Geriatric Incontinence: Where Do We Stand in 2016?

Neil M. Resnick, MD
Thomas Detre Professor of Medicine
Chief, Division of Geriatric Medicine
Associate Director, Aging Institute
University of Pittsburgh/UPMC
Disclosures

• Current funding:
  – NIH: UI; osteoporosis; falls; Pepper
  – Foundation grants to re-engineer and improve geriatric care

• Other financial relationships: None

• Conflicts of interest: None
Former State of the Art

“The last scene of all, that ends this strange eventful history, is second childishness, and mere oblivion: Sans teeth, sans eyes, sans taste, (sans bladder control)”

— “As You Like It”, Scene 7
William Shakespeare
Much Has Changed!
Case

An 88 yo F with Parkinson’s disease suffered a hip frx → confusion, Rx with haloperidol. Incontinence developed.

Exam: In wheelchair, Parkinsonian, with CHF, impaction, bladder distention, atrophic vaginitis
Two Months Later...

She was back home,

- Mentally-intact
- Fully mobile
- Continent

How?
## Will Traditional Paradigm Suffice?

<table>
<thead>
<tr>
<th>UI Cause</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑ Detrusor (DO)</td>
<td>Bladder relaxant</td>
</tr>
<tr>
<td>↓ Detrusor (DU)</td>
<td>(Bethanechol)</td>
</tr>
<tr>
<td>↓ Outlet (SI)</td>
<td>α adrenergic; surgery</td>
</tr>
<tr>
<td>↑ Outlet (obstruction)</td>
<td>α adrenergic blocker</td>
</tr>
</tbody>
</table>
Geriatric UI: What We Know (1)

• It is common, morbid (med, psych), costly
• It is *never* normal, regardless of age, mental status, mobility, or setting
• Its causes appear to differ from UI in younger people, and involve not only the LUT but aging, function, and comorbidity
• It is *multifactorial* at *every* level -- organism, LUT, and even if a single LUT dx
Continence Requires

- Mentation
- Mobility
- Motivation
- Manual Dexterity
- Urinary Tract Function
CNS Changes in Continent Elders

Compared with younger adults

• ↓ activation of the R insula
• ↓ activation of anterior cingulate gyrus
• ↑ deactivation of medial pre-frontal cortex

Impact

• ↓ ability to sense bladder filling
• ↓ ability to suppress bladder contractions

Griffiths et al J Urol ’05; Tadic Neuroimage ‘09
LUT Changes in Continent Elders

**Increased**
- Detrusor Overactivity
- Nocturnal urine output
- BPH
- PVR (< 100 ml)
- Bacteriuria

**Decreased**
- Bladder contractility
- Bladder sensation
- Sphincter strength (F)

**Unchanged**
- Bladder capacity
- Bladder compliance

Resnick *NeuroUrodyn* 1996, Pfisterer JAGS 2006
<table>
<thead>
<tr>
<th>Condition</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detrusor Overactivity</td>
<td>48</td>
</tr>
<tr>
<td>Obstruction (men)</td>
<td>53</td>
</tr>
<tr>
<td>Underactive Detrusor</td>
<td>13</td>
</tr>
<tr>
<td>Normal</td>
<td>18</td>
</tr>
</tbody>
</table>

Resnick, *Neuourol Urodyn* 1995
Thus

**Geriatric** continence results *not* from *normal* lower urinary tract (LUT) function but *despite* abnormal LUT function!

UI vs. Dementia in NH Residents

Resnick, NEJM ‘89
<table>
<thead>
<tr>
<th>Dementia</th>
<th>Self-Transfer</th>
<th>Bed-Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent/Mild</td>
<td>24%</td>
<td>42%</td>
</tr>
<tr>
<td>Moderate</td>
<td>41%</td>
<td>86%</td>
</tr>
<tr>
<td>Severe</td>
<td>59%</td>
<td>100%</td>
</tr>
</tbody>
</table>
**Independent, Non-LUT Risk Factors for UI in SNF**

<table>
<thead>
<tr>
<th>Dependent Transfers</th>
<th>Antipsychotic Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antidepressant Use</td>
<td>Dementia</td>
</tr>
<tr>
<td>Parkinson’s Disease</td>
<td>Past Stroke</td>
</tr>
<tr>
<td>Dependent Dressing</td>
<td>Diabetes Mellitus</td>
</tr>
<tr>
<td>Ca$^{+2}$ channel blocker</td>
<td>Diuretic Use (Loop)</td>
</tr>
</tbody>
</table>

Resnick, *Neurourol* 1988
Implications for UI in NH

- Outside the LUT → Dx/Rx beyond LUT
- Multifactorial → No “magic bullet”
- Multidimensional → Function is important
- Dementia 7th/10 → No longer tenable to ascribe UI to Alz Dis

Most of the identified factors are Rxable!
Principles of Geriatric UI

Aging *predisposes* to UI

Drugs and diseases *precipitate* it

Thus, treatable causes *outside* LUT are more likely

May not need to Rx LUT abnormality

Resnick, *NEJM* 1985
LUT Causes in SNF/Implications

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>61%</td>
<td>DO underlies &lt; 2/3 of UI</td>
</tr>
<tr>
<td>DHIC</td>
<td>32%</td>
<td>DO exists as 2 types; 1 mimics SI, BOO, UD</td>
</tr>
<tr>
<td>DH</td>
<td>29%</td>
<td>Outlet problem in 1/3 and no assoc w/ ↓cogn</td>
</tr>
<tr>
<td>BOO/SI</td>
<td>31%</td>
<td>“Functional” UI is rare</td>
</tr>
<tr>
<td>UD</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Det+Outlet</td>
<td>45%</td>
<td>&gt;1 LUT cause is common</td>
</tr>
</tbody>
</table>

