

# Chapter 30: Urinary Incontinence in the Elderly

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## EPIDEMIOLOGY

The prevalence of urinary incontinence (UI) increases with age. Moderate to severe UI affects 7% of women 20 to 39 yr of age, 17% 40 to 59 yr of age, 23% 60 to 79 yr of age, and 32%  $\geq$ 80 yr of age.<sup>1</sup> The prevalence in men is approximately one third that of women, until it equalizes in the ninth decade. Nursing home residents have especially high rates of UI, ranging from 60 to 78% in women and 45 to 72% in men. The primary impact of UI is on quality of life, including self-concept, self-esteem, and the burden of coping. Economic costs of UI continue to rise, adding an estimated \$6 billion annually to the cost of caring for older Americans.<sup>2</sup>

## ETIOLOGY

Whereas UI in younger and middle-aged persons is nearly entirely caused by alteration in the lower urinary tract (LUT) and its innervation, in older persons, UI represents a geriatric syndrome with broadly based, patient level risk factors that include age-related changes in physiology, comorbidity, medications, and especially functional impairments.<sup>3,4</sup> Moreover, in older persons, UI can cause significant morbidity (such as falls and fractures) and functional impairment. Additionally, many older and especially frailer persons require caregivers, and UI can lead to caregiver stress and institutionalization of the frail elder. Risk factors for UI in older persons include impaired mobility, falls, medications, depression, transient ischemic attacks and stroke, dementia, congestive heart failure, fecal incontinence and constipation, and obesity.<sup>4</sup>

## TYPES OF INCONTINENCE

Urge UI is the symptom of leakage associated with a compelling, often sudden, urgency to void. Urge UI

is usually associated with uninhibited bladder contractions, called detrusor overactivity (DO). However, up to 40% of continent healthy older adults have DO on urodynamic testing,<sup>5</sup> suggesting that urge UI requires not just DO but impaired central nervous system and other compensatory mechanisms as well. DO may be idiopathic, age-related, secondary to lesions in cerebral and spinal inhibitory pathways, caused by bladder outlet obstruction, or (less commonly) result from local bladder irritation (*e.g.*, infection, stones, tumor). Recent evidence suggests that increased afferent signaling from the detrusor may also contribute to urgency, DO, and urge UI. Frail older persons may have DO but without sufficient detrusor contractility to fully empty the bladder, leading to an elevated postvoiding residual volume (PVR). This condition is called detrusor hyperactivity with impaired contractility (DHIC).<sup>5</sup>

Stress UI is the symptom of leakage associated with increased intra-abdominal pressure. It occurs with impaired urethral sphincter support or damage impairing urethral closure, as may occur from surgical scarring, radical prostatectomy, and some spinal cord injuries. Although parity is an important risk factor for stress UI in younger and middle-aged women, its contribution to stress UI in older women is minimal to none.

Mixed UI is the symptom of leakage with features of both urge and stress UI and is most common in younger-old women. Either urge or stress UI symptoms may predominate.

UI with impaired bladder emptying is leakage associated with an elevated PVR, which can be caused by bladder outlet obstruction, poor bladder

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contractility (detrusor underactivity), or both.<sup>6</sup> The most common cause of obstruction in men is prostate disease, and in women, it is either a large cystocele that kinks the urethra or urethral scarring. Detrusor underactivity may be age related, caused by detrusor smooth muscle damage, peripheral neuropathy (diabetes mellitus, vitamin B<sub>12</sub> deficiency, alcoholism), or damage to the sacral cord and spinal bladder efferents by disc herniation, spinal stenosis, tumor, or degenerative neurologic disease. Neurologic diseases affecting the sacral spinal cord can cause detrusor underactivity and/or neurally mediated obstruction, depending on the exact level and extent of damage.

In general, over the age of 65, urge UI increases, stress UI decreases, the prevalence of mixed UI remains stable, and overflow is rare. Urge UI is the most common form in older men, whereas stress UI is important after prostatectomy, especially radical surgery.

