



URINARY INCONTINENCE

Know and understand:

- Prevalence, impact, and types of urinary incontinence (UI) among older adults
- Factors, conditions, and lower urinary tract pathophysiology associated with UI
- Elements of a complete evaluation
- Treatment strategies
- Use and management of urethral catheters

- Prevalence and Impact of Incontinence
- Risk Factors and Associated Comorbid Conditions
- Pathophysiology
- Evaluation
- Treatment and Management
- Evaluation and Management of UI in Nursing Home Residents
- Catheters and Catheter Care

- Affects 15%–30% of community-dwelling older adults
- Affects 60%–70% of residents of long-term-care institutions
- Prevalence increases with age
- Affects more women than men (2:1) until age 80 (then 1:1)

- **Morbidity**
 - Dermatitis, cellulitis, pressure ulcers, UTIs
 - Sleep deprivation, falls with fractures, sexual dysfunction
 - Depression, social withdrawal, impaired quality of life
- **Costs:** >\$26 billion annually

- Obesity
- Functional impairment
- Dementia
- Medications
- Environmental barriers to toilet access

COMORBIDITIES THAT CAN CAUSE OR WORSEN UI

- Affective and anxiety disorders
- Alcoholism
- Arteriovascular disease
- Chronic cough
- Congestive heart failure
- Constipation
- Degenerative joint disease
- Delirium
- Dementia
- Diabetes
- Hypercalcemia
- Mobility impairment
- Multiple sclerosis
- Normal-pressure hydrocephalus
- Parkinson disease
- Peripheral venous insufficiency
- Psychosis
- Rheumatoid arthritis
- Sleep apnea
- Spinal cord injury
- Spinal stenosis
- Stroke
- Vitamin B₁₂ deficiency

MEDICATIONS THAT CAN CAUSE OR WORSEN UI

- Alcohol
- α -Adrenergic agonists (M)
- α -Adrenergic blockers (W)
- ACE inhibitors
- Anticholinergics
- Antipsychotics
- Calcium channel blockers
- Cholinesterase inhibitors
- Estrogen (oral)
- GABAergic agents
- Loop diuretics
- Narcotic analgesics
- NSAIDs
- Sedative hypnotics
- Thiazolidinediones
- Tricyclic antidepressants

AGE-RELATED LOWER URINARY TRACT CHANGES

- Decreased bladder contractility
- Increased uninhibited bladder contractions
- Diurnal urine output shifted later in the day
- Sphincteric striated muscle attenuation
- Decreased bladder capacity
- (Modest) Increased postvoid residual (PVR)
- Decreased urethral closure pressure, increased vaginal mucosal atrophy (women)
- Benign prostatic hyperplasia and prostate hypertrophy (men)

- Urge UI with detrusor overactivity (DO) (uninhibited bladder contractions)
- Stress UI and impaired urethral sphincter support and/or closure
- Mixed UI with both DO and impaired sphincter support/function
- UI with impaired bladder emptying due to bladder outlet obstruction and/or detrusor underactivity

Detrusor overactivity may be:

- Age-related
- Idiopathic
- Secondary to lesion in central inhibitory pathways (eg, stroke, cervical stenosis)
- Due to bladder outlet obstruction or, less commonly, local bladder irritation (eg, stones, infection, tumor)

Leakage is due to one or both mechanisms:

- **Damage to pelvic floor supports** (levator ani, connective tissues)
 - Failure to adequately compress the urethra when intra-abdominal pressure increases
- **Sphincter failure**
 - Surgical damage or severe atrophy
 - Subsacral spinal cord injury rarely

- DO can cause apparent “stress” UI when cough triggers an uninhibited detrusor contraction
 - Leakage usually occurs after and not coincident with the cough, is large in volume, and is difficult to stop
- Often coexists with urge UI (mixed UI)

UI WITH IMPAIRED BLADDER EMPTYING (1 of 2)

- Results from detrusor underactivity, bladder outlet obstruction, or both
- **Outlet obstruction**
 - **Causes in men:** prostate hyperplasia causing prostate enlargement
 - **Causes in women:** urethral scarring or large cystocele/prolapse that kinks urethra

UI WITH IMPAIRED BLADDER EMPTYING (2 of 2)

- **Detrusor underactivity results from:**
 - **Intrinsic bladder smooth muscle damage** (eg, ischemia, scarring, fibrosis)
 - **Peripheral neuropathy** (eg, diabetes, vitamin B₁₂ deficiency, alcoholism)
 - **Damage to spinal cord or spinal bladder efferent nerve** (eg, from disc herniation, spinal stenosis, tumors, or degenerative neurologic disease)