Resnick et al, JAMA 1987, and NEJM 1989
Multifactorial *Within* the LUT-1

- ~ 50% have >1 concurrent LUT problem:
  - DO
  - Impaired contractility
  - BOO
  - SUI

- Moreover…
Multifactorial in LUT even w/1 Dx

- Multifactorial even for a single LUT dx. Ex: DO: both odds of urge UI and UI severity α with¹,²
  - Volume at which DO occurs
  - Rate of detrusor pressure rise
  - Presence/amount of warning before DO
  - Sphincter (strength, coordination, striated mm to BN)
  - Ability to suppress DO and to oppose UI w/sphincter

- Risk of UI increases 10-fold depending on these¹

Potential Determinants of Urge Urinary Incontinence

- Bladder Capacity
- Volume at Uninhibited Contraction
- Urine Output
- Voiding Frequency
- Urge Urinary Incontinence (Frequency of Episodes)
- Detrusor Overactivity (Involuntary Contractions)
- Detrusor Contractility
- Urethral Sphincter Adequacy
- Mobility, Mentation
- Warning (Sensation)

Resnick NM, *Campbell-Walsh Urology*
Disease Severity

Symptomatic

Compensatory Mechanisms

Asymptomatic

Resnick. *JAMA* 1996
Syndromes
Geriatric Syndromes

- Conditions reflecting the superimposition of new insult(s) on pre-existing vulnerability
- Because the cause/extent of the pre-existing vulnerability is so variable, as are the insults, so too is the pathophysiology of a syndrome
- “Causes” are thus multiple, variable, and may have less to do with the “usual organ” impugned
- Challenges the classic disease-based paradigm
Clash of Paradigms

Young

Single abnormality
Relevant organ
"The" cause
Rx → ↓ diz sx

Elderly

Multiple abnormalities
Multiple organs
Multiple contributors
Rx → ↓ diz sx + other syndrome sx too
Implications

No silver bullet for geriatric UI

But

There is a silver lining …
Incontinence vs. Age

Drugs
Diabetes, Ca$^{+2}$
CHF/Edema
↓ Mobility
Impaction

Memory Impairment vs. Age

Drugs/Alcohol
Metabolic
Depression
CHF/COPD
Vision/Hearing

Resnick and Marcantonio, Lancet 1997
Reasons UI Rx May Have Failed

- Assumed just one cause, inside the LUT
- *Wrong LUT diagnosis* because existence of the most common geriatric bladder problem was unknown and it mimics SI, BOO, and UD
- *Wrong LUT treatment* → worsened the problem
- *Wrong drug doses* used, esp. if DHIC present
- Neglected multiple causes outside the bladder
- In incontinent demented patients, assumed that since dementia *could not be treated* neither could the incontinence
So What if UI Rx Incorporates These Principles?
Oxybutynin IR in Elderly

- RCT: ~100 older chronic UUI patients w/DO
- Stepwise Approach:
  - First, treated causes of UI outside the LUT
  - Confirmed DO=1^0 LUT cause; excluded other dx
  - Dose titration to success, side effects, PVR
- Results:
  - 63% continent vs. 17% on placebo
    - 75% for DO; 50% for DHIC
- Conclusion: Elderly can respond well to Rx

Miller et al. J Urol 2000
What We Know (2)

• Geriatric UI is usually a complex syndrome rather than a single disease/disorder

• Geriatric UI is usually treatable, and often curable, usually without requiring surgery

• Yet most pts. neither seek nor receive care

• Eval’n/Rx: stepwise, multi-faceted, focused first on reversible causes beyond LUT

• **IF** LUT Rx required, consider individualized benefits/risks with shared decision making
What We Don’t Know: Selected

- Relevant experimental models?
- Brain’s role in geriatric UI?
- Burden spectrum; reasons for under-report?
- Optimal evaluations, and for which patients?
- Best Rx for *individual*, and likely response?
- Prevention strategies and durability?
- How to ↑implement’n (pts, MDs, public hlth)
Elephant in the Room

- Detrusor overactivity. If we knew its cause(s) and could abolish it:
  - Most elderly would be continent regardless of comorbidity/functional impairment
  - Rx of other UI causes would be enhanced
  - Even if continence not achievable in an individual, “social continence” could be
Mammoth in the Room

?Results of studies *stratified* by?

- Age
- Cognition
- Function
- Comorbidity

Still, we have made progress!
Case

An 88 yo F with Parkinson’s disease suffered a hip frx → confusion, Rx with haloperidol. Incontinence developed.

O/E: In wheelchair, Parkinsonian, with CHF, impaction, bladder distention, atrophic vaginitis
Case - 2

Decompressed bladder
Disimpacted
Diuresed
Discontinued haloperidol
Added estrogen, Sinemet®
Case - 3

Parkinson’s remits
CHF resolves
Bowels regularize
Mobility improves
UI lessens
Case - 4

Precipitant UI
Nocturia x 3 w/o polyuria
No stress symptoms
Stress test negative
PVR = 75 ml
Urology Department. Can you hold?
Two Months Later...

She was back home,

- Mentally-intact
- Fully mobile
- Continent
“Perhaps the greatest obstacle to progress is the belief that no progress is possible.”

-- Francis Bacon