Regardless of the type of UI symptom, leakage in older persons may be caused or worsened by comorbid conditions, medications, and functional impairment (Table). In the past, UI related to such factors has often been referred to as “transient” or “functional” UI. However, for many older persons, UI is a chronic and often progressive condition, and both “transient” and “functional” contributing factors frequently co-exist with other comorbidity and lower urinary tract (LUT) abnormalities. Persons with UI usually have several other LUT symptoms (LUTS), including frequency (patient complaint of too frequent voiding); nocturia (need to wake twice or more times at night to void); slow stream (perception of reduced urine flow); intermittent stream (urine flow which stops and starts during voiding); hesitancy (difficulty in initiating urine flow); straining (to either initiate, maintain or improve urine flow); and sense of incomplete bladder emptying. These LUTS lack specificity, especially frequency (which can reflect increased fluid intake and/or increased diuresis from many

causes) and nocturia (which can be caused by a disproportionate nocturnal polyuria or a primary sleep disorder).

## EVALUATION

Evaluation of UI in older persons should be multifactorial, addressing comorbidity, function, and medications as potential etiologic or contributing factors. The important first step is active screening for UI, because 50% of affected persons do not volunteer their symptoms to their providers. History should include UI onset, frequency, volume, timing, and associated factors or events. Patients and/or caregivers should be asked about UI-associated bother and quality-of-life impact. Simple questions can help determine the type of UI symptoms: *e.g.*, “Do you lose urine during coughing, sneezing, or lifting?” (for stress UI) and “Do you experience a such strong and sudden urge to urinate that you leak before reaching the toilet?” (for urge UI). In women, these questions are most helpful to diagnose urge UI and slightly less so stress UI; if a woman denies stress leakage, it is highly unlikely that she has physiologic stress UI.<sup>7</sup>

Physical examination should include cognitive and functional assessments and focus on potential comorbid conditions associated with UI. Rectal exam is used to assess for masses, tone, and prostate nodules or firmness in men (not size). The neurologic evaluation should include evaluation of sacral cord integrity with perineal sensation, anal “wink” (anal sphincter contraction when the perirectal skin is lightly scratched), and bulbocavernosus reflex (anal sphincter contraction when either the clitoris or glans is lightly touched). Vaginal mucosa should be evaluated for severe atrophy, and the pelvic exam should include evaluation for pelvic organ prolapse (cystocele, rectocele, uterine prolapse) with straining.<sup>4</sup>

Urinalysis is recommended for all patients, primarily to

**Table 1.** Examples of comorbidity causing or worsening UI in older persons

Aspect of Continence Affected	Comorbidity
Ability to get to toilet	Functional impairment, <i>e.g.</i> , from arthritis, Parkinson’s, poor vision Extrapyramidal effects of antipsychotic medications Medications causing sedation or confusion, <i>e.g.</i> , benzodiazepines Poor access to toilets
Fluid balance	Severe cognitive impairment: advanced dementia, severe depression Excessive intake of caffeinated beverages, alcohol Increased nocturnal diuresis from congestive failure, sleep apnea, venous stasis, or drugs causing peripheral edema ( <i>e.g.</i> , amlodipine, thiazolinediones, gabapentin) Diuretic medications
Urethral closure	Marked obesity Cough because of pulmonary disease, ACE inhibitors Increased urethral tone from alpha adrenergic agonists, decreased tone from alpha blockers
Bladder contractile strength	Medications impairing bladder contractility: calcium channel blockers, anticholinergics, opiates Diabetes (advanced), vitamin B <sub>12</sub> deficiency, lower spinal cord injury
Uninhibited bladder contractions	CNS diseases, stroke, suprasacral spinal cord diseases Diabetes Local bladder irritation: stones, carcinoma

look for hematuria (and glycosuria in diabetics). Pyuria and/or bacteriuria likely represents asymptomatic bacteriuria—not cystitis—in women without dysuria, fever, or other signs of urinary tract infection, especially if UI is not acute.

