Incontinence in Older Women

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PATIENT’S STORY

Mrs F is an active 83-year-old woman who has been under the care of Dr V, her internist at a university hospital, since 1976. Her medical history includes degenerative joint disease, hypercholesterolemia, osteoporosis, and gastroesophageal reflux; her obstetrical and gynecological history includes 2 pregnancies and a hysterectomy. Her current medications include alendronate, calcium/vitamin D, omeprazole, acetaminophen, simvastatin, and zolpidem.

In November 1996, Mrs F mentioned to Dr V that she was having occasional urinary incontinence (UI) and urgency, and that she couldn’t go hiking without getting a damp minipad. Examination revealed a small cystocele and vaginal atrophy. Dr V referred her to urogynecologist Dr U, who verified that the cystocele was not related to the incontinence, nor significant enough to address surgically. Neurological examination results were normal, as was her postvoid residual volume of 30 mL and a urinalysis. Mrs F received treatment from the urogynecological practice on 8 occasions between November 1996 and May 1997. She was advised to restrict her caffeine intake, received biofeedback-assisted pelvic floor muscle training and instructions for home exercises, and was prescribed estrogen cream intravaginally. She experienced little improvement. Sublingual hyoscyamine was tried unsuccessfully. Mrs F was not interested in using other medications and gradually improved.

In 1999, Mrs F was treated for localized breast carcinoma with lumpectomy and tamoxifen, and her oncologist advised her to stop using the estrogen cream.

Mrs F did not complain about UI again until a visit with Dr V in June 2008. She said that her problem was never major urinary loss, but more of an insecurity that if she coughed or went on a long walk, that she might leak a small amount of urine. Dr V performed another examination and noted no change from the prior examination. Urinalysis and urine culture results were negative. Dr V recommended that Mrs F begin Kegel exercises again and referred her back to the urogynecologist.

Dr V obtained a history of Mrs F’s pattern of urination—daytime frequency every 30 minutes, nocturia twice nightly, urgency, sometimes barely making it to the bathroom, and occasional stress incontinence for which she was wearing a pantyliner. Postvoid residual volume was only 10 mL. Since Mrs F was reluctant to take another medication, Dr U engaged her in a trial of percutaneous tibial nerve stimulation from March 2009 to June 2009. After 8 of the planned 12 sessions with no improvement, tibial nerve stimulation was discontinued and Mrs F agreed to try immediate-release tolterodine, 2 mg orally per day or as needed. When Dr V saw Mrs F 1 month later, she hadn’t yet taken the medication, wanting to ensure that it was compatible with her other medications. Dr V did a drug multacheck, reassured Mrs F, and encouraged her to try the tolterodine. When he called to follow-up, Mrs F noted some improvement with

Urinary incontinence is a common geriatric syndrome that affects at least 1 in 3 older women and can greatly diminish quality of life. Incontinence has been associated with increased social isolation, falls, fractures, and admission to long-term care facilities. Often unreported and thus untreated, it is important to include incontinence as part of the review of systems for all older women. Using the case of Mrs F, we highlight the chronicity of incontinence and discuss the evidence base for evaluation of incontinence in older women, with proper initial diagnosis of the type of incontinence—stress, urgency, or mixed—in order to prescribe optimal treatment. We present an evidence-based discussion of available incontinence treatments including pelvic floor muscle exercises, stress strategies, urge-suppression strategies, fluid management, medications, intravaginal pessaries, intravesical injection of botulinum toxin, percutaneous tibial nerve stimulation, sacral neuromodulation, and surgical procedures for stress incontinence. Special considerations in evaluation and treatment of patients with dementia are presented. Urinary incontinence treatments yield high levels of patient satisfaction and improvements in quality of life.
Box 1. Risk Factors and Evidence for Urinary Incontinence in Women

