Urinary Incontinence in Elderly Women

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Objectives

- Recognize the age related lower urinary tract changes
- Appreciate unique aspects of geriatric voiding problems
- Distinguish among various forms of incontinence and nocturia
- Steps in the evaluation and a variety of management strategies
- Criteria for referral

Urinary Incontinence = involuntary leakage of urine
The Burden of Urinary Incontinence

- Very common among the elderly !!
  - 44–57% of women 40-60 years old
  - 78% for women > 75 years old
- UI presents physical, psychological, and social burdens that can range from mildly bothersome to debilitating
  - 6% of nursing home admissions of women are directly attributable to UI management
- Expensive !!
  - Annual costs in US averaged $19.5 billion in 2004

Process of Micturation

**Dual control of urination:**

1. Autonomic nervous system control
   - Nerve coming from the spinal cord and go directly to the bladder
   - When bladder gets fuller, signals are sent to the brain
2. Central nervous system
   - Voluntary control to choose when to void

- Both can be altered by aging or neurological disease

"I've reached that age where I've given up on Mind Over Matter and am concentrating on Mind Over Bladder."
Genitourinary Changes with Aging

**INCREASED**
- Post void residual < 100 cc
- Detrusor activity
- Nocturnal Urinary Output
- Bacteriuria 20%

**DECREASED**
- Ability to postpone voiding
- Total bladder capacity
- Detrusor contractility
- Ability to concentrate urine (apoptosis) of long nephrons
- Vaginal and urethral epithelial thickness

Aging and Continence

- Most elderly people remain continent *in spite of age* associated LUT changes
- Increasing research reveals that much of geriatric voiding dysfunction is “beyond the bladder”
- Cortical & sub-cortical control over bladder function
- Mostly inhibitory control that requires intact attention, working memory, executive functions
- Mobility, dexterity influence on continence
- Almost always multifactorial

Risk Factors for UI

- Pregnancy
- Childbirth
- Hysterectomy
- Menopausal therapy
- Advancing age
- Family history
- Functional impairment
- Cognitive impairment
- Smoking (Chronic cough)
- Caffeine
- Constipation
- Depression
- Exercise
- UTI
- Delirium
- Comorbid medical condition (DM, Stroke)
- Decrease fluid intake

Reference: BMJ
Impact of Drugs on Continence and LUTS in Elderly

- Nocturia
- Nifedipine
- "Glitazones"
- NSAIDs/COX2
- Gabapentin
- Pegolbain
- Constipation
- Calcium blockers
- Anticholinergics
- Narcotics
- Mobility
- Antipsychotics
- Antidepressant
- Montelukast
- Sedative hypnotics
- Benzodiazepines
- Anticholinergics
- Stress Ul
- ACE inhibitors
- LUT function
- Decrease contractility
- Anticholinergics
- Calcium blockers
- ↑ Sphincter tone
- Alpha agonists
- ↓ Sphincter tone
- Alpha blockers
- Diuretics

Types of Incontinence

- TRANSIENT VS CHRONIC
- Stress
- Urge
- Mixed Urge and Stress
- Overflow
- Functional

Transient Incontinence

- Delirium
- Infection
- Atrophic vaginitis or urethritis
- Pharmaceuticals
- Psychological disorders
- Endocrine Disorders
- Restricted mobility
- Stool impaction
Types of Urinary Incontinence

**Urgency**
- Involuntary loss of urine accompanied by urgency resulting from abnormal bladder contractions
- Prevalence ↑ with age

**Stress**
- Involuntary loss of urine on effort, physical exertion, or sneezing or coughing
- Most prevalent type (19-64)

**Mixed Symptoms**
- Combination of stress and urge incontinence
- 10% of older women report mixed UI

Urgency
- Sudden, compelling desire to urinate, that is difficult to defer

Frequency
- 8 or more visits to the toilet per 24 hours

Nocturia
- 1 or more visits to the toilet during sleeping hours

Overactive Bladder Syndrome

**Urgency**
- Sudden, compelling desire to urinate, that is difficult to defer

**Frequency**
- 8 or more visits to the toilet per 24 hours

**Nocturia**
- 1 or more visits to the toilet during sleeping hours

Overactive Incontinence
- Sudden & involuntary loss of urine, accompanied by or immediately preceded by urgency