Although frail elderly may have a higher prevalence of elevated PVR, especially in association with DHIC, it is not clear that evaluation of the PVR always would alter management. Therefore, a prudent approach would be to limit PVR testing to patients with either diabetes, previous urinary retention or elevated PVR, recurrent urinary tract infections (UTIs), severe constipation, complex neurologic disease (e.g., Parkinson's), marked pelvic organ prolapse or prior anti-incontinence surgery (women), medications known to decrease detrusor contractility (e.g., anticholinergics), persistent or worsening urge UI despite antimuscarinic treatment, or prior urodynamic evaluation showing with poor contractility or outlet obstruction. Ultrasound or catheterization must be used because abdominal palpation is neither sensitive nor specific.

A clinical stress test may be helpful in patients with stress UI symptoms. The patient should have a full bladder and a relaxed perineum and buttocks, and the examiner should be positioned to observe or catch any leakage when the patient gives a single vigorous cough.<sup>7</sup> The test is most sensitive when the patient is upright and insensitive if the patient cannot cooperate, is inhibited, or the bladder volume is low. Bladder diaries can be helpful to determine whether urine volume and timing contribute to frequency and nocturia symptoms and can assist evaluation of UI frequency, timing, and circumstances. The diary entails recording the time and volume of all continent voids and UI episodes, typically over 3 d. Routine urodynamic testing is not necessary and may be misleading because of the high prevalence of DO in healthy, continent older persons. Such testing should be reserved for patients considering invasive treatment; when either the etiology of UI is unclear and a precise diagnosis would change management; or when empiric treatment has failed. Cystoscopy is necessary only for hematuria or otherwise unexplained pelvic pain.

## TREATMENT

Correction of reversible precipitants and contributing factors is critical. Specific treatment should be targeted to the patient's most bothersome symptom(s). Treatment should be stepped, starting with noninvasive behavioral methods and then adding medications (if urge UI still is problematic), and finally consideration of minimally invasive or more extensive surgery, if appropriate and acceptable. Specialist referral is recommended for patients with hematuria, pelvic pain, complicated neurologic disease (e.g., spinal cord injury), and previous pelvic surgery.

Lifestyle modifications that may be helpful include avoiding extremes of fluid intake, caffeinated beverages, and alcohol; minimizing evening intake for nocturia; and smoking cessation for patients with stress UI. Weight loss has been shown to decrease UI in morbidly obese women.

The two main behavioral therapies are bladder training and pelvic muscle exercises, both of which are effective for urge, mixed, and stress UI and are often used in combination. Bladder training uses two principles: frequent voluntary voiding to keep bladder volume low and urgency suppression using central nervous system and pelvic mechanisms. Prompted voiding can be used instead of bladder training for persons with cognitive impairment and urge UI. Pelvic muscle exercises (PMEs) strengthen the muscular components of urethral support and are effective for urge, mixed, and stress UI.

Pharmacologic treatment is largely limited to antimuscarinic agents for urge UI, overactive bladder, and mixed UI. Oral estrogen, alone or in combination with progestins, increases stress and urge UI and should not be used. There is no consensus whether topical estrogen applied in the vagina improves UI, but it is helpful for uncomfortable vaginal atrophy and can decrease recurrent UTIs. There are currently five antimuscarinic agents for treatment of urge UI and overactive bladder: oxybutynin (immediate and extended release, and topical patch), tolterodine (immediate and extended release), solifenacin, darifenacin, and trospium. These five antimuscarinics have similar efficacy, resulting in continence rates of approximately 30% and reduce UI by an average of half an episode or more per day over placebo.<sup>8</sup> Two additional agents are expected to become available in 2009: an extended release version of trospium, and fesoterodine, which is a prodrug that is metabolized to tolterodine.

