

Urinary Incontinence in an Elderly Woman

Case Study and Commentary:

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Urinary incontinence (UI) is defined as an involuntary loss of urine that is objectively shown through physiologic testing.¹ UI is quite prevalent in western countries; approximately 13 million Americans² and 3 million citizens of the United Kingdom³ are reported to have the condition. The economic costs associated with UI are high: in the United States, the condition is estimated to consume \$15 billion of health care resources annually² and in the United Kingdom, approximately £424 million annually.⁴

Overall in the United States, approximately half of homebound and institutionalized elderly persons and 25% to 30% of older patients who have recently been discharged from hospitals are incontinent, with approximately 5% of community-dwelling older persons having continuous or daily incontinence.⁵⁻⁷ Women are disproportionately affected by the disorder; approximately 10% to 15% of community-dwelling, ambulatory, non-homebound older (ie, age > 60 years) men are incontinent, compared with 40% of community-dwelling, ambulatory, nonhomebound older women⁸ (and 20.2% percent of all adult women age > 40 years).⁹ At least 1 in 10 women will experience UI at some time in their lives.¹⁰ Although the condition is common, fewer than 50% of affected patients report incontinence to their physicians because of various social concerns,¹¹ as noted in this case study.

In addition to pelvic muscle exercises, bladder training, behavioral treatments, and pharmacologic approaches, other conservative, nonsurgical treatments for UI have been developed recently. For example, electronic devices that stimulate the pudendal nerve with electrodes via the anus or vagina have been shown to reduce urinary leakage in a double blind, placebo-controlled study.¹² In addition, occlusive devices have

been reported to successfully reduce UI. These devices occlude the urethra through use of urethral plugs and expandable urethral devices. Intraurethral devices appear to be highly successful¹³; there is more limited success with external devices, because of limited patient compliance and the need for manual dexterity to use the device appropriately.¹⁴

In addition, neuromodulation has been used to treat UI. The precise mechanisms by which this procedure works are unknown. However, it is postulated that electrical stimulation of the area activates spinal interneurons or β -adrenergic neurons, which then inhibit bladder activity. Patients are tested by stimulation of the S3 sacral nerve to determine if they respond; responders then can be offered chronic stimulation with an implanted system. Roughly half of treated patients respond to the test, and success rates as high as 60% have been reported at the 5-year point for those with implanted systems.¹⁵

Biofeedback also has been used in treating UI. Using visual, auditory, and/or tactile signals to consciously inhibit bladder contractions has led to subjective and objective (ie, on polygraphic tracings) improvements in controlling incontinence.^{16,17}

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Minor surgical treatment (short of open procedures) also has been used to successfully manage UI. For example, colposuspension is a minor surgical process entailing placing 2 to 3 sutures between the paravaginal fascia (on either side of the bladder neck) and the base of the bladder and then attaching them to the ipsilateral iliopectineal ligament. This technique was described as early as 1961 as a treatment for UI.¹⁸ Although an effective method of treating UI, colposuspension is an invasive procedure. More recently, laparoscopic colposuspension—which is clearly less invasive and has minimal effect on the patient's lifestyle—has been performed; however, the laparoscopic technique is not as effective as the open procedure, and limited follow-up data have been reported.¹⁹

Another less invasive method of treating UI involves using tension-free vaginal tape. The tape, developed in Sweden, is inserted under local, regional, or even full anesthesia. A vaginal and 2 small suprapubic incisions are made. After minimal paraurethral dissection of the vaginal wall, a special polypropylene tape covered with a plastic sheath is placed on a 5-mL needle attached to an introducer; the needle is inserted into the retropubic area, where it perforates the urogenital diaphragm and then is passed laterally to the midurethra and behind the pubic bone to perforate the rectus sheath and abdominal wall. The procedure is then repeated for the other side, thus placing the tape in a "U" shape surrounding the urethra. After cystoscopy is performed to exclude potential bladder damage, the tape is adjusted under the urethra to control incontinence. This method has had tremendous cure rates in preliminary studies.^{20,21}

UI in women is a highly common disorder that is eminently treatable. However, social concerns, embarrassment, and other patient preoccupations often prevent discussion, and thus treatment, of the disorder. Physicians must be vigilant and introduce the subject with patients who may be affected. By doing so, they may be able to ameliorate patient concerns and suggest a variety of noninvasive treatments that will improve the quality of life for these patients.