Reference: Annals
**Overflow Incontinence**

- Bladder is filled to capacity, but unable to empty
- Weight of urine $>_{outlet\ resistance}$
  - urine leaks past a normal or overactive outlet and sphincter
- Anatomic outlet obstruction $\rightarrow$ resistance to the flow of urine is increased
- BPH, prostate CA, surgery, systemic neurologic dysfunction
- Weakened detrusor muscle loses the ability to contract
- Long-term chronic bladder outlet obstruction
  - BPH, prostate CA, DM, denervation (pelvic surgery)

**Functional Incontinence**

- Impaired Mobility
- Impaired dexterity
- Impaired cognition
- Environmental
- Psychological

**Nocturia**

> If sleep does not serve an absolutely vital function, then it is the biggest mistake the evolutionary process ever made.

Nocturia is the Leading Cause of Sleep Disturbance in Older Adults

Prevalence (%) of self-reported causes of disturbed sleep

How often do the following disturb your sleep?

- Every night/almost every night
- Few nights/week
- Few nights/month
- Rarely
- Never

Prevalence (Self-reported causes of disturbed sleep)

Nocturia

- Definition: voiding during (nocturnal) sleep time - preceded and followed by sleep (ICS guidelines)
- Normal nocturia ≤ 2
- Scientific problems:
  - How to define sleep time
  - Is patient awakened by the need to void?
  - Do patient void because they are awake?

1. van Kerrebroeck et al Neurourol and Urodyn 2002; 21:179-83

What Triggers Nocturia?

- 50 men and women
  - Mean number of nocturia events=2.6
- Nocturia awakening attributed to urge or not?
  - 78% nocturia voids were preceded by urge to void
  - In the remainder, the patient awakened for some reason, then voided out of habit or convenience before going back to sleep

The etiology and treatment of these two groups is likely to be different

What Degree of Nocturia is Important?

- Results from multiple studies of mortality, fractures and QoL all shows >2 voids/night is a threshold for significant negative impact from nocturia.
- One void per night is less likely to have serious consequences.

Prevalence >2 Voids / Night

- Meta analysis of 43 studies

<table>
<thead>
<tr>
<th>Gender</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men (20-40 years)</td>
<td>2-17%</td>
</tr>
<tr>
<td>Women (20-40 years)</td>
<td>4-18%</td>
</tr>
<tr>
<td>Men ( &gt;70 years)</td>
<td>29-59%</td>
</tr>
<tr>
<td>Women ( &gt;70 years)</td>
<td>28-62%</td>
</tr>
</tbody>
</table>

Bosch and Weiss. J Urol 2010;184(2): 440-446

Nocturia is a Multifactorial Condition

- Nocturnal polyuria
- Medications
- Detrusor overactivity
- Reduced bladder capacity
- Sleep disorders
- Sleep disorders
- Comorbid diseases (CVD, DM, CKD)
Potential Factors Underlying Nocturia

Urological evaluation reveals:

<table>
<thead>
<tr>
<th>Nocturnal polyuria</th>
<th>Reduced nocturnal bladder capacity</th>
<th>24-hour polyuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nocturnal urine volume &gt;20–30% of total 24-hour urinary volume (dependent on age)</td>
<td>Urine production within normal limits, increased frequency, small voided volumes</td>
<td>24-hour urinary output exceeding 40 mL/kg body weight</td>
</tr>
</tbody>
</table>

Possible causes:

- Impaired circadian rhythm of AVP secretion
- Congestive heart failure
- Renal insufficiency
- Excessive evening fluid/caffeine intake
- Diuretic medication
- Estrogen deficiency
- Sleep apnea
- Venous insufficiency
- Edema
- Hypoalbuminemia
- Diverse bladder
- Bladder outlet obstruction (including benign prostatic enlargement)
- Infection
- Intravesical cystitis
- Bladder hyper-reflexivity
- Cystocele
- Cancer
- Detrusor overactivity (e.g. multiple sclerosis)
- Poorly-controlled diabetes mellitus (type 1 or type 2)
- Diabetes insipidus
- Polydipsia
- Overactive bladder
- Bladder hypersensitivity
- Calculi
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How will I get evaluated?

“How do you feel about your bladder?”

“Hello, incontinence helpline – Can you hold?”

Screening and Diagnosing UI

- The first Step: Ask, Ask, Ask

“Do you have a problem with urinary incontinence (of your bladder) that is bothersome enough that you would like to known more about how it could be treated?”