The most common adverse drug effect (ADE) from antimuscarinics is dry mouth, which is not only bothersome but can cause dental caries, problems chewing, poorly fitting dentures, dysphagia, and sleeping difficulty. The highest rates of dry mouth occur with oxybutynin. Other ADEs include decreased visual accommodation (causing blurred vision and possibly increased falls) and constipation (more likely with oxybutynin, solifenacin, and darifenacin than tolterodine). The major antimuscarinic ADE of concern in older and especially frail adults is cognitive impairment, yet the incidence, prevalence, domains of impairment, magnitude, and impact of this ADE from specific antimuscarinic UI drugs is largely unknown. There is insufficient evidence at this time that one agent is "safer" for all older patients or specifically those with dementia or central nervous system diseases, despite theoretical arguments about the ability of specific agents to cross the blood-brain barrier. Most importantly, it is unclear that cognitive risks outweigh potential treatment benefits. Other agents used for UI (e.g., flavoxate, propantheline, dicyclomine, imipramine, hyoscyamine) have scant or poor efficacy data. Vasopressin (DDAVP) should not be used to treat nocturia in older persons because of the high risk of hyponatremia.

Pessaries may benefit women whose stress or urge UI is exacerbated by bladder or uterine prolapse. There are now several minimally invasive therapies available for those with urge UI refractory to antimuscarinics, including botulinum toxin injection into the bladder wall and sacral neuromodulation. Surgery provides the highest cure rates for women with stress

UI. Many patients will require or choose to continue to use pads and protective garments. Catheters should be reserved for short-term decompression of acute retention, management of outlet obstruction when medical or surgical treatment is not possible, protection of wounds that need to be kept clean of urine, and for terminally ill or severely impaired persons for whom frequent clothing or garment changes would be very uncomfortable.

## TAKE HOME POINTS

- UI is highly prevalent in older persons and results in significantly decreased quality of life, morbidity, and high costs
- In older persons, UI is not simply a LUT disorder but represents a geriatric syndrome with broadly based, patient level risk factors that include age-related changes in physiology, comorbidity, medications, and functional impairments
- Older persons should be actively screened for UI, and an initial office-based evaluation based on history, exam, and urinalysis is sufficient to initiate treatment
- UI treatment should be stepwise, progressing from behavioral and medication therapy to more invasive approaches, as needed and appropriate
- Behavioral therapy (bladder training and pelvic muscle exercises) is effective in reducing urge and stress UI
- Antimuscarinic medications for urge UI have similar efficacy, and drug choice should be guided by anticipated adverse effects and other factors (e.g., cost)

## DISCLOSURES

None.

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## REVIEW QUESTIONS: URINARY INCONTINENCE IN THE ELDERLY

1. In older patients, uninhibited bladder contractions:
  - a. Although present may not be the cause of incontinence
  - b. Are rarely seen in asymptomatic patients
  - c. Are primarily caused by CNS pathology
  - d. Are inevitable with dementia
2. A 74-yr-old woman complains of leakage associated with an abrupt urge to void that occurs at least twice daily but not at night. She also notes leakage with coughing. She in general good health, has hypertension treated with a thiazide diuretic, and uses topical estrogen for vaginal dryness. The next step in management should be:
  - a. Initiate a course of pelvic muscle exercises
  - b. Stop the diuretic
  - c. Start a bladder relaxant
  - d. Refer to surgery if she is intent on cure
3. An 85-yr-old woman complains of urge incontinence episodes twice a day and nocturia three times at night. Her bladder diary reveals a daytime urine volume of 800 ml and a nocturnal output of 700 ml. This patient's nocturia:
  - a. Is caused by DHIC (detrusor hyperactivity with impaired contractility)
  - b. Should be treated with tolterodine at bedtime
  - c. May be related to pedal edema
  - d. Should be addressed with a bedside commode