DR. SCHNEIDER ET AL:

UI, the involuntary loss of urine significant enough in amount or frequency to be a health or social problem, affects at least 10 million adults in the United States.²² The prevalence of UI among community-dwelling older adults has been estimated at 38% for women and 19% for men.²³ Among institutionalized elderly persons, the prevalence is approximately 50%.³ Although common,

UI frequently is not identified; fewer than 50% of affected persons seek medical attention.¹¹

UI has important medical, psychosocial, and economic implications. UI can lead to cystitis, urosepsis, perineal rashes, pressure sores, and falls.²⁵ Psychosocial complications of the disorder include diminished self-esteem and quality of life, isolation, and depression. The direct annual health care costs of managing UI in the United States have been estimated to be \$11.2 billion for patients in the community and \$5.2 billion for patients in nursing homes.²⁶

As a person ages, bladder capacity and contractility decrease and involuntary detrusor contractions increase. These changes may predispose a person to UI, but UI is not a normal part of aging. It is important to dispel this myth and encourage patients to seek evaluation and treatment as UI is one of the most frequently cited reasons for admitting an elderly patient to a nursing home.²⁷

CASE STUDY

Initial Presentation

A 71-year-old woman presents without complaints to her daughter's primary care physician for the first time. She recently moved to the area to be close to her daughter after her husband died.

History

Past medical history is significant only for depression, which was diagnosed 3 years ago and for which the patient attended a primary care depression clinic. The patient has been taking hydrochlorothiazide for peripheral edema for the past several months. She takes no other medications. Review of systems is positive for bladder problems, which the patient describes as "occasional urine leakage."

The patient is a retired music teacher who lives in a downtown neighborhood. She has 3 other adult children who live in other states. She enjoys going to the theater and to concerts but has not done this lately. She has never smoked and drinks alcohol a few times per week, but never more than 1 drink per occasion. She drinks 2 cups of coffee in the morning and several glasses of iced tea each day.

Physical Examination

Physical examination reveals a healthy-appearing, well-groomed woman. Height is 5'4", weight is 160 lb, blood pressure is 110/70 mm Hg, and pulse is 72 bpm. Pelvic examination reveals mild atrophic vaginitis. Rectal examination shows normal sphincter tone and no masses. Neurologic examination is nonfocal, and score on the Mini-Mental State Examination is 30/30.

Table 1. Transient Causes of Urinary Incontinence (DIAPPERS)

Delirium/confusion
Infection, urinary (symptomatic)
Atrophic vaginitis or urethritis
Pharmaceutical agents
Psychologic factors
Excess urine output
Restricted mobility
Stool impaction

Adapted with permission from Resnick NM. An 89-year-old woman with urinary incontinence. *JAMA* 1996;276:1832–40.

QUESTION

- **What additional historical and physical examination data should be obtained in this patient?**

Evaluation of UI Symptoms

This patient responded positively to questioning about bladder problems during review of symptoms. Patients with UI symptoms should undergo a basic evaluation that includes a focused medical history and a detailed exploration of UI symptoms.

Patients are often reluctant to discuss incontinence because of the stigma associated with the disorder and the common misconception that incontinence is an inevitable part of aging. Although UI is an embarrassing subject for many patients to discuss, patients have often analyzed their symptoms carefully and tried many self-help strategies. All elderly patients should be questioned directly about urine loss, even if they do not initially volunteer incontinence as a complaint. Questions to use include “Are you having any problems with your bladder?” and “Do you ever lose urine when you don’t want to?” Geriatric screening instruments may also help identify patients with this syndrome.²⁸

The first goal of the basic evaluation is to detect reversible conditions that cause or contribute to UI. Such transient causes of incontinence can be remembered by the mnemonic “DIAPPERS” (Table 1). These causes are usually easy to diagnose, and treatment for the precipitant may be sufficient to restore continence. Table 2 shows the reversible causes of UI and their management.

