Geriatric Incontinence and Voiding Dysfunction

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Agenda

- Review
- Why is Geriatric UI/VD different?
  - Pathophysiology
  - Co-morbidities
  - Treatment
- What’s new?
Who are We Talking About?

- Older definition: >65
  - Based on older assessments
  - Not reflective of our current “older population”

- Trend now (at least for research) is >75
  - More reflective of our older population
  - More likely to include “frail elderly”
What is different about UI & Voiding Dysfunction in the Geriatric Patient?

- Age related changes: occur in everyone
- Age associated changes: accumulation of pathologic conditions that do not occur in everyone
- Does it matter??

- LUTs
- Nocturia
- BOO
- Incontinence
Definitions

- Frequency: the need to void very often, typically affecting QOL. (>8x / day)
- Nocturia: need to void during night, typically affecting QOL (>2x)
- Urgency: Sensation to void that is so strong that fear of urine loss is imminent
- Incontinence: involuntary loss of urine
Types of Incontinence

- **Stress UI (SUI)**
  - Incompetent bladder outlet
  - Leakage associated with activity & putting pressure on bladder

- **Urge UI (UUI)**
  - Component of OAB
  - Due to involuntary detrusor activity

- **Mixed UI (MUI)**
  - Usually combination of SUI and UUI

- **Overflow--retention**

- **Functional**
  - implies normal GU tract
  - environmental issues prohibit timely void
Urinary Incontinence
General Info

- 13-25 million Americans
- 10-35% of all adults
  - 30%-50% of those ages > 60 years
  - 50% women experience UI at some point
  - 33% women experience regular UI
- Female > Male (70% vs. 30%)
  - <60 yo: 4:1
  - >60 yo: 2:1
- >50% Nursing home residents
  - often precipitating factor for placement
  - there are 1.5 million Americans in NH
Distribution of UI by Different Subtypes & by Age Group

Hannestad et al., 2000
Geriatric Voiding Dysfunction

- Voiding dysfunction directly attributed to factors of aging
  - Effects at bladder level
  - Effects at CNS level
- “Routine” Voiding problems exacerbated by age factors
  - Greater prevalence with elderly
  - GU condition worsened by other factors
- Limitations in treatment due to age factors
Age-related LUT Changes

- Bladder
- Urethra
- Pelvic floor
- Vagina
- Prostate
Age-related LUT Changes: Bladder

- Increased incidence detrusor overactivity
- Decline in detrusor contractility
- Decrease in detrusor capacity
- Decrease in flow rate

DuBeau, International Consultation on Incontinence 2008
Myogenic DO: Etiology

- Detrusor changes: ultrastructural level
  - Altered smooth cell properties
    - Altered signal transduction
    - Altered cell to cell gap junctions
    - Reduced contractile force
    - Does not need neural stimulation
      - spontaneous detrusor activity
      - Extra foci of activity
      - Disorder of synchronization?
  - Denervation injury/super-sensitivity
    - Changes in nerve receptor densities
    - Allows for ectopic foci
    - Less efficient transmission
  - Increased collagen content

Elbadawi 1997
Mills 2000
Voiding Disorder: Bladder Level Cholinergic Denervation

Normal Bladder-Cholinergic Nerve Distribution

Idiopathic DH-Patchy cholinergic denervation

Mills 2000
Age-related LUT Changes: Urethra

- Decreased vascular density & blood flow
- Decreased striated & circular smooth muscle density
- Decreased urethral sensation

DuBeau, International Consultation on Incontinence 2008
Age-related LUT Changes: Pelvic Floor

- Recent studies saw no age related changes in pelvic floor and vaginal tissue
- However, lifetime risk of POP surgery is 11.1% for women over 80 (reported in 1997)
- Need for POP surgery likely to increase
  - POP and SUI more accepted by society
  - Aging population with baby boomers “coming of age”
    - 1994: 1%
    - 2020: 2%
    - 2040: 4%

Arisco & Kraus, Current Opinion in Urology 2008
Age: Prolapse

- Direct correlation: advanced age & degree of prolapse
- Decrease in urethral pressures and length
- Risk factors
  - Multiple parturitions
  - Hormonal-menopausal effects
  - Pelvic Surgery
  - Systemic disease effects