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>Prevalence increases with age to approximately 30 years, stabilizes until the age of approximately 65 years, and then again increases with age.²²,²³</td>
</tr>
<tr>
<td><strong>Race and Ethnicity</strong></td>
<td>Lower prevalence of stress incontinence in African American and Asian groups compared with whites.⁴</td>
</tr>
<tr>
<td><strong>Childbirth</strong></td>
<td>Increased risk with vaginal delivery, maternal age, and fetal weight; parity is a significant risk factor for incontinence in younger women, but the association with incontinence appears to be diminished or absent in middle-aged and older women, perhaps because other factors become more prominent.⁶</td>
</tr>
<tr>
<td><strong>Oral Hormone Therapy</strong></td>
<td>Increased the risk of incontinence and worsened existing incontinence in randomized controlled trials using 0.625 mg of conjugated estrogens alone or plus 2.5 mg of medroxyprogesterone acetate daily with effect evident by 4 months and sustained for 4 years.⁰,⁰¹</td>
</tr>
<tr>
<td><strong>Obesity and Body Mass Index</strong></td>
<td>Each 5-unit increase in body mass index increases the risk of daily incontinence by approximately 60%;⁴,¹²,¹₄ improvements in continence are associated with even small reductions in weight.¹⁵</td>
</tr>
<tr>
<td><strong>Cognitive Impairment</strong></td>
<td>Consistent relationship to presence and increased severity of dementia in acute care and nursing home settings; weaker association in community dwellers.¹⁶,¹⁷</td>
</tr>
<tr>
<td><strong>Mobility Impairment</strong></td>
<td>Consistent findings using several measures of mobility: history of falls, arthritis, needing assistance to walk, inability to walk, chair/stand time, and walking speed.⁴</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td>Risk of incontinence increases when diabetes has been present for at least 1 year.²⁰</td>
</tr>
<tr>
<td><strong>Hysterectomy</strong></td>
<td>Conflicting evidence; epidemiological studies provide support; clinical series find no difference in the short term.¹⁰,²¹</td>
</tr>
<tr>
<td><strong>Menopause</strong></td>
<td>Conflicting evidence; natural menopause may have a neutral or protective effect vs surgical menopause, which is a risk factor.¹²,²¹</td>
</tr>
<tr>
<td><strong>Less Severe/Less Frequent Urinary Incontinence</strong></td>
<td>Having urinary incontinence in the past year increased the risk of developing monthly or more frequent leakage over a 3-year period in older women.²⁴,²⁵</td>
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</table>

Less urgency and few adverse effects. Dr V suggested increasing the medication to twice daily and following up with Dr U.

**Perspectives**

Mrs F, Dr V, and Dr U were interviewed by a Care of the Aging Patient editor in July and August 2009.

**Mrs F:** When I went there [the urogynecology clinic] the first time, 10 years ago, . . . I had a drip here and there and it worried me. In the meantime, I had the urge incontinence, where you run and you have to go quickly.

**Dr V:** I think we did the right thing, given the patient’s reluctance to take medication, trying biofeedback and pelvic muscle exercises first.

**Dr U:** We try to give the patients a realistic outlook. If they’ve had incontinence for 10 or 15 years, then it’s not getting better tomorrow. So, it’s certainly a 6-month to 1-year process depending . . . this is completely their choice. As I say to this patient and other patients, “You do what feels right to you. When you say you want more, then you can move on to more.”

**Definitions, Epidemiology, and Prevalence**

Urinary incontinence, the involuntary loss of urine, affects 30% to 60% of middle-aged and older women.¹ The most common types of incontinence are stress, urgency, and mixed (stress and urgency) incontinence. Stress incontinence is the loss of urine on effort or exertion, or on sneezing or coughing.³ Urinary incontinence is the loss of urine accompanied by or immediately preceded by a sensation of urgency.² In older women in the United States, mixed incontinence is the most common type, accounting for approximately one-half of all cases, with urgency incontinence alone being the next most common, and stress incontinence the least common.³

Risk factors for incontinence in older women are summarized in Box 1.¹⁴⁻²⁵ Mrs F had several of these potential risk factors: older age, white race, parity, and hysterectomy. Although incontinence is not considered to be a normal part of aging, age-associated diseases and physiological changes in bladder and pelvic floor function²⁶⁻²⁹ may contribute to problems with bladder control in the older woman.

**Impact on Quality of Life**

Dr U: We held a focus group and one of the participants said: “Incontinence doesn’t kill you—it just takes away your life.” Urinary incontinence has a profound negative impact on quality of life, exceeding that of many comorbid diseases (ie, diabetes, stroke, and arthritis in the hands and wrists).³⁰,³¹ Urinary incontinence is associated with a 30% increase in functional decline, and a 2-fold increased risk of falls, depressive symptoms, and nursing home placement.³¹⁻³⁶ Further, women with UI often have concomitant and treatable symptoms that can be quite bothersome including urinary frequency, urgency, nocturia, and fecal incontinence.³⁷,³⁸

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Table 1. Modifiable Contributing Factors for Urinary Incontinence

