Geriatric UI:
A Case-Based Approach

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Disclosures

- None

UI: The Problem

Prevalence in elderly ≥ 33%
Morbidity substantial
Costs >$76 billion *annually*[1]
Yet ignored, although ↑ treatable

[1] Koyne KS, et al. *J Manag Care* Pharm. 2014; 20: 130-40

What's Wrong with This Picture?

Cause	Treatment
↑ Detrusor (DO)	Bladder relaxant
↓ Detrusor (DU)	~~Bethanechol~~
↓ Outlet (SI)	α adrenergic; surgery
↑ Outlet (obstruction)	x'azosin; surgery

It Doesn't Account for the Changes of Normal Aging!

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

LUT in ***Continent*** Elderly

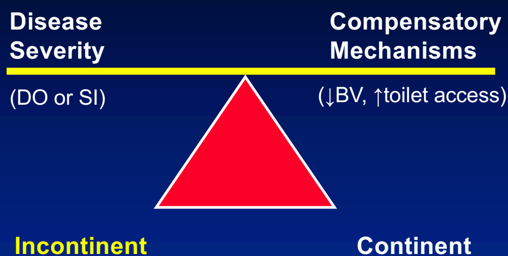
Condition*	%
Detrusor Overactivity (DO)	48
Obstruction (men)	53
Underactive Detrusor	13
Normal	18

* includes coexisting conditions

Resnick. *NUD* 1995

Thus

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



Resnick. *JAMA* 1996

Rationale for a Different Paradigm

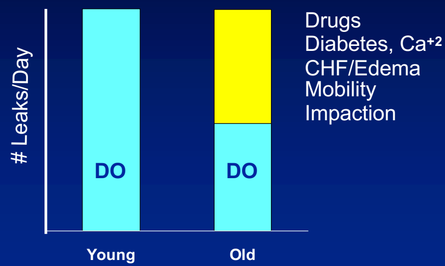
Young

- ***Single "cause"***: LUT
- Diagnostic testing to determine ***LUT cause***
- Rx LUT "diagnosis"

Elderly

- ***Many "contributors"***: LUT, medical diz's, drugs, ↓ function
- Clinical eval'n first step
- Rx all "***contributors***"
- If fails, consider testing

LUT Abnormality vs. UI



Resnick, *Lancet* 1997

Case 1

89 yo F with cough-associated leakage. No precipitancy (i.e., "urgency")

PMH: L MCA stroke, RA, UGI bleed, HTN

Meds: HCTZ, atenolol, ACEI, Benadryl®, trazodone, oxycodone, iron, enema

Exam: ↓sphincter; impxn; +ST, R h'paresis

Void: 450 ml; PVR = 150 ml

Cause?

Voiding Diary

Time	Wet/Dry	Void	Comments
08:00	D	100	
10:00	W	400	Cough → leak
12:00	D	125	
14:00	D	40	Cough; no leak

Case 1: Rx

- Despite stroke, *not* urge UI but stress UI
- So Rx: α adrenergic, surgery? *OR…*
- Stress UI at high bladder volumes often responds to keeping bladder less full
- Rx strategy (↓ load on sphincter):
  - ↓ Blad Vol: disimpact; d/c Benadryl, ↓oxycodone; Rx RA/add PT to ↑toileting, activity & sleep
  - Stop cough: Discontinue ACEI → ***continent***
- Did not fix sphincter, but ↓ challenge
- Continence achieved without testing/SI Rx

Case 2

83 yo woman w/nocturia and nightly urge UI

PMH: Dementia, depression, HTN, OA, falls

Meds: doxazosin, CCB, NSAID, imipramine

PE: Orthostasis, edema, antalgic gait,
- CHF, -ST, void 80 ml; PVR=10

VD: Voids = 150 ml (day), 250 ml (night)
Output = 600 ml/day, 1200 ml/night

Cause?

Nocturia

- Volume
- Sleep
- LUT

Case 2: Nocturia

Volume

- nocturnal polyuria (NP) due to Rx-induced edema (CCB, NSAID)

Sleep

- insomnia due to arthritis, NP

LUT

- DO

Case 2: Rx

- Likely DO w/ ↑impact b/c ↓compensatory: ↓ cognition, ↓ mobility, and nocturia. Rx all!
- Treatment plan:
  - Cognition: Stop imipramine (anticholinergic)
  - Mobility: Stop meds → orthostasis and edema (doxazosin, imipramine, CCB); add PT, etc.
  - Rx nocturia, ***if*** still present ***and*** necessary
- *Dry* – and without a bladder relaxant Rx!

But what if a bladder relaxant is needed?