YES
Key History Components

- Frequency
- Urgency
- Hematuria
- Recurrent UTIs
- Nocturia
- Symptom severity (daily pad usage)
- Vaginal bulge
- Bowel habits
- Fluid intake (Caffeine and ETOH intake)
- Expectation of the treatment

References: BMJ

HISTORY

- Past Gyn/Obstetrics Hx:
  Mode of delivery, birth weight, # of delivery.
- Medical history:
  Constipation, DM, HTN, neurological or disc prolapse, CHF
- Past Surgical history:
  Pelvic or abdominal surgeries
- Medications
  Prescribed and OTC

The Prescribing Cascade

Nifedipine for HTN
- Edema, constipation, impaired bladder emptying
- Nocturia, ↑ urgency, some UI
- OAB!
- Add antimuscarinic
- ↑ constipation
- Add laxative....
Physical Examination

- Functional, Cognitive and Neurological exam
- Abdominal examination
- Pelvic and Rectal examination
  - Atrophy, pelvic organ prolapse, perineal sensation, rectal tone
- Cough stress test
- Cotton swab test ("Q-Tip Test for urethral hypermobility")
- Presence of lower extremity edema

Investigations

- Blood work (BUN, creatinine, glucose, calcium) is recommended if compromised renal function is suspected or if polyuria (in the absence of diuretics) is present
- UA and PVR
- Urine cytology is not recommended in the routine evaluation of incontinence.
- Renal ultrasound

References:
When to refer?
Most UI can be treated by primary care providers

- Failure to improve with current measures
- Elevated PVR volume
- Hematuria without infection on urinalysis
- Recurrent symptomatic UTI
- Pelvic bladder, vaginal, or urethral pain
- UI with new neurological symptoms
- Hx. Of pelvic surgery, irradiation.
- Symptomatic prolapse

When to do Urodynamics?

- Not essential for a basic work up
- Urodynamic may help distinguish between pure stress UI, urgency UI, and mixed UI
- No statistically significant differences in continence, improvement, or treatment failure were found between groups of women who did or did not have a baseline urodynamics diagnosis
- It is used for differential diagnosis, especially for patients considering surgical treatment

Treatment Options

- Behavioral therapy
- Medication
- Combined therapy: behavioral and pharmacologic therapy
- Minimally invasive therapies
  - Botulinum A-toxin
  - Neuromodulation
- Surgery

Behavioral Therapy

- Avoid extreme of fluid intake (No too much and no too little)
- Avoid caffeine and alcohol.
- Timed void.
- Prevent constipation instead of treating it
- Clothing
- DME in bathroom
- Weight loss
- Pelvic floor muscle training, aka Kegel exercise.


Weight Loss to Treat Urinary Incontinence in Overweight and Obese Women

RCT of intensive 6 month weight loss VS structured educational program in 338 obese women with 10 or more episodes of UI a week found a 47% reduction in UI episodes in the weight loss group vs 28% reduction in the controls at 6 months (P<0.001)

The New England Journal of Medicine Jan 2009

Pelvic Floor Exercise

- Helps strengthen the muscles of the pelvic floor and to contract them in isolation to inhibit detrusor contractions
- Kegel exercise (8-10 contractions 3 times a day)

AUG guideline:
- First line therapy for stress and mixed UI!!
INTONE PELVIC FLOOR MUSCLE EXERCISER
Nonpharmacological Treatment

- Supportive interventions
  - Toileting substitutes and other environmental modifications
  - Absorbent products
  - Physical therapy
Comparative Effectiveness of Nonpharmacological Interventions

For Stress and Mixed UI:
- PFMT alone versus PFMT combined with either biofeedback, bladder training, or supervision
  Strength of Evidence = High
- PFMT alone versus PFMT combined with either intravaginal electrical stimulation or intravaginal devices
  Strength of Evidence = Moderate

For Urgency UI:
- Bladder training alone versus bladder training plus PFMT
  Strength of Evidence = High

“Each capsule contains your medication plus a treatment for each of its side effects.”