History. The medical history should seek to identify reversible and nonreversible conditions that may be contributing to the UI. The history should include a complete review of medications: many prescription and nonprescription drugs affect the bladder and urethra

and may cause or worsen UI (Table 2). If a drug is suspected as the cause of UI, the drug should be discontinued or another medication with a different side effect profile should be substituted if possible. Other possible contributory factors or causes may be uncovered during the history such as the presence of metabolic conditions (diabetes), conditions that restrict mobility (eg, arthritis, pain), or a urinary tract infection (UTI).

A UI history can help determine the direction of subsequent assessment and treatment. A UI history should include the duration and characteristics of symptoms. Frequency, timing, and precipitants of involuntary urination should be assessed. Physicians should specifically ask about dysuria, straining to empty the bladder, dribbling, and nocturia, as well as measures or treatments that the patient has already tried and the effectiveness of these measures. The patient should also be asked about fluid intake patterns.

Physical examination. The goal of the physical examination is to identify causes that precipitate UI and to establish urinary pathophysiology. A complete physical examination should be performed, focusing on coexistent medical issues such as heart failure, orthostatic blood pressure, and musculoskeletal problems. A rectal examination is mandatory, and the physician should look for skin irritation, fecal impaction, sphincter tone, and masses. A pelvic examination may reveal vaginitis, vaginal atrophy, masses, pelvic floor laxity, and normal vaginal contractions. A brief neurologic examination also should be performed, including assessment of mental status.

Postvoid residual volume. The basic evaluation of UI should include measurement of postvoid residual urine volume. The patient should be asked to void and the bladder should be palpated; the presence of a palpable bladder after voiding indicates inadequate emptying. A more accurate assessment of incomplete bladder emptying can be performed using portable ultrasonography or postvoid catheterization. A postvoid residual volume of greater than 50 mL or more than 20% of the amount voided is abnormal and may indicate overflow incontinence. In elderly patients, postvoid residual urine volume normally increases, but probably to no more than 50 mL.²⁹

Additional assessments. A voiding diary can be helpful. The patient is asked to complete a diary that charts all voids and incontinent episodes during a 3- to 5-day period. This may help to determine if polyuria is present, determine if voids cluster around certain events, and may be an intervention to help in bladder training. Urinary symptoms (eg, urgency, nocturia) are common among all elderly patients, even patients who

Table 2. Reversible Conditions That Cause or Contribute to Urinary Incontinence

Condition	Management
Conditions affecting the lower urinary tract	
Urinary tract infection	Antimicrobial therapy
Atrophic vaginitis/urethritis	Estrogen
Stool impaction	Disimpaction; appropriate use of stool softeners, bulk-forming agents, and laxatives if necessary; implement high fiber intake, adequate mobility and fluid intake
Drug side effects	
Diuretics (polyuria, frequency, urgency)	For all, discontinue or change therapy, as clinically possible. Dosage reduction or modification may also help.
Caffeine (aggravation or precipitation of UI)	
Anticholinergic agents (urinary retention, overflow UI, impaction)	
Antidepressants (anticholinergic actions, sedation)	
Antipsychotics (anticholinergic actions, sedation, rigidity)	
Sedatives/hypnotics (sedation, delirium, immobility)	
Narcotic analgesics (urinary retention, fecal impaction, sedation)	
α -Adrenergic blockers (urethral relaxation)	
α -Adrenergic agonists (urinary retention; present in many non-prescription cold medicines)	
β -Adrenergic agonists (urinary retention)	
Calcium channel blockers (urinary retention)	
Alcohol (polyuria, frequency, urgency, sedation, delirium)	
Increased urine production	
Metabolic (hyperglycemia, hypercalcemia)	Better control of diabetes mellitus; therapy for hypercalcemia dependent on underlying cause
Excess fluid intake	Reduction in intake of diuretic fluids (eg, caffeinated beverages)
Volume overload	
Venous insufficiency with edema	Support stocking, leg elevation, sodium restriction, diuretic therapy
Congestive heart failure	Medical therapy
Impaired ability or willingness to reach a toilet	
Delirium	Diagnosis and treatment of underlying cause(s) of acute confusional state
Chronic illness, injury, or restraint	Regular toileting, use of toilet substitutes, environmental alterations
Psychological	Appropriate pharmacologic and/or nonpharmacologic treatment

Adapted from Fantl JA, Newman DK, Colling J, et al. Urinary incontinence in adults: acute and chronic management. Clinical Practice Guideline No. 2, 1996 Update. Rockville (MD): US Dept. of Health and Human Services, Agency for Health Care Policy and Research; 1992. AHCPR Pub. No. 96-0682.

are continent. Urgency is reported by up to 40% of healthy elderly patients, and most healthy elderly patients report nocturia at least once per night.³⁰ A void-

ing diary may help differentiate normal from abnormal urinary patterns.