- **Nocturnal polyuria** (nocturnal output $>33\%$ of total 24-hour urine output)
 - Late day/evening fluids, especially with caffeine or alcohol
 - Pedal edema (eg, due to medications, venous stasis, heart failure)
 - Heart failure
 - Obstructive sleep apnea

- **Sleep disturbance**
 - Obstructive sleep apnea
 - Medications
 - Cardiac or pulmonary disease
 - Pain
 - Restless leg syndrome
 - Depression
 - Sleep partner

- Lower urinary tract
 - Detrusor overactivity
 - Benign prostatic hyperplasia
 - Impaired bladder emptying

COMPREHENSIVE ASSESSMENT OF UI

- **Screening:** all patients, as underreporting common
- **History:** including quality of life
- **Physical examination:** include (at some point) cardiovascular, abdominal, musculoskeletal, neurologic, & genitourinary exams
- **Testing:** urinalysis
- **Optional:** PVR, urodynamics, cytology, other lab tests

- All older patients, especially women, should be asked at least yearly about UI:
 - Do you have any problems with bladder control?
 - Do you have problems making it to the bathroom on time?
 - Do you ever leak urine?
- If positive, ask questions to determine the type of UI (*see next slide*)

Do you leak urine most often:

- When you are performing some physical activity, such as coughing, sneezing, lifting, or exercising? (**stress UI**)
- When you have the urge or feeling that you need to empty your bladder but cannot get to the toilet fast enough? (**urge UI**)
- With both physical activity and a sense of urgency? (**mixed UI**)
- Without physical activity and without sense of urgency? (**other**)

ASSESSMENT: HISTORY

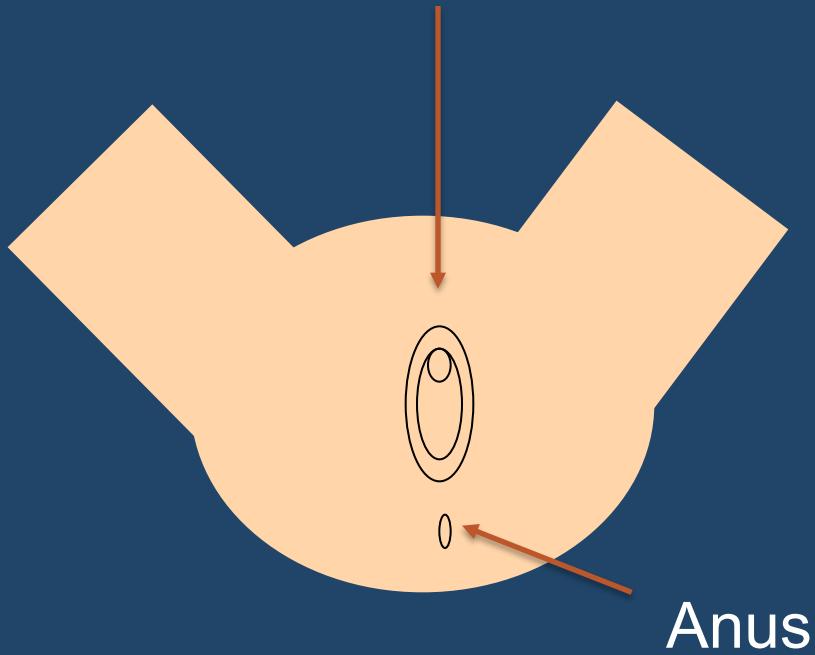
- **Should include:** onset, frequency, volume, timing, exacerbating and ameliorating factors, other LUT symptoms, amount/types of fluid intake, success or failure of past treatment(s), current management
- **Red flag symptoms:** abrupt onset, pelvic pain, hematuria (could herald neurologic disease or cancer—prompt evaluation and referral required)
- **Review:** medical conditions and their status, medications, functional status, access to toilets
- **Ask patients and/or caregivers about UI-associated bother and impact on quality of life**

- **General:** cognitive and functional status, focus on presence and severity of associated comorbidities, depression screening, sleep apnea screening if nocturia
- **Abdominal:** palpation (insensitive and nonspecific for bladder distention)
- **Neurologic:** tests for integrity of the sacral cord with sacral reflexes:
 - Perineal sensation
 - Anal wink
 - Bulbocavernosus reflex

