Rehab Nursing Competencies: Functional Pattern - Elimination

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Learning Objectives

1. To briefly review bladder & bowel anatomy & physiology
2. To recognize neurogenic & non-neurogenic bladder & bowel dysfunction
3. To assess physical & psychosocial indicators that impact bladder & bowel function.
4. To identify nursing interventions utilized in management of bladder & bowel dysfunction
Learning Objectives

5. To recognize:
   - Signs & symptoms of autonomic dysreflexia (AD) in SCI
   - Bladder/bowel triggers of AD
   - Acute management interventions of AD

Urological Anatomy

- Upper urinary tract
  - Kidneys
  - Ureters
- Lower urinary tract
  - Bladder
  - Urethra
  - Internal & external sphincters
- Regulated by CNS & ANS
Bladder & Urethra

- Detrusor urinae
- Trigone
- Reservoir
  - collects, stores & expels urine
- Urethra
  - sphincters

Physiology of Normal Micturition

**Filling phase:**
Afferent impulses → S2-S4 cord → cerebral cortex

**Postponement phase:**
Detrusor relaxes & external sphincter contracts

**Emptying phase:**
Frontal lobe → motor response to S2-S4
Anterior pons coordinates bladder & sphincter
PNS + SNS → detrusor contracts & external sphincter relaxes
Neurotransmitters in Micturition (DANSE)

<table>
<thead>
<tr>
<th>Neurotransmitter</th>
<th>Action</th>
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<tbody>
<tr>
<td>Norepinephrine – SNS</td>
<td>Adrenergic fibers</td>
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<tr>
<td></td>
<td>- Bladder storage</td>
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<tr>
<td>Acetylcholine – Somatic</td>
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<td>Acetylcholine – PNS</td>
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Urinary Continence

- Depends on:
  1) Adequate pelvic floor support
  2) Good sphincter control
  3) Maintenance of the intraurethral pressure > intravesical pressure
Classification of Neurogenic Bladder

- **UMN bladder**
  - reflexic (spastic)
  - uninhibited

- **LMN bladder**
  - areflexic (autonomous, flaccid or sacral)
  - motor paralytic
  - sensory paralytic

**UMN Bladder**
(Reflexic, Spastic)

- Intact S2-S4 reflex arc
- Saddle sensation
  - impaired or absent
- Voluntary control
  - impaired or absent
- + B/C reflex
- Etiology:
  - SCI ↑ T11
  - MS, tumors, infarction
  - Transverse myelitis
Presentation of UMN Bladder: (Reflexic, Spastic)

- detrusor hyperreflexia
- ↓/↑ bladder capacity
- urinary incontinence w/ continual leakage or fluctuating output patterns
- ↑ risk of UTI

Detrusor Sphincter Dyssynergia

- co-contraction detrusor & external sphincter
- failure to empty w/ ↑ PVR’s
- ↑ intravesical pressure
- > risk of UTI & upper tract damage
- Etiology:
  - 96% of UMN lesions
  - 10-20% of MS pt
**UMN Bladder: Uninhibited**

- brain lesions → loss of cortical control
- detrusor hyperreflexia
  - initiation or inhibition diminished
- saddle sensation intact
- normal B/C reflex
- frequency, urgency, nocturia
- ↓ bladder capacity w/ low or no residual
- Etiology:
  - CVA, MS, TBI, Tumor, Parkinsons & Alzheimers disease

**LMN Bladder: Areflexic**

- Disrupted S2-S4 reflex arc
  - loss of reflex activity
- Saddle sensation
  - impaired/absent
- Voluntary control
  - impaired/absent
- - B/C reflex
- Etiology
  - SCI at/or ↓T12-L1
  - Spina bifida, spinal trauma
  - lumbar herniated disc tumors
Presentation of LMN Bladder: Areflexic

- detrusor areflexia
- large capacity atonic bladder
- failure to empty, ↑ PVR's
- dribbling & overflow incontinence
- high incidence of UTI

LMN Bladder: Motor Paralytic

- damage to S2-S4 efferent nerve fibers
- saddle sensation intact
- voluntary control absent
- B/C reflex absent
- ↑ bladder capacity w/ ↑PVR
- Incontinence rare
- Etiology:
  - polio, herniated disk, trauma/tumor
LMN Bladder: Sensory Paralytic

- damage to S2-S4 afferent nerve roots
- saddle sensation/sense of fullness absent
- ↓ voluntary control w/ chronic overdistention d/t infrequent voids
- B/C reflex absent
- overflow incontinence rare
- Etiology:
  - diabetic neuropathies, Duchenne’s, MS
  - syringomyelia, progressive motor ataxia

Non-neurogenic Bladder Incontinence

<table>
<thead>
<tr>
<th>Stress</th>
<th>sphincter incompetence</th>
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<tbody>
<tr>
<td>Urge</td>
<td>unstable detrusor, urethral hypertropy or impaired cognition</td>
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<tr>
<td>Overflow</td>
<td>outlet obstruction or underactive detrusor</td>
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<tr>
<td>Functional</td>
<td>normal bladder &amp; urethral function</td>
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(Hoeman, 2002)
The Effects of Incontinence