If renal insufficiency is suspected or polyuria is

present, basic blood assessment may include measurement of electrolyte, glucose, urea, creatinine, and calcium levels. A urinalysis should be performed on all patients and culture obtained if indicated.

UI History and Results of Testing

The physician inquires about the patient's "occasional urine leakage." The patient states that her UI first occurred after the birth of her second child. She then noted only very occasional episodes of small amounts of urine leakage with a forceful cough or sneeze. Over the last several years, these episodes have occurred more frequently, and she has noted a worsening in UI with leakage associated with an intense urge to void and a new onset of nocturia. She relates that her incontinence is affecting her ability to make friends in her new neighborhood. She is reluctant to attend social functions because she is afraid of embarrassment from wetness and odor. Also, she is feeling increasingly tired, which she feels is due to her frequent trips to the bathroom at night. Results of a urinalysis and postvoid residual urine measurement are within normal limits.

Treatment of Transient Causes

The physician explains that several factors may be contributing to her UI. She suggests discontinuing the diuretic, which she feels is unnecessary for treatment of mild lower extremity edema. She also prescribes estrogen for treatment of the patient's atrophic vaginitis. The physician points out that her caffeinated beverage consumption may also be contributing to her symptoms and suggests that she reduce her intake by half.

At a follow-up visit 2 weeks later, the patient reports some improvement in nocturia but is still experiencing leakage associated with a sudden urge to void and with coughing or laughing.

QUESTION

- **What are the clinical subtypes of UI?**

UI in the elderly is commonly classified according to its clinical presentation. Other nosologies (eg, those used by specialists) classify subtypes according to pathophysiologic characteristics.

Urge Incontinence

Urge incontinence is the most common type of UI in patients older than 75 years.³¹ Urine loss is associated with a sudden strong urge to void, and involuntary urination occurs prior to the patient reaching the bathroom. Urge incontinence is usually caused by involuntary detrusor contractions. When abnormal detrusor

contractions occur in patients who are neurologically intact, this type of incontinence is termed detrusor instability or unstable bladder. This type of incontinence may also be associated with neurologic deficits (ie, secondary to cerebrovascular accident, Parkinson's disease, or dementia). When a causative neurologic lesion is established, urge incontinence is termed detrusor hyperreflexia. The clinician would need to rule out uncontrollable contractions secondary to inflammation or irritation of the bladder from infections, calculi, malignancy, and atrophic urethritis. These secondary etiologies are relatively infrequent, and instability is usually due to decreased bladder capacity related to aging.

Urge incontinence may also be the predominant symptom in frail elderly patients who have detrusor hyperactivity coupled with impaired bladder contractility (DHIC).³² Although patients with DHIC have hyperactive detrusor muscles, these patients are also unable to adequately empty their bladders and have elevated residual urine volumes after voiding. DHIC can be differentiated from simple detrusor hyperactivity only by assessment of postvoid residual urine and other urodynamic testing.²⁹

Stress Incontinence

Stress incontinence is a loss of urine that occurs with physical activities that raise intra-abdominal pressure (eg, sneezing, coughing, laughing). Stress incontinence usually is not associated with abnormal detrusor contractions or urinary retention but is caused by a weakening in the tissues surrounding the urethra and bladder neck, which are then displaced downward during stress maneuvers. Patients at risk for stress incontinence include those who have postmenopausal atrophy of the urogenital region, which leads to a loss of tone of pelvic musculature and thus a decrease in bladder outlet resistance. In women, estrogen loss leads to atrophy in the tissues that line and surround the urethra, bladder outlet, and vagina, which may cause weakening of the pelvic floor muscles and a decline in bladder outlet and urethral resistance. Changes secondary to prior radiation, surgery, or multiparity and the use of α -blocking medications also increase the risk of stress UI.³³ Physical examination may reveal vaginal atrophy, vaginitis, and pelvic floor laxity.