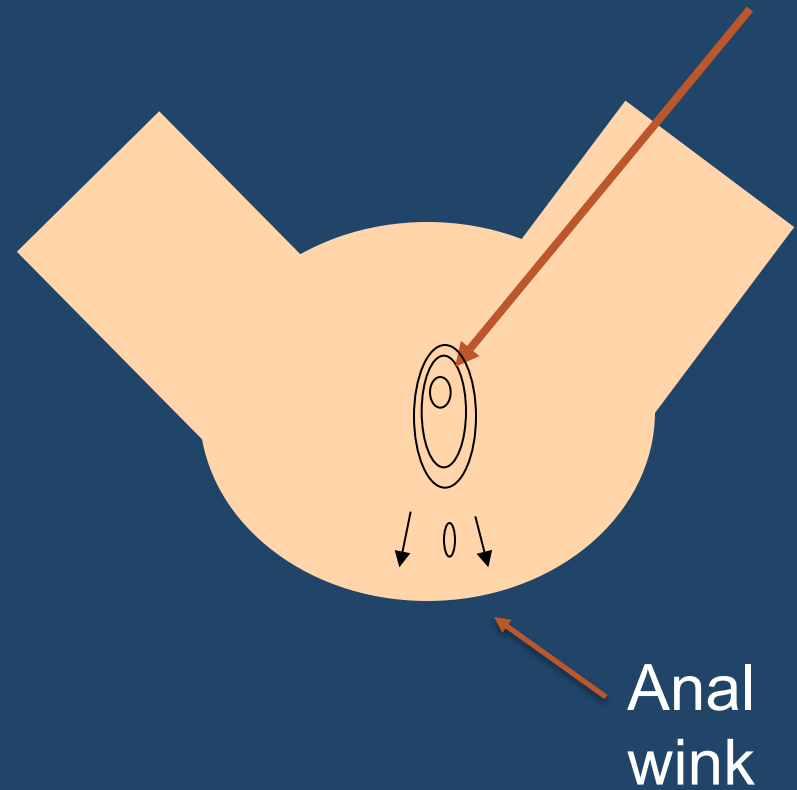
ASSESSMENT: PHYSICAL (2 of 4)

Testing Sacral Reflexes

Clitoris



Bulbocavernosus



- Genitourinary:
 - DRE to check for masses, fecal loading
 - **Men:** prostate nodules/firmness, masses (cannot accurately tell size by DRE); if uncircumcised, check for phimosis, paraphimosis, balanitis
 - **Women:** labial and vaginal lesions, marked pelvic organ prolapse

ASSESSMENT: PHYSICAL Clinical Stress Test (4 of 4)

- Best if bladder is full, patient relaxes perineum and buttocks, examiner positioned to observe or catch any leakage with single vigorous cough
- Highly sensitive (most helpful when negative) for stress incontinence, especially when patient stands
- Insensitive if patient cannot cooperate, is inhibited, or if bladder volume is low

ASSESSMENT: TESTING Laboratory Tests

Only recommended test for all patients: urinalysis, to check for hematuria and glycosuria in diabetics

- Diagnosis of UTI requires additional signs and symptoms
- Do not treat asymptomatic bacteriuria

ASSESSMENT: TESTING Bladder Diary

- Can help determine whether urine volume contributes to UI frequency and especially nocturia
- Can assist in evaluation of UI frequency, timing, and circumstances
- Entails recording the time and volume of all continent voids and UI episodes for 2–3 days, including day and evening

ASSESSMENT: TESTING Postvoid Residual (PVR)

- Not routinely necessary and definition of “increased” PVR not standardized
- Done by catheterization or ultrasound
- Consider PVR measurement in those with:
 - Prior urinary retention
 - Longstanding diabetes
 - Recurrent urinary tract infections
 - Severe constipation
 - Complex neurologic disease
 - Higher than routine risk for prostate enlargement (men)
 - Marked pelvic organ prolapse or prior UI surgery (women)

ASSESSMENT: TESTING

Urodynamic Testing

- Routine urodynamic testing is not necessary or desirable
- Consider only if:
 - The cause of UI is unclear and knowing it would change management
 - Empiric treatment has failed and the patient would consider invasive or surgical therapy

- Management should focus on relieving the aspect of UI that is most bothersome for the patient
- Stepped management strategy:



ADDRESSING COMORBID AND LIFESTYLE FACTORS

- Weight loss significantly reduces stress incontinence in obese, young-old women
- Lifestyle interventions that lack confirmatory evidence but may be helpful:
 - Avoiding extremes of fluid intake, caffeinated beverages, alcohol
 - Minimizing evening intake in those with nocturia
 - Quitting smoking (to decrease coughing in patients with stress UI)