<table>
<thead>
<tr>
<th>Age (y)</th>
<th>Stage 0</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-29 (n = 66)</td>
<td>22.7%</td>
<td>50.0%</td>
<td>27.3%</td>
<td>—</td>
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<tr>
<td>30-39 (n = 116)</td>
<td>6.9%</td>
<td>50.9%</td>
<td>41.4%</td>
<td>0.9%</td>
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<tr>
<td>40-49 (n = 154)</td>
<td>2.6%</td>
<td>44.2%</td>
<td>51.9%</td>
<td>1.3%</td>
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<tr>
<td>50-59 (n = 95)</td>
<td>3.2%</td>
<td>38.9%</td>
<td>55.8%</td>
<td>2.1%</td>
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<tr>
<td>60-69 (n = 47)</td>
<td>4.3%</td>
<td>27.7%</td>
<td>59.6%</td>
<td>8.5%</td>
</tr>
<tr>
<td>≥70 (n = 19)</td>
<td>—</td>
<td>26.3%</td>
<td>52.6%</td>
<td>21.1%</td>
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</table>
Age-related LUT Changes: Prostate

- BPH progresses from microscopic state to a macroscopic state to a clinical disease state
- Microscopic BPH
  - Begins as early as 20-30 yo.
  - 80-100% all men will have microscopic evidence of BPH
- 50% of microscopic BPH develops into macroscopic nodules (~ 5 yrs)
  - 50% of these produce clinical disease,
- Thus 25% of microscopic BPH develops clinical disease
Age-related changes in prostate weight

Berry et al, JU 1984
Odds of Moderate/Severe Sxs Increase with Prostate Size

- Community based study
- Odds for moderate or severe LUTS (age adjusted)
  - 1.2 x greater for prostates > 30 gm vs ≤ 30 gm
  - 3.0 x greater for prostates > 40 gm vs ≤ 40 gm
  - 3.5 x greater for prostates > 50 gm vs ≤ 50 gm

Above the bladder

- CNS changes
- Cognitive dysfunction
Micturition Neuro Reflex Arcs

- Sensory
- Sacral Center
- Reflex motor
  - Bladder
  - Sphincter
- Pons
- Cerebral

Krane & Siroky 1991
Neural Control of Micturition: Storage

- Continuous central inhibition of micturition reflex
- Sphincter activity
- Accommodation of filling
  - local and central facilitation of increasing volume without pressure change

Krane & Siroky 1991
Neural Control of Micturition: Voiding

- Volitional suppression of central inhibitory signal
- Relaxation of sphincter
- Parasympathetic stimulation of detrusor contraction

Krane & Siroky 1991
Detrusor Overactivity (urge incontinence)

- Loss of **CENTRAL** inhibition
  - Failure to detect sensation
  - Failure to react to sensation
- Enhanced excitatory reflex neurotransmission
- Increased Primary Afferent Input from bladder
- New or unmasked bladder neuro-reflexes that are resistant to central inhibition
- Consequence of Aging?

Krane & Siroky 1991
Above the bladder: CNS Changes

- **Blok et al (Brain 1997)**
  - R. Ant Cingulate Gyrus
  - Increased during void
  - Decreased during storage
  - Implies area for “control”

- **Griffiths (Behav Brain Res 1998)**
  - Decreased perfusion frontal (esp. Right)
  - Genuine urge incontinence with reduced sensation

Blok et al, Brain 1997
Griffiths et al Behav Brain Res 1998
Above the bladder: Cognitive dysfunction

- Obvious dementia
- Not so obvious cognitive decline
  - Loss of executive control may be related to UI
    - Executive control dysfunction may be an early state of decline (not clinically obvious)
    - Probably more common than thought
    - UI predictor of future cognitive decline (Miles 2001)
  - Is LUT dysfunction a predictor of Cognitive decline?
    - Weak association between irritative AUASI and Executive impairment

Miles et al, J Geron Med Sci 2001
Kraus & Miles, AGS 2002
Reversible (Transient) Incontinence

- Delirium
- Infection
- Atrophic Vaginitis
- Pharmacological/Psychological
- Excessive Urine output
- Restricted mobility
- Stool impaction