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mechanism</th>
<th>Treatment Implications</th>
</tr>
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<tbody>
<tr>
<td>Urinary tract infection</td>
<td>Cystitis causes urgency and frequency</td>
<td>Asymptomatic bacteriuria is more common in elderly patients and does not need treatment</td>
</tr>
<tr>
<td></td>
<td>Postulated physical irritation of the bladder from rectal distension</td>
<td>Appropriate management with increased fluid intake, increased dietary fruit and fiber, stool softeners, and laxatives as needed</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>Glycosuria causes polyuria, also associated with diabetic neuropathic bladder</td>
<td>Improved control of diabetes can decrease osmotic diuresis and improve incontinence</td>
</tr>
<tr>
<td>Obesity</td>
<td>Pressure on the bladder from central obesity as well as stress on the pelvic floor muscles</td>
<td>In a randomized controlled trial, an average weight loss of 17 lb (vs 3 lb) over 6 mo reduced incontinence episodes by 47% (vs 28%) Both groups received a self-help booklet</td>
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<tr>
<td>Sleep apnea</td>
<td>Nocturnal diuresis due to production of atrial natriuretic peptide</td>
<td>Treatment decreases nocturnal diuresis and decreases nocturia</td>
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<tr>
<td>Mobility impairment</td>
<td>Slowed mobility from any cause can precipitate urgency incontinence; pain with movement from degenerative joint disease or other conditions can cause postponement of voiding with resultant urgency incontinence</td>
<td>Physical therapy, assistive devices, or other interventions to improve mobility Improved pain management (pharmacologic or nonpharmacologic) and education concerning regular toileting, which helps decrease stiffness and improves incontinence</td>
</tr>
<tr>
<td>Drugs</td>
<td>Caffeine is a mild diuretic and a bladder irritant</td>
<td>Eliminating or reducing caffeine can improve incontinence</td>
</tr>
<tr>
<td>Diuretics</td>
<td>Increased diuresis worsens urgency incontinence</td>
<td>Evaluate for necessity of prescribed diuretic Loop diuretics can be moved to late in the afternoon to allow useful daytime hours without frequency and then diuresis abates before bedtime</td>
</tr>
<tr>
<td>Angiotensin converting enzyme inhibitors</td>
<td>Cough is a common adverse effect in elderly patients and precipitates stress incontinence</td>
<td>Consider change to angiotensin II receptor blockers or other agents</td>
</tr>
<tr>
<td>Anticholinergics, sedatives, and hypnotics</td>
<td>May cause incomplete bladder emptying and constipation and thus contribute to frequency, urgency, and urinary incontinence; also may cause cognitive impairment that interferes with ability to sense, process, and respond to the need to void</td>
<td>Discontinue or reduce dose when possible</td>
</tr>
</tbody>
</table>

**Methods**

We conducted PubMed searches (January 1, 2007-October 31, 2009), reviewed reference lists, and reviewed the following evidence-based summaries: (1) International Consultation on Incontinence report, which used the Oxford Centre for Evidence-Based Medicine levels of evidence and grades of recommendation A (consistent level I studies) through D (troublingly inconsistent studies at any level),90-41 (2) Cochrane reviews32-45; and (3) Agency for Healthcare Research and Quality evidence review for overactive bladder.46 PubMed searches used the search terms older women and geriatrics with each type of incontinence and the individual treatments described.

**Evaluation of UI by the Primary Care Clinician**

**Detection.** The first step in evaluation of women with UI is detection. Mrs F told Dr V about her incontinence. However, community-based studies in the United States indicate that only 30% to 45% of women with incontinence seek care.47-49 Discussing incontinence can be embarrassing, and most women are not aware of the range of effective treatments available.

Thus, due to the high prevalence of undiagnosed incontinence, it should be included in the review of systems for all older women. Further, although a woman may tell her clinician that infrequent incontinence is not bothersome, she should be advised that occasional incontinence is a risk factor for more frequent incontinence.24,53 Also, evidence exists that behavioral intervention is effective in preventing increased incontinence or reducing the progression of infrequent incontinence.50

Once incontinence is diagnosed, there are many treatments that can be implemented by the primary care clinician after a relatively simple evaluation.

**Evaluation.** The evaluation of patients with UI takes place in the primary care setting. The incontinence history can be brief and targeted to identify the type, severity, duration, and burden of incontinence, and any potentially modifiable contributing factors (TABLE 1)15,41,51-55 so that appropriate treatments can be prescribed (level of evidence C).39,41,56 The 4-question, patient-completed International Consultation on Incontinence Modular Questionnaire-Urinary Incontinence (ICIQ-UI) Short Form (http://www.iciq.net) is extremely useful for eliciting types of incontinence and estimating severity and burden.57,58 It demonstrates excellent sensitivity to change, and thus, can also be used to assess improvement or worsening on subsequent visits (level of evidence A).57 Concomitant symptoms such as frequency, urgency, and nocturia should also be explored because they can cause considerable burden and respond well to treatment.59,60

Mrs F described the effect of frequency and urgency on her life when asked how often she needed to change her pad, saying “I don’t, as long as I keep running to the bathroom” and “I know where the bathrooms are, wherever I go.”