- Embarrassment
- Depression
- Social Isolation
- Caregiver stress
- Skin problems
- ↓ Finances

Nursing Interventions

Assessment of Bladder Dysfunction

- Characteristics of urological dysfunction
- Genitourinary history
- Relevant medical history
- Physical & cognitive assessment
- Medications
- Appropriate tests
- Functional assessment
  - mobility & manual dexterity
- Environmental factors
Goals of Bladder Management

- Prevent bladder distention & preserve function of upper urinary tract
- Prevent & manage symptomatic UTI’s
- Minimize incontinence
- Acceptable method of management that promotes independence
- Patient/caregiver demonstrates ability to implement interventions

Modifiable Risk Factors for UTI

- Adequate fluid intake
- Hygiene
- Frequency of emptying r/t PVR
- Proper IC technique
- Maintenance of drainage equipment
Nursing Interventions

UMN Bladder (Reflexic, Spastic)

- Voiding diary
- Scheduled voiding + reflex triggering techniques
- Crede or valsalva maneuver if no reflux
- IC’s q4-6h +/- anticholinergics
- External condom catheters w/ collection device
- Indwelling urinary catheter

Medical Alternatives: UMN Bladder

Medications

- Anticholinergic Agents
  - Oxybutynin (ditropan), detrol
- Tricyclic antidepressants
  - Imipramine
- Desmopressin acetate (DDAVP) for nocturia

Surgical options

- transurethral stent or sphincterotomy
- augmentation enterocystoplasty +/- continent stoma
- neurostimulation
Nursing Interventions

**UMN Bladder (Uninhibited)**

- Rule out urinary retention
  - If PVR > 150 cc. institute IC’s

- If no urinary retention:
  - Prompted voiding (RNAO, BPG, 2005)
  - Titrated anticholinergic medx

- Supportive care: pads, external condom catheter, indwelling catheter for persistent incontinence

**Nursing Interventions**

**LMN Bladder**

**Areflexic & Motor Paralytic:**

- IC’s &/or Crede/Valsalva maneuvers if permitted
- External condom catheter prn
- Medication - Bethanecol

**Sensory Paralytic:**

- Timed voiding &/or IC’s
Nursing Interventions
Non-Neurogenic Urinary Incontinence

Stress
- ** Fluid management w/ regular toileting
- ** Pelvic muscle exercises
- Biofeedback
- Pelvic floor electrical stimulation
- Alpha-adrenergic, tricyclic antidepressants
- IC’s if retention
- Pessary
- Surgery
  - Burch colposuspension sling procedure

Urge
- Bladder training
  - Stop/sit down if possible
  - Tighten pelvic muscles
  - Relax and deep breath
  - Use distraction
  - Biofeedback/Electrical stimulation

Overflow
- IC’s, foley, surgery

Functional
- Cognitive retraining, train caregivers
- Modify environment

Anatomy of Gastrointestinal Tract
Phases of the Digestive System

- **Oral Phase**: Intake of food
- **Digestive Phase**: Mouth & Stomach
  - Gastro-Colic Reflex
  - Nutrient Absorption
  - Fluid Absorption
- **Absorption Phase**: Gastro-Colic Reflex
  - Nutrient Absorption
  - Fluid Absorption
- **Elimination Phase**: Peristalsis
  - Defecation Reflex
  - Sacral Reflex

Neural Control of Bowel Function

- **A. Intrinsic nervous system**
- **B. Autonomic nervous system**
- **C. Reflexes**
  - Somatic
  - Gastrocolic
Process of Defecation

- Gastrocolic response
- Peristaltic waves move feces into rectum
- Rectal stretch receptors $\rightarrow$ S2-S4 segment $\rightarrow$ cortex
- Cortical motor response $\rightarrow$ S2-S4 to relax or contract external sphincter

Fecal continence

Depends on:
- Normal function of the colon
- Rectal compliance & capacity
- Intact autonomic & somatic nervous system
Bowel dysfunction

- Incidence - 2.2% of population (Nelson et al, 1995)
- common problem in disability
- ↓ self-esteem & social isolation
- ↑ pt./caregiver stress & depression
  - 54% of SCI persons find bowel management emotionally upsetting (Glickman & Cann, 1996)
- ↑ institutionalization

Classification of Neurogenic Bowel

- **UMN**
  - Reflexic (spastic)
  - Uninhibited
- **LMN**
  - Areflexic (flaccid)
  - Motor paralytic
  - Sensory paralytic
UMN Bowel: Reflexic

- sacral reflex arc intact
- loss of cortical control
- sensory loss in perineum & rectum
- loss of voluntary external sphincter control with sudden massive emptying
- Etiology:
  - SCI, sacral reflex arc, MS, vascular disease, pernicious anemia