A less common cause of stress incontinence is intrinsic urethral sphincter deficiency, which usually occurs following radiation therapy, surgery, or trauma. Patients with intrinsic urethral sphincter deficiency often leak urine continuously. Stress incontinence also is occasionally caused by sacral cord defects.

A simple test for stress incontinence can be performed by asking the patient to cough while the bladder is full (either with urine or saline administered via a straight catheter) and observing for immediate urine leakage. If urine leakage occurs some seconds after coughing and has a moderate to large volume, then the patient's incontinence may be caused by detrusor instability rather than by stress incontinence. During the pelvic examination, if the clinician places her fingers lateral to the urethra and lifts up, urine leakage may stop if the patient has pure stress incontinence.

Many elderly people have mixed incontinence, in which urge and stress continence coexist.

Overflow Incontinence

Overflow incontinence (also known as bladder neck or urethral obstruction) is urine leakage associated with an enlarged distended bladder. The inability to empty the bladder completely may be caused by inadequate bladder contractility or outlet obstruction. Patients may present with a complaint of dribbling urine, urgency, or symptoms of stress incontinence. Decreased contractility may occur secondary to taking medications that inhibit bladder contraction (eg, anticholinergic agents). Stool impaction may also lead to overflow incontinence. A rectal examination for both stool impaction and sphincter tone (an assessment of perineal innervation) is a necessary part of the basic evaluation. A neurologic exam should focus on perineal as well as peripheral sensation. Outlet obstruction is rare in women except in those who have severe pelvic prolapse or following failed surgery to correct UI.

Functional Incontinence

Functional incontinence is a loss of urine that is unrelated to disorders of the urinary tract but is related to impairments of physical and/or cognitive functioning (eg, degenerative joint disease, dementia). Many frail elderly patients have components of both urge and functional incontinence.

QUESTION

- **What are common treatment options for UI?**

Treatment of underlying medical conditions and other transient causes of UI may yield significant benefits. Treatment of established UI is usually multifactorial and must address factors outside the urinary tract.³⁴ If symptoms persist following treatment of transient causes, the physician should prescribe appropriate treatment based on the type of UI diagnosed. In some cases, further evaluation may be helpful (**Table 3**). In

Table 3. Criteria for Further Evaluation of Urinary Incontinence

Uncertain diagnosis and inability to develop a reasonable treatment plan based on the basic diagnostic evaluation
Uncertainty in diagnosis when there is a lack of correlation between symptoms and clinical findings
Failure to respond to the patient's satisfaction to an adequate therapeutic trial, and the patient is interested in pursuing further therapy
Consideration of surgical intervention, particularly if previous surgery failed
Hematuria without infection
The presence of other comorbid conditions, such as:
Incontinence associated with recurrent symptomatic UTI
Persistent symptoms of difficult bladder emptying
History of previous anti-incontinence surgery or radical pelvic surgery
Symptomatic pelvic prolapse
Abnormal postvoid residual urine volume
Neurologic condition, such as multiple sclerosis and spinal cord lesions or injury

NOTE: Some patients who meet the criteria may not be appropriate for further evaluation and treatment if such evaluation and/or treatment is not desired by or feasible for the patient.

Adapted from Fantl JA, Newman DK, Colling J, et al. Urinary incontinence in adults: acute and chronic management. Clinical Practice Guideline No. 2, 1996 Update. Rockville (MD): US Dept. of Health and Human Services, Agency for Health Care Policy and Research; March 1992. AHCPR Pub. No. 96-0682.

general, behavior therapies are first-choice treatments. Treatment for incontinent elderly patients should be tailored to their functional and cognitive ability. Patient education about behavioral treatments is important to achieve a satisfactory response.