- Bladder training and pelvic muscle exercise (PME): effective for urge, stress, and mixed UI
- Prompted voiding: cognitively-impaired patients with urge incontinence

BLADDER TRAINING FOR COGNITIVELY-INTACT PATIENTS

- Urgency suppression using CNS and pelvic mechanisms
 - Be still, don't run to the bathroom
 - Do several pelvic muscle contractions
 - When urgency decreases, then go to the bathroom
- Frequent voluntary voiding to keep bladder volume low
 - Initial toileting frequency: About 2 hr, or use the shortest interval between voids from bladder diary if possible
 - Increase time between scheduled voids by ~30–60 minutes until reach a comfortable level balancing voiding frequency and continence
- Success may take several weeks; reassure patient

BLADDER TRAINING FOR COGNITIVELY-IMPAIRED PATIENTS

- Only prompted voiding is proven effective
- Caregiver:
 - Monitors the patient and encourages him or her to report any need to void
 - Prompts the patient to toilet on a regular schedule during the day (usually every 2–3 hours)
 - Leads the patient to the bathroom
 - Gives the patient positive feedback when he or she toilets
- Habit training and scheduled voiding are not effective

PELVIC MUSCLE EXERCISES

- Effective for urge, mixed, and stress UI
- Requires motivated patient & careful instruction, though simple instruction booklets alone have moderate benefit
- To do PME:
 - **Perform an isolated pelvic muscle contraction;** avoid buttock, abdomen, thigh muscle contraction. Hold 6–8 seconds
 - **Repeat the contraction 8–12 times (one set);** relax the pelvis between each contraction
 - **Complete 3 sets daily at least 3–4 times a week;** continue at least 15–20 weeks

- Moderately effective for urge UI, overactive bladder, and mixed UI
- **Contraindicated in patients with narrow-angle glaucoma, impaired gastric emptying, or urinary retention**
- Work by increasing bladder capacity; they do not ablate uninhibited contractions
- Routine PVR monitoring is unnecessary
 - Check PVR for patients complaining of worsening UI while on antimuscarinic, because increased PVR decreases functional bladder capacity

ANTIMUSCARINIC AGENTS (2 of 2)

Agent	Dosing	Considerations
Oxybutynin IR	2.5–5 mg q6–12h	P450 interactions
Oxybutynin ER	5–20 mg/day	
Oxybutynin patch	3.9 mg/24 h, 2x/week	
Oxybutynin gel	3% gel or 10% sachet daily	
Tolterodine IR	1–2 mg q12h	P450 interactions; consider dose adjustment in renal impairment
Tolterodine ER	2–4 mg/day	
Trospium IR	20 mg q12h or q24h	Renal clearance; give once daily in pts with renal impairment; should be taken on empty stomach
Trospium ER	60 mg daily in AM	
Darifenacin	7.5–15 mg/day	P450 interactions
Solifenacin	5–10 mg/day	P450 interactions; consider dose adjustment in renal impairment
Fesoterodine	4–8 mg/day	P450 interactions; prodrug that is metabolized to tolterodine; consider dose adjustment in renal impairment

KEY ADVERSE EVENTS OF ANTIMUSCARINICS

- Chronic use causes dry mouth with increased risk of **caries and constipation**
- Class effect: **cognitive impairment**
 - Evidence is insufficient that any agent is “safer” than another for all patients or those with dementia
- **Do not combine with cholinesterase inhibitors** because of lack of efficacy, risk of increased functional and possibly cognitive impairment

- β_3 -adrenergic agonist that stimulates detrusor relaxation and increases bladder capacity
- Dosing: 25–50mg/d
- Similar moderate efficacy as antimuscarinics
- Has not been shown to have cognitive adverse effects to date
- May raise blood pressure
- Drug-drug interactions: digoxin, metoprolol, venlafaxine, desipramine, dextromethorphan

- **Duloxetine** (off-label) decreases stress UI
- **Vaginal estrogen** — helpful for uncomfortable vaginal atrophy, may decrease recurrent UTIs, insufficient evidence for improvement of UI
- **Do not use vasopressin for nocturia** (risk of hyponatremia in older adults)
- **Insufficient evidence** for propantheline, dicyclomine, imipramine, hyoscyamine, calcium channel blockers, NSAIDs, flavoxate