Detrusor Overactivity: Rx

Anticholinergic Bladder Relaxants (≈ equal)
- Oxybutynin (Ditropan® [IR, XL, patch, gel])
- Tolterodine (Detrol® [LA])
- Darifenacin (Enablex®)
- Solifenacin (Vesicare®)
- Trospium (Sanctura® XR)
- Fesoterodine (Toviaz®)

Beta-3 Agonist: Mirabegron (Myrbetriq®)
Can *combine* antichol + mirabegron (if need)
Botox, Neuromodulation (SNS/PTNS)?
DDAVP? ***NO***

Antimuscarinics vs. Mirabegron

- Antimuscarinics proven effective, even in vulnerable and frail elderly
- Recent epidemiology studies: ↑Alz risk after years of use: possible 2% absolute ↑ risk at 15+ yrs *if* true, but may not be causal
- Mirabegron: likely equivalent efficacy and safe, even if CAD and HTN, but much less experience especially in vulnerable elderly

Case 3

76 yo woman with persistent urge UI
PMH: OA (mild), HTN
Meds: HCTZ, acetaminophen, oxybutynin
PE: BP=126/70, MoCA=28, OA fingers
Void diary: 2 episodes UUI/day
voids q2-3 hr, normal volumes
PVR: 55 ml

Rx?

Case 3

- Urge UI without exacerbating features (e.g., ↓ function, polyuria, overflow)
- Some response to oxybutynin but desires more control
- PVR normal
- Rx: add mirabegron and monitor

Case 4

75 yo man with urge UI; UDS: no obstruction

Voiding diary reveals:

Voids every 1 - 2.5 hours

Largest void = 300 ml

PVR = 150 ml

24° volume = ~3000 ml

Dx: DHIC, normal TBV, ↑ output

Rx: ↓ fluid intake → asymptomatic w/o Rx!

Detrusor Hyperactivity with Impaired Contractility (DHIC)

- Bladder is "spastic" but weak
- Most common cause of geriatric UI
- Implications:
  - Predisposes to urinary retention
  - Mimics stress incontinence/obstruction
  - Implications for treatment
  - Implications about the cause?

Resnick & Yalla, JAMA 1987

Case 5

67 yo woman with UI, only when tired. Occurs with activity. No precipitancy.

PMH: Viral T2-4 tr'verse myelitis w/AUR

O/E: PFM lax. Neuro ± normal. Mildly +ST

VD: 6-7 voids/day, 0/noc, mild leak w/ex

Flow: Weak, but continuous and ↑ w/strain

Void: Voided 300 ml; PVR = 50 ml

Case 5: Rx

- Transverse myelitis ↑ risk DO and DSD but no evidence of either:
  - DO: 6-7 voids/24°, no precipitancy, TBV wnl, sleeps 7 hrs without voiding or leaking despite output >500 ml/night, and no gush even when PFM weak enough to allow SI.
  - DSD: no DO sx, normal proprioception, stream is continuous and ↑ with strain.
- Dx = UD + SI due to residual neuropathy
- Pessary restored continence; no UDS

Case 6

80 yo F with freq; no urgency; occ UI at ***night***

Voids q 2-3 hrs (day),1-1.5 hrs (night)

No other symptoms. Bladder relaxant failed

PMH: Mild cognitive impairment (MCI)

Meds: amlodipine

VD: Voids 60-120 ml day and night

Vol = 700 ml (day), 840 ml (night)

Case 6: Exam

Overweight, walks slowly with a cane

MoCA = 22

No CHF or edema

Normal sacral sensation, tone, reflexes

Stocking neuropathy

Stress Test negative @ 70 ml; PVR=8 ml

Case 6: Discussion

Frequency likely not due to DO:
- No urgency or day UI, despite ↓mobility

Though neuropathy, not a factor:
- Reliable urge at <100 ml
- Small bladder capacity and ↓ residual

Exacerbated by CCB (via nocturia)?

Functional bladder contraction d/t habit

Case 6: Rx

Progressively ↑ voided vol to 250 ml

Treated nocturia

- Substituted HCTZ for amlodipine
- No furosemide (no edema/CHF)
- ***Not*** DDAVP

Continent and normal voiding intervals

Problems with “Functional UI”

In functionally-impaired patients:

- UI not inevitable even if ↓mentat’n/mobility
- UI without LUT dysfunction is rare
- Obstrxn/SI common, potentially treatable
- Factors causing transient UI more likely

Case 7

90 yo M with Parkinsons developed urosepsis complicated by an NSTEMI. Several days later, agitated, confused, UI.

PMH: CHF, moderate cognitive impairment

Meds: haloperidol, furosemide, antibx

Case 7

O/E: Delirious, Parkinsonian, CHF, bladder distention, and impaction

Labs: Unremarkable

ECG: Unchanged, CXR: CHF

PVR: 1000 ml

Likely causes of his UI? Eval’n?

MI → pain → $MS0_4$ → FI → AUR → delirium

Case 7

- Catheter placed and disimpacted
- CHF treated
- Sinemet restarted; haloperidol weaned
- Much improved → discharged home
- Catheter removed by VNA in 10 days
- Returned to the office 2 weeks later

Case 7

Voiding diary

1 leak/day, including 4-hr nap in W/C

UI q1-2 hourly at night, despite ↓fluids

Why still UI?

Why when asleep at night but not when asleep in the afternoon?

Case 7

- Recurrent CHF diuresed
- Became completely continent
- PVR = 30 ml

What further testing required?

Does he need UDS?

None!

The End