Pelvic Muscle Exercises

Pelvic muscle exercises (also termed Kegel exercises) improve urethral resistance by actively exercising the pubococcygeus muscle, which provides increased muscle support to the pelvic viscera and increased closing force on the urethra. Pelvic muscle exercises are indicated for women with stress UI and can reduce urgency and prevent urge UI.²

It is unclear what is the most efficient method of teaching pelvic muscle exercises. One method is to ask patients to try to stop their flow of urine midstream. A successful stop of the urine flow indicates that the patient has contracted the proper muscle. To perform

the exercise, the patient should hold the contraction for 10 seconds, followed by 10 seconds of relaxation. These contraction-release exercises should be performed 30 to 80 times per day. Benefits are usually seen in 6 weeks, but some symptom improvement can occur after 2 weeks. Pelvic muscle exercises may be augmented by the use of vaginal cones, which act as weight training for the pelvic muscles.

Some type of biofeedback device is often used to assist patients to gain function and pelvic muscle awareness. Biofeedback uses electronic or mechanical instruments to relay information to patients about their physiologic activity. The goal of this technique is to teach patients how to alter physiologic responses that control bladder function. Studies of biofeedback combined with behavioral treatment report a 54% to 87% improvement in UI across various patient groups using different biofeedback and behavioral procedures.² In a recent randomized placebo-controlled trial that compared the effectiveness of biofeedback-assisted behavioral therapy with that of oxybutynin for treatment of urge UI, episodes of UI decreased nearly 81% on average with behavioral treatment, significantly more than with drug treatment or placebo.¹⁷

Bladder Training

Bladder training, also termed bladder retraining, requires the patient to consciously delay voiding and to void according to a timetable rather than according to the urinary urge. Initially, the intervals between voiding times are short (2 to 3 hours) but are increased incrementally as continence is achieved. Bladder training is strongly recommended for management of urge and mixed UI and is recommended for management of stress UI.² A randomized controlled trial of older women with UI reported that 12% of the women who underwent bladder training regained continence and 75% achieved at least a 50% reduction in the number of incontinent episodes.³⁴

Timed Voiding

Timed voiding, also termed habit training, is toileting scheduled to match the patient's voiding habits. Unlike bladder training, no systematic effort is made by the patient to delay voiding. In one controlled study of nursing home residents, 86% of patients had a significant reduction in UI and a decrease in the volume of urine loss during the 3-month intervention.³⁵

Prompted Voiding

Prompted voiding is used as a supplement to timed voiding for dependent or cognitively impaired pa-

tients. Patients are checked by a caregiver on a regular basis and asked to report verbally if wet or dry. Patients are then prompted to try to void and praised for maintaining continence and for trying to void. Clinical trials have shown some success with this technique in 30% to 70% of patients.³⁶

Trial of Behavioral Therapy and Follow-up

Because treatment of transient causes did not result in adequate symptom improvement, the physician makes a presumptive diagnosis of mixed urge and stress incontinence and prescribes a trial of Kegel exercises. The nurse spends some time with the patient teaching her the exercise.

The patient returns in 1 month with much improvement in her symptoms but still has involuntary loss of urine 1 to 2 times daily. The physician tells her that several medications have proven to be beneficial for treating UI, and she would like to prescribe an agent that will help stop the involuntary muscle contractions that cause leakage. The patient is encouraged to continue her Kegel exercises and agrees to a trial of tolterodine.

QUESTION

- **What pharmacologic agents aid in the treatment of UI?**

Several drugs have proved helpful for alleviating UI (Table 4), although their risk-to-benefit ratios are difficult to gauge.² In employing these therapies, the maximum associated with all drug treatment in elderly patients applies: start low and go slow.

Pharmacotherapy for Urge Incontinence

Anticholinergic agents are the first-line pharmacologic therapy for patients with urge incontinence.³⁶ These agents increase bladder capacity and cause remission of uninhibited contractions more than placebo; however, uninhibited bladder contractions often persist with treatment, even for patients who experience improvement in their symptoms. Tricyclic antidepressants have also been shown to be effective but produce many adverse effects. Pharmacologic treatment for detrusor hyperactivity should be used only in conjunction with behavioral therapies. Calcium channel blockers, terodiline, and flavoxate are not recommended for treatment of detrusor hyperactivity.²

Anticholinergic agents. Oxybutynin has both anticholinergic and direct smooth muscle relaxant properties. It is the anticholinergic agent of choice for treatment of UI. Side effects include severe mouth dryness, blurred vision, dry skin, nausea, constipation, and confusion. As