Distribution of Cholinergic and Adrenergic Receptors

- M = muscarinic
- N = nicotinic
- η = η1 and η2 adrenergic
- β = β1 adrenergic

Detrusor muscle (M2, 60%; M3, 20%; J)
Mucosa and submucosa (M2, M3)
Bladder neck (η)
Pelvic floor (N)
Urethra (β)
Pharmacological Interventions for UI

- Pharmacological interventions are used for urgency UI and mixed UI.
- The use of drug treatment for stress UI is rare and is considered “off-label.”

**Drug name | Starting dose**
--- | ---
Darifenacin (Enablex) | 7.5 mg PO daily
Fosenteroline (Tioral) | 4 mg PO daily
Oxybutynin (Ditropan) | 5 mg PO BID-TID
Solifenacin (Vesicare) | 5 mg PO daily
Tolterodine (Detrol) | 2 mg PO daily
Trospium (Sanctura) | 20 mg PO BID


**B3-Adrenoceptor Agonists**

- Mirabegron (Myrbetriq) 25 mg PO Daily
- FDA approved in 2012
- Potential Side Effects:
  - Elevated Blood Pressure
  - Urinary Retention
  - Angioedema
  - Nasopharyngitis
  - Expensive (~ $300/month)

*Reference: BMJ*

**Oxybutynin Transdermal System (Oxytrol)**

- Apply every fourth day
- Avoids first-pass metabolism,
- Fewer systemic side effects
- Dry mouth and constipation = placebo
- 17% incidence of skin reactions
- Contact dermatitis
- Erythema resolves
- Pruritus, use moisturizer and rotate location

*References: BMJ*
Oxybutinin Topical Chloride Gel (Gelnique)

- Once daily gel formulation
- Similar systemic side effect profile to patch
- Less local skin reaction

So which med to use for the treatment of urinary incontinence?

<table>
<thead>
<tr>
<th>No Differences</th>
<th>Efficacy</th>
<th>Tolerability</th>
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<tbody>
<tr>
<td>All decrease UI ~70%</td>
<td>1. Dry mouth</td>
<td>1. ↑ cognitive dysfunction in dementia patients</td>
</tr>
<tr>
<td>~25% cure rate</td>
<td>2. Blurred vision</td>
<td>2. Interaction with acetylcholinesterase inhibitors (dementia patients)</td>
</tr>
<tr>
<td></td>
<td>3. Constipation</td>
<td>3. Additive side effects with other anticholinergic medications</td>
</tr>
<tr>
<td></td>
<td>4. Urinary retention</td>
<td>4. Interaction with anticholinergic medications</td>
</tr>
<tr>
<td></td>
<td>5. Drowsiness</td>
<td>5. Additive side effects with other anticholinergic medications</td>
</tr>
<tr>
<td></td>
<td>6. Memory impairment</td>
<td>6. Additive side effects with other anticholinergic medications</td>
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Anticholinergics in Patients with Dementia

Does risk outweigh benefit?

1. ↑ cognitive dysfunction in dementia patients
2. Interaction with acetylcholinesterase inhibitors (dementia patients)
3. Additive side effects with other anticholinergic medications
Onabotulinum toxin A
(Requires Referral to Specialist)

- FDA approved in 2013 for the treatment of:
  - overactive bladder symptoms in adults 18 years and older when oral medications are ineffective or contraindicated
  - overactive bladder symptoms due to neurologic disease when anticholinergic medications are ineffective or contraindicated
- Take Home Message: Not first line therapy for UI. Due to the risk of urinary retention, only patients who are willing and able to initiate catheterization post-treatment, if required, should be considered for treatment!!

Reference: BMJ

Sacral Neuromodulation
(Requires Referral to Specialist)

- Electrodes are placed into the S3 nerve foramen (office setting vs OR)
- Systematic review found that 67-80% of patients achieve continence or greater than 50% improvement in urge UI symptoms
- Excellent option for women who are unwilling to accept the risk of urinary retention after botox injections

Reference: BMJ

Posterior Tibial Nerve Simulation
(Requires Referral to Specialist)

- Small needle placed superior to the medial malleolus to stimulate the posterior Tibial nerve peripherally to modulate the sacral nerve through S2-S4 nerves
- Office procedure
  - 12 weekly office visits (30 minutes each)
  - Third-line therapy for highly motivated cognitively intact patients

Reference: BMJ
Insufficient Evidence For Interventions

- Pessaries:
- Soy-enriched diet
- Acupuncture
References

-消防科の尿失禁

- Burden of UI

- References: