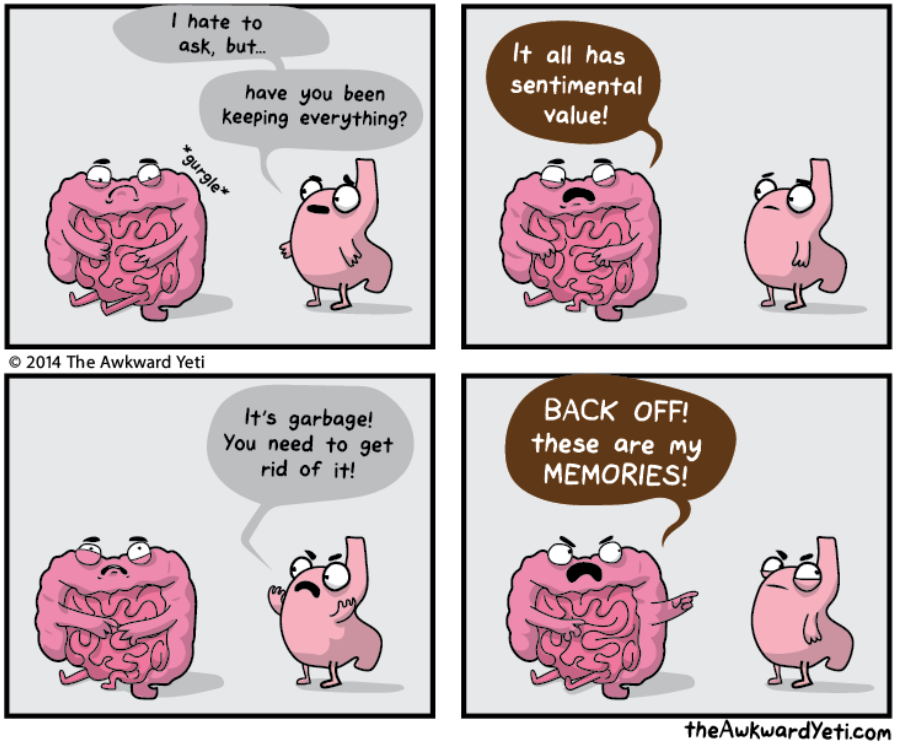
- Keys to a successful bowel program
  - Digital stimulation
  - Dietary fiber intake and hydration
  - Oral medications
  - Rectal evacuants

NEUROGENIC BOWEL

- Medication assistance
  - Consider starting with 3-2-1 approach
    - Colace 100mg 3 times a day
    - Senokot 2 tablets daily
    - Dulcolax (Bisacodyl) 1 suppository daily after a meal (have patient choose breakfast or dinner)
      - Should discuss with patient their pre-injury bowel program
      - Tailor your medication and program around patients preferred schedule
    - Enema
    - OUT OF BED ACTIVITIES!

NEUROGENIC BOWEL

- Goals
  - Ultimate goal is consistent and complete evacuation of the bowel at a specified time, in a relatively short time period, without incontinence between programs.
    - Assists with community re-entry,
      - patients highly unlikely to return to social activities until continent of bowel


I hate to ask, but...
have you been keeping everything?
gurgle
It all has sentimental value!
© 2014 The Awkward Yeti
It's garbage! You need to get rid of it!
BACK OFF! these are my MEMORIES!
theAwkwardYeti.com

CASE #4

- 40 yo male s/p MVC with traumatic spinal cord injury now with constipation
  - A)Review medication list
  - B)order enema
  - C)Call surgery for colostomy placement

CASE #4

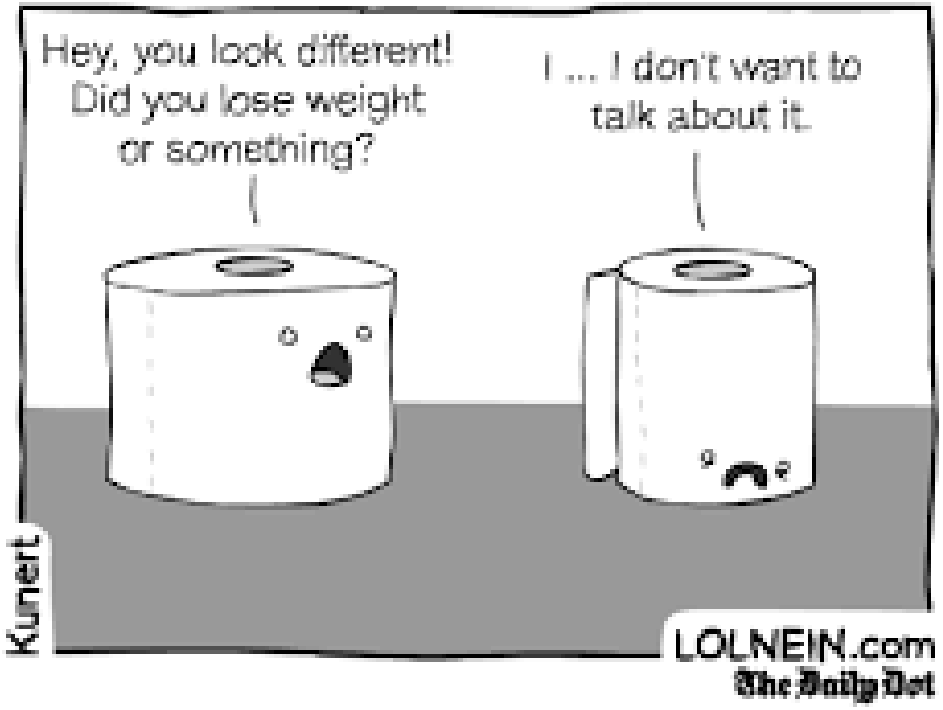
- A) review medication list
  - Minimize medications that decrease bowel motility (opioids, tricyclic agents, anticholinergics)

CASE #5

- 65 yo female with C7 ASIA B Spinal Cord Injury after gun shot wound. Patient has developed constipation 3 months after her discharge due to poor adherence to bowel program
  - A)Refer for colostomy placement
  - B)Place in a nursing home for 24 hour care
  - C)discuss with patient what has changed since discharge

CASE #5

- C) Discuss with patient what has changed since discharge
  - Recently her husband went back to work and she is unable to successfully place a suppository by herself due to her injury
    - Rx given for adaptive equipment



Funny toilet paper Jokes

PEARLS TO REMEMBER

- If possible use gravity to help with neurogenic bladder
- Know when a bladder scan is taken (pre vs post void)
- Consistence is the key to a successful bowel program
- The only way to succeed is with a patient driven plan

PEARLS TO REMEMBER

- Continence is key to risk of depression and community re-entry, make your bowel and bladder program a priority

- It takes a team!

BROWARD HEALTH REHABILITATION INSTITUTE

- Established in 1991
- 30 bed acute rehab unit within Broward Health North
- Accredited by Commission on Accreditation for Rehabilitation Facilities (CARF) for
  - Comprehensive Program
  - Stroke Specialty Program
- Joint Commission Certified for Stroke Rehabilitation

BROWARD HEALTH
Rehabilitation Institute

QUESTIONS?