Table 4. Pharmaceutical Therapy for Urinary Incontinence

Agent	Indication	Dose	Side Effects	Contraindications
Oxybutynin	Detrusor hyperactivity	2.5–5 mg 2 to 4 times daily	Severe mouth dryness, blurred vision, dry skin, nausea, constipation	Narrow-angle glaucoma, gastrointestinal tract obstruction
Tolterodine	Detrusor hyperactivity	2 mg twice daily	Dry mouth, dyspepsia, constipation urinary retention	Narrow-angle glaucoma, obstruction uropathy, gastrointestinal tract obstruction
Propantheline	Detrusor hyperactivity	7.5–30 mg 3 to 5 times daily on an empty stomach	Blurred vision, mouth dryness, nausea, constipation, tachycardia, drowsiness, confusion	Narrow-angle glaucoma, obstructive uropathy, myasthenia gravis
Dicyclomine	Detrusor hyperactivity	10–20 mg 3 times daily	Mouth dryness, blurred vision, confusion, nausea, dizziness, drowsiness	Narrow-angle glaucoma, obstructive uropathy, myasthenia gravis, gastrointestinal tract obstruction
Doxepin	Detrusor hyperactivity	10–25 mg 1 to 3 times daily	Mouth dryness, dizziness, orthostatic hypotension, nausea, confusion	Concomitant use of monoamine oxidase inhibitors
Imipramine	Detrusor hyperactivity, stress incontinence	10–25 mg 1 to 4 times daily	Mouth dryness, dizziness, orthostatic hypotension, nausea, confusion	Concomitant use of monoamine oxidase inhibitors, recent myocardial infarction
Sustained-release phenylpropanolamine	Stress incontinence	25–75 mg 2 times daily	Minimal, including nausea, mouth dryness, insomnia, itching, rash, restlessness	Prescribe cautiously for patients with hypertension
Estrogen supplements	Stress incontinence	Oral conjugated estrogen: 0.3–1.25 mg daily Vaginal conjugated estrogen: 2 g or fraction	Nausea, breast tenderness, mood changes, weight fluctuations, headache	Known or suspected cancer of the uterus, cervix, or breast, active thrombophlebitis, thromboembolic disease, acute liver disease

with all anticholinergics, it is contraindicated in patients with narrow-angle glaucoma, myasthenia gravis, and partial or complete obstruction of the gastrointestinal tract. Tolterodine, a new antimuscarinic agent that blocks bladder contractions, was found to be as effective as oxybutynin but better tolerated in a recent randomized, placebo-controlled trial for the treatment of bladder overactivity.³⁷ Because of its improved side effect profile, it may be the new drug of choice for detrusor instability.

Propantheline is a second-line agent in patients with detrusor instability. It is inexpensive and has long been used; however, few adequate trials have documented this agent's efficacy in treating UI. Nonetheless, experts have concluded that propantheline is an effective and recommended treatment for patients who can tolerate the full dosage.² The recommended

dose for propantheline is 7.5 to 30 mg 3 to 5 times daily, taken on an empty stomach. Side effects include blurred vision, mouth dryness, nausea, constipation, tachycardia, drowsiness, and confusion. In cognitively impaired patients, use of this agent may lead to increased confusion.

Dicyclomine is an anticholinergic agent with smooth muscle relaxant properties that is considered an acceptable alternative to other available anticholinergic agents.

Tricyclic agents. Tricyclic agents are prescribed because of their anticholinergic properties. Limited research on the use of tricyclics is available; most studies have examined imipramine and doxepin. Side effects include mouth dryness, dizziness, orthostatic hypotension, nausea, and confusion. These agents should be reserved for carefully evaluated and selected

patients. They are occasionally used in patients with concurrent depression.

Pharmacotherapy for Stress Incontinence

The rationale for pharmacologic therapy for stress incontinence is based on the high concentration of α -adrenergic receptors in the bladder neck and proximal urethra.

α -Adrenergic agonist drugs presumably cause muscle contraction in these areas and thereby increase bladder outlet resistance. Phenylpropanolamine is a first-line pharmacologic therapy for women with stress UI. Treatment with this agent rarely cures UI, but in studies in which the improvement rate was reported, reduction in leakage ranged from 31% to 60% over response with placebo.² The recommended dose is 25 to 75 mg twice daily. Side effects are minimal. Phenylpropanolamine should be used with caution in hypertensive patients.