- **Sacral nerve neuromodulation** has some effect for urge UI refractory to drug treatment and urinary retention (idiopathic and neurogenic)
- **Posterior tibial nerve stimulation** — less invasive form of neuromodulation with a variably defined response rate of 60–81% in small short-term trials
- **Intravesical injection of botulinum toxin** is effective for refractory urge UI
- **Pessaries** for women with stress or urge UI exacerbated by bladder or uterine prolapse

- Highest cure rates for stress UI in women
- Most common:
 - Colposuspension (Burch operation)
 - Slings (midurethral and bladder neck)
- **Periurethral injection** of a bulking agent for short term (≤ 1 year)
- **Artificial sphincters** for refractory stress incontinence from sphincter damage (eg, after radical prostatectomy)

- F-tag 315 is the nursing home compliance standard for evaluation and management of UI and urinary catheters
- Interventions that combine prompted voiding with bedside exercise improve both incontinence and physical function
 - Prompted voiding should be tried in all eligible patients
 - Continue in those who are able to accept and follow the prompt to toilet at least 75% of the time in first 3 days; “check and change” for those who do not respond
- Up to 1/3 of nursing home residents with UI have underlying bladder outlet problem and may be candidates for medical or surgical treatment

USE CATHETERIZATION WITH CAUTION

- Significant morbidity: polymicrobial bacteriuria, febrile episodes, nephrolithiasis, bladder stones, epididymitis, chronic renal inflammation, pyelonephritis, meatal damage
- Inappropriate and/or poorly documented indications for catheter use are major focus in F-tag 315
- **Reserve indwelling catheters for:**
 - Short-term decompression of acute urinary retention
 - Chronic retention not surgically/medically remediable
 - Patients with wounds that must be kept clean of urine
 - Very ill patients who cannot tolerate garment changes

- Keep long-term-care residents with catheters in separate rooms from each other to decrease cross-infection
- Bacteriuria is universal in catheterized patients
 - Do not treat in absence of clear symptoms of infection
 - Do not routinely culture or re-culture after UTI Rx
- Culture symptomatic patients after old catheter is removed and new catheter is placed

- Catheters do not need to be changed routinely as long as monitoring is adequate and catheter blockage does not develop
 - Changing every 30 days is reasonable in patients who cannot be monitored
- Risk factors for catheter blockage: alkaline urine, female gender, poor mobility, calciuria, proteinuria, copious mucin, *Proteus* colonization, bladder stones
- Causes of persistent leakage around the catheter: large Foley balloon, detrusor overactivity, bacteriuria, constipation or impaction, improper catheter positioning

- Urinary incontinence is common in older adults and results in impaired quality of life, morbidity, and increased costs
- Age-related changes and common disorders and impairments increase an older person's risk of incontinence
- Evaluation is based on history, physical, and focused laboratory testing

- Treatment is stepwise, starting with remediation of comorbid and lifestyle factors, progressing to behavioral therapy, medications, and, if necessary, surgery
- Indwelling catheters should be used with caution and only when absolutely necessary

- A 72-year-old woman has difficulty holding urine when she has the urge to void.
 - The difficulty has increased over the past 2 years.
 - For 5 years, she has leaked urine when she coughs or sneezes.
 - The bladder problems interfere with her part-time job.
 - She has no hematuria or dysuria.
- History: hypertension, hypothyroidism, osteoporosis, hypercholesterolemia
 - 3 pregnancies, each normal vaginal delivery
 - Total vaginal hysterectomy 10 years ago for fibroids
- Medications: lisinopril, amlodipine, levothyroxine, pravastatin, alendronate (weekly), vitamin D
 - She adheres to the drug regimen, but finds the quantity of pills burdensome.

- Physical examination
 - Grade 1 pelvic organ prolapse
 - No evidence of atrophic vaginitis
 - She can perform isolated contraction of pelvic floor muscles.
 - Cough provocation confirms stress incontinence.
- Ultrasonography of bladder: 40 mL post-void residual urine
- Urinalysis
 - No leukocyte esterase, nitrates, or hemoglobin
 - 5–10 WBC/hpf
 - No RBCs
 - Urine culture: *E. coli* <10,000 colony-forming units

Which one of the following would be the most appropriate initial treatment?

- A. Fesoterodine 4 mg/d
- B. Three-day course of ciprofloxacin
- C. Exercise-based behavioral therapy of pelvic floor muscle
- D. Cystoscopic intradetrusor injection of onabotulinum toxin
- E. Stimulation of the posterior tibial nerve

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