UMN Bowel: Uninhibited

- S2-S4 reflex arc intact or increased
- saddle sensation usually preserved
- bulbocavernosus & anal reflex intact
- decreased voluntary control
- Etiology:
  - Damage to UMN's in the cerebral cortex, internal capsule, brainstem
  - Stroke, MS, ABI & tumors
LMN Bowel: Areflexic

- sacral reflex arc absent
- loss of sensation
- loss of external sphincter control with involuntary defecation
- hard, formed stool
- greater challenge
- Etiology:
  - SCI lesion ↓ T12

Motor paralytic bowel

- damage to efferent nerve roots at S2-S4
- saddle sensation intact
- bulbocavernosus & anal reflex absent
- incontinence rare
- Etiology:
  - polio, intervertebral disc, trauma or tumour
Sensory Paralytic Bowel

- damage to S2-S4 afferent nerve roots
- saddle sensation diminished or absent
- bulbocavernosus normal, increased, or absent
- incontinence rare

Etiology:

- diabetes, tabes dorsalis

Assessment of Bowel

- pre-morbid bowel function
- effects of injury, disease
- co-morbidities
- diet, fluid intake
- functional ability
- activity pattern
- cognition
- characteristics of stool
- current bowel program
- medications
- alcohol/drug use
- physical exam
- tests
Goals of Bowel Management

- regular, predictable & efficient elimination
- absence of involuntary BM’s
- compatible with individual’s lifestyle
- acceptable routine

Basics of an Effective Bowel Routine

- High fiber diet
- Avoid irritants
- Fluid intake
- Physical activity
- Timing/Consistency
- Gravity
Nursing Interventions

UMN Bowel (Reflexic)

- Routine
  - daily to q2d
  - Timing
- Rectal touch/stretch or digital stimulation +/- disimpaction
- Medications
- Functional Electrical Stimulation
- Biofeedback

Nursing Interventions

Uninhibited Bowel

- Daily routine
- Adaptive clothing
- Valsalva maneuver

- Medications
- Digital stimulation & disimpaction prn

- Process of digital stimulation:
  - insert gloved, lubricated finger ½ to 1” into rectum
  - stimulate in a gentle circular motion approx. 30-60 sec. until ext. sphincter relaxes
  - repeat 3-4 X/prn q10min.
Nursing Interventions

LMN Bowel (Areflexic)

- Daily or twice daily routine
- Valsalva maneuver, abdominal massage
- Digital disimpaction
- Medications

Pharmaceutical Products

- Stool softeners
- Stimulants
- Suppositories
- Saline osmotics
- Hyperosmolar laxatives
- Prokinetic agents
Autonomic Dysreflexia (AD) in SCI

- Potentially life-threatening condition
- Continued exaggerated response of the SNS
- Precipitated by a noxious stimuli originating below the level of the spinal lesion

Etiology:
- SCI at or $\uparrow T6$

Consortium for Spinal Cord Medicine, 2001, 2nd ed.

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Signs & Symptoms of AD in SCI

- Sudden elevated BP
  - 20-40 mm Hg above baseline
- Severe pounding H/A
- Bradycardia
- Cardiac irregularities
- Flushing & diaphoresis
- Pallor & piloerection
- Nasal congestion
- Visual disturbances
- Aphasia
- Apprehension
- Minimal or no symptoms

(Consortium for Spinal Cord Medicine, 2001)
Urological Triggers of AD

- Bladder distention
  - inadequate reflex voiding
  - infrequent IC’s
  - obstructed catheter or condom drainage system
  - over filled leg bag
- Urinary tract infection
- Bladder/Kidney stone
- Epididymitis

Bowel Triggers of AD

- Distention:
  - constipation, impaction
- Digital stimulation/disimpaction
- Hemorrhoids
- Acute/chronic gastrointestinal pathology
Acute Management of AD: Immediate Response

- Assist to a sitting position
- Call for assistance
- Remove constrictive clothing
- Monitor BP and HR q3-5 min
- Quickly survey for trigger

Acute Management of AD

- Empty bladder
  - IC w/ 2% lidocaine gel
  - irrigate indwelling catheter (10-15 cc N/S)
  - if no drainage, remove/replacement catheter
- Monitor symptoms & BP for at least 2 hrs after resolution
- If unresolved, proceed to assess bowel

- For suspected fecal impaction & BP<150 mm Hg:
  - instill 2% lidocaine gel
  - gently remove stool
  - if AD worsens, stop evacuation & instill additional anesthetic
  - recheck rectum approx. 20 min. later
  - if unresolved check for less frequent causes
Medical Management of AD

- SBP =/> 150 mm Hg
  - rapid acting/short duration antihypertensive
- Options:
  - nifedipine (bite & swallow)
  - nitropaste 1” above the level of the spinal lesion
  - prazosin & captopril

Prevention & education are key elements to prevent bowel & bladder complications that contribute to improved patient outcomes.