Resnick & Yalla, NEJM, 1985
UI and Cognitive Decline: Guilty by Association

- Patients with dementia often have UI
- Potential damage to cortical areas in charge of control
  - Loss of inhibition of involuntary detrusor contractions
  - Loss of sensory ability
  - Urge UI is most common form of UI in dementia
- Not always “reversible” but
  - Address possible causes of dementia exacerbation
    - Mobility often key factor
- Don’t forget “routine” UI
Transient Incontinence

- **Infection**
  - Reversible
  - Causes DH or impaired emptying

- **Asymptomatic Bacteriuria**
  - 10-20% community elderly
  - 30-40% institutional elderly
  - Risk increases as functionality decreases
  - Risk increased with menopause
    - Lower vaginal pH results in recolonization with uropathogenic
  - HOWEVER: Treatment not shown to improve outcome
    - Several prospective RCT in LTC Facilities: Abx vs. Placebo
    - No significant difference in symptomatic episodes
    - Infectious Disease Society DOES NOT RECOMMEND routine treatment of asymptomatic bacteriuria in the elderly

Colgan et al, AAFP, 2006
Robichaud et al Medscape 2009
Transient Incontinence: Pharmacologic

- Sedative/hypnotics
  - Sedation
  - Immobility
  - Delirium/confusion

- Anticholinergics
  - Must also include: Antidepressants, Anti-psychotic, anti-Parkinson's
    - Retention/overflow incontinence
    - Anticholinergic actions (sedation, confusion, constipation, etc)

- Narcotic analgesics
  - Retention
  - Fecal impaction
  - Sedation/delirium
Transient Incontinence: Pharmacologic

- **Alpha Antagonists**
  - Urethral relaxation leading to stress incontinence
- **Alpha agonists**
  - Male retention
- **Calcium Channel blockers**
  - Retention (bladder effect?)
  - Fluid redistribution leading to polyuria, frequency & nocturia
- **Diuretics**
  - Fluid redistribution leading to polyuria, frequency & nocturia
Treatment of the Older patient with UI

- Is treatment the same as younger patient?
- Is the treatment as effective in the older patient?
- Is there a higher risk of side effects, complications, or other concerns?
- Are additional testing needed for the older patient?
Review of Treatment Options

- Behavioral Therapy
- Pelvic floor exercises
- Medications
- Combination therapy
- Surgery
Review of Treatment Options

- Behavioral Therapy (SUI, UUI, MUI)
  - Adjusting fluid intake
  - Timing of fluid intake
  - Urge strategies
  - Avoidance of bladder irritants (ex: caffeine)

- Pelvic floor exercises (SUI, UUI, MUI)
  - Often combined with behavioral therapy
  - Biofeedback
    - Thought to enhance capability to learn and do exercises
Review of Treatment Options

- Medications (OAB: UUI, MUI)
  - OAB: Anticholinergics
  - SUI:
    - No available agents proven to be effective
    - Exception: Duloxetine but not approved for SUI

- Combination therapy
  - Behavioral and Anticholinergics
Review of Treatment Options

- Surgery for SUI
  - Urethral bulking injections
  - Mid urethral slings (TVT, TOT)

- Surgery for UUI
  - Sacral nerve modulation therapy (Interstim)
  - Intravesical injection of Botulinum toxin (Botox)
Behavioral therapy: Is it effective in Older Women with UUI

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<tr>
<th></th>
<th>Accidents/ week % reduction</th>
<th>Improvement with cross over</th>
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<tbody>
<tr>
<td>Behavioral</td>
<td>81%</td>
<td>57% → 89%</td>
</tr>
<tr>
<td>Drug</td>
<td>69%</td>
<td>72% → 84%</td>
</tr>
<tr>
<td>Control</td>
<td>38%</td>
<td></td>
</tr>
</tbody>
</table>

Burgio et al JAGS 2000
Behavioral therapy & Older Women: Risks and Downside?

- No obvious concerns directly related to therapy itself
- Requires motivated patient
- Time commitment
- Cost
Anticholinergics & Older patient with OAB/UUI: Effective?