Estrogen therapy in postmenopausal women may restore the urethral mucosa and increase urethral muscle tone and responsiveness, thus leading to increased bladder outlet resistance and decreased stress incontinence. Evidence suggests that combined estrogen and α -adrenergic agonist therapy may be more effective than α -adrenergic agonist therapy alone.¹⁵ Estrogen is administered in standard regimens for postmenopausal women; progestin should be added for women with an intact uterus. Side effects included nausea, breast tenderness, mood changes, weight fluctuations, and headache. Estrogen treatment is contraindicated in women with known or suspected cancer of the uterus, cervix, or breast, active thrombophlebitis, thromboembolic disease, and acute liver disease.

Imipramine has been reported to be beneficial in women with stress incontinence.¹⁵ It should be reserved for patients who have failed first-line therapy.

Treatment Follow-up

One month later, the patient reports almost total resolution of her symptoms, with urine leakage only about 1 to 2 times weekly.

QUESTION

- **What other supportive therapies can be used in the management of UI?**

Absorbent products are widely used by patients with UI. Protective pads or diapers can be helpful during assessment and treatment of UI but should not be used in place of treatment. The cost and quality of these products vary considerably, and improper use may contribute to skin irritation and breakdown.

External collection systems have been developed for men with UI. Such systems involve an external (condom) catheter secured on the shaft of the penis with an adhesive and connected by a tube to a urine collecting bag. Collection devices have been developed for women, but the efficacy and acceptability of these devices have not yet been fully assessed.

Pessaries are designed to temporarily reduce pelvic prolapse in women who are not surgical candidates. These devices require fitting by a specialist and regular follow-up examinations. Objective evidence about the ability of these devices to reduce UI is not available.³⁸ Complications include ulceration of the vagina and fistula formation.

Intermittent catheterization is a safe and effective treatment for most types of urinary retention. A clean (not sterile) catheter is passed through the urethra into the bladder every 3 to 6 hours to empty the bladder. Some frail elderly patients are able to perform intermittent catheterization on themselves or can be assisted by others. Complications occur in approximately 20% of cases and include urethritis, UTI, difficulty with insertion, urethral stricture, epididymitis, and bladder stones.² Intermittent catheterization is preferred over indwelling catheterization because of the lower risk of symptomatic UTI and bladder stone formation. Other complications of indwelling catheterization include hematuria, fistula formation, bladder spasms, urethral erosions, urethritis, and chronic renal inflammatory changes. Indwelling catheters are most appropriate for acutely ill patients for whom fluid balance is important, for short-term use to aid healing of a skin condition or pressure ulcer, or for terminally ill patients for whom bed and clothing changes are disruptive or painful.

QUESTION

- **When should surgery be considered?**

Surgical therapy is indicated for carefully selected patients and may be curative in these patients. The objectives of surgical treatment depend on the specific etiology. Treatment of reversible etiologies should precede any referral to a urologic surgeon.

Patients with anatomic obstruction may benefit from surgery, especially if the detrusor muscle is contracting normally. Surgical correction should be considered in cases in which an obstruction is causing urinary retention with overflow, when lower urinary tract pathology (eg, bladder tumor or stone) is contributing to UI, and in some women with stress incontinence who have not benefited from behavioral therapies.

QUESTION

• How cost-effective are therapies for management of UI?

The magnitude of the cost impact of UI is quite substantial. In 1992, the direct costs for treating stress incontinence alone in the United States totaled \$0.5 billion.³⁹

In the last several years, there have been several new approaches to cost-effectively treat UI. Periurethral injection of polytef paste, GAX collagen, autologous fat tissue, and silicone implants have been shown to be reasonable options in some female patients with stress incontinence.⁴⁰ Biofeedback-assisted pelvic floor muscle training and programs of prompted voiding⁴¹ have shown some promise in curtailing costs. A nurse-led continence promotion service may provide greater awareness, savings, and accessibility.⁴² A simple change such as a better diaper or containment system may reduce nursing costs.⁴³

EPILOGUE

At 6 months' follow-up, the patient continues to be doing well, with no known adverse effects from the medication. **HP**

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