- No difference in reduction of UUI episodes after Tolterodine therapy in patients <65 and >65
  - Reduction of UUI 12 vs. 11.5 (respectively)
- No difference between 65-74 vs. >75
  - Reduction of UUI 11.3 vs. 9.5 (p=NS)
- Same improvement in micturition frequency in patients <65 and >65
  - Reduced 24 hr frequency by 2.0 vs. 1.5 (respectively)

Zinner et al JAGS 2002
Anticholinergics & Older patient Tolerable?

- No difference in dry mouth or constipation between patients <65 and >65
  - 23% vs. 24% reported dry mouth (vs. 8% for placebo)
  - 6% vs. 6% reported constipation (vs. 4% for placebo)

- No difference in discontinuation rates between patients <65 and >65
  - 5.5% vs. 5.1%
  - No differences in CNS categories: somnolence, headache, dizziness or vision changes

- Limited reliability: self reported, FDA trial, industry sponsored

Zinner et al JAGS 2002
SUI Surgery and Older Patient

- UITN SISTER Trial: <65 yo vs. >65 yo
  - N=574 (<65) and N=81 (>65)
  - Mean ages: 49 vs. 70
  - Older women greater risk for persistent SUI @ 24 months (OR: 3.7)
  - Older women more likely to require repeat SUI surgery (OR: 3.9)
  - No difference in adverse events, length of hospital stay

- Medicare Analysis on sample of women undergoing sling between 1999 & 2000 (stratified by age <75 vs. >75)
  - Older women more likely
    - Higher incidence of postoperative urge incontinence (20% vs. 13%)
    - Treatment failure (11% vs. 7%)
    - Outlet obstruction (11% vs. 7%)
  - Older age and co-morbidities were associated with higher rates of nonurological complications.

Richter et al, Obstet & Gyn 2008
Anger et al JAGS 2007
UUI Surgery and Older Patient

Problems:
- Limited to Refractory OAB, harder group to treat
- No comparative studies with younger population
- Paucity of data, retrospective

Sacral Nerve Modulation therapy
- N=25, mean age 69, 12/25 proceeded to implant
- Results:
  - 17% dry (less than expected)
  - ALL were Improved (better than 50%)
  - Well tolerated

Botulinum toxin intravesical injection tx
- N=10 (mean 75.3, all >65, 100-300 units)
- 5/10 reported >50% improvement, mean duration 4 mos
- 90% impaired emptying (pvr >150)

Amundsen et al AJOG. 2002;187:1462
Matteucci et al SUFU 2008
SNM: Considerations for Elderly

- **Advantages:**
  - Minimally invasive
  - Avoid chronic antimuscarinic
  - Potential benefit for fecal incontinence and bowel disorders (research is promising)

- **Disadvantages**
  - Requires a procedure
  - Based on sole study (small), less likely to achieve dryness

- Patient selection is key
Treatment Considerations

- Cure vs. improvement?
- QOL improvement can occur even in absence of cure
- From patient perspective, treatment should not be worse than the problem
- Usually begin least invasive and work up
  - But is that always right?
- Address reversible causes when possible
Modifiable Conditions in the Geriatric Patient

- Medical Co-morbidities
  - Diuretics: adjust type, dose or timing
  - Diabetes Mellitus: stabilize
- Constipation: fiber, fluids, regular toileting
- Atrophic vaginitis: estrogen cream, ring
- Non-surgical options
  - Pessary
  - Urethral inserts
Behavioral Treatment: Tips for the Geriatric Patient

- Accommodate any perceptual problems:
  - vision
  - hearing

- Adjust exercise progression for muscle weakness
  - Start low
  - Go slow

- Memory aids for memory problems
  - Audio tapes
  - Visual cues
  - Patient Hand-outs
Voiding Aids

- Timers for prompted voiding programs
- Bedside Commode
- Seat elevator
- Handle bars
- Urinal (female too)
- Clothing
  - Velcro
  - Stretch waist
  - Avoid buttons
Future: Research

- Needs to include more representative older population
  - >65 typically used
  - Probably need to consider older patients
    - >75 yo old
    - Include the “frail” or “vulnerable”

- Need more prospective comparative RCTs
  - Behavioral, drug, procedures

- Need to look at cognitive function