Past guidelines have recommended a history, voiding diary, physical examination including pelvic examination, measurement of a postvoid residual urine volume, and a cough
stress test, with the level of evidence being consensus expert opinion.61 However, one study has shown that a less burdensome evaluation can be safe and fairly accurate.62 In a multisite study, 301 community-dwelling women aged 40 to 94 years were evaluated with a self-administered 3-item questionnaire and a urinalysis vs an extended evaluation by a urogynecologist or urologist according to the previously mentioned guidelines.61,62 Using the subspecialty evaluation as the criterion standard, the 3-item questionnaire had a sensitivity of 0.75 and 0.86, and specificity of 0.77 and 0.60 for classifying urgency and stress incontinence, respectively.62

A physical examination is less useful for initial assessment than the history,63 although it is an excellent opportunity to teach proper pelvic floor muscle exercise technique. In women with clear-cut urgency or stress incontinence, initial management could be based on a history and urinalysis.64 Our experience shows that the postvoid residual volume measurement, which can be difficult to obtain in a primary care setting, also does not need to be part of an initial evaluation because it is seldom elevated significantly in incontinent women without an underlying neurological disorder, pelvic organ prolapse beyond the introitus, or recurrent urinary tract infections (level of evidence C). Urinalysis is important in detecting hematuria, pyuria (leukocyte esterase), bacteriuria (nitrite), and glycosuria, and should be included in the initial evaluation (level of evidence C).63,64 A brief cognitive assessment should be considered for patients who give a history that is inconsistent or unclear or who have no response to initial treatments.65,66

**Treatment of UI**

**Establish Goals of Therapy.** Treatment satisfaction may be enhanced by clearly establishing treatment outcome goals. These include a decrease in specific symptom burden such as incontinence, urgency, frequency, nocturia, or a combination of any or all of the 4 symptoms; dryness or using less protection (eg, from diapers to pads); enabling of specific social activities; maintaining residence at home or in assisted-living by becoming independent in incontinence management; or achieving less caregiver burden when applicable. One of Mrs F’s treatment goals was to avoid another medication if possible.

**Behavioral Treatments.** These interventions improve incontinence by teaching skills and changing the patient’s behavior. Behavioral programs usually comprise multiple individualized components that can include self-monitoring (bladder diary), scheduled voiding, delayed voiding, pelvic floor muscle training and exercise, stress strategies, urge-suppression strategies, biofeedback, electrical stimulation, caffeine reduction, fluid management, weight loss, and/or other lifestyle changes.

Pelvic Floor Muscle Training and Exercise. A cornerstone of behavioral treatment is pelvic floor muscle training and exercise, also known as Kegel exercise. It is effective for reducing stress, urgency, and mixed incontinence in most patients who cooperate with training (eTable 1, available at http://www.jama.com).67 In randomized trials (most of which analyzed results in completers only), UI episodes were reduced by 54% to 75% compared with 6% to 16% with no treatment. Several methods have been effectively used to help patients identify and correctly exercise the pelvic floor muscles, including self-help books,66,67 biofeedback,67,68 verbal feedback based on vaginal or anal palpation,67 and electrical stimulation.70 Careful training with verbal feedback during physical examination can be as effective as biofeedback.67,71 While pelvic floor electrical stimulation is an effective treatment for urgency or stress incontinence in women,72-73 a randomized trial found no difference in outcomes compared with pelvic floor muscle training alone.70 Confirming that patients have identified and isolated the correct muscles is essential to ensure correct exercise and avoid treatment failure, regardless of the method used for pelvic floor muscle training and exercise.

**Behavioral Training for Stress Incontinence.** Three goals for treatment of stress incontinence are addressed with behavioral training including increasing pelvic floor muscle strength, improving structural support, and teaching patients to use their muscles consciously to occlude the urethra during activities that precipitate leakage such as sneezing.67,74 This skill is known by several terms including stress strategy, the knack, and counterbracing.67,70,74

**Behavioral Training for Urgency Incontinence and Related Symptoms.** Conscious pelvic floor muscle contraction, which can also be used to suppress detrusor contractions and reduce urgency, is a key component of behavioral training for urgency incontinence and related symptoms.68,69 Urge suppression techniques involve teaching patients not to rush to the toilet, which can trigger incontinence, but instead to remain still, use their muscles to suppress urgency, and wait for the urge to pass. This skill is a central element in the treatment of urgency incontinence and overactive bladder.68,69 The effectiveness of behavioral training has been established in controlled trials in which mean reductions of incontinence range from 60% to 80% (eTable 1). Behavioral training with urge suppression has been shown to reduce voiding frequency77 and nocturia60 in older women. Although Mrs F received instruction in pelvic floor muscle exercise, she may have benefited more from a program of behavioral training that included urge suppression skills to address her symptoms of urgency, frequency, and nocturia.

Bladder training is a behavioral treatment that uses incremental voiding schedules to reduce voiding frequency, increase bladder capacity, and restore normal bladder function.76 To adhere to the voiding schedule, patients resist the sensation of urgency using various techniques, including relaxation, distraction, or pelvic floor muscle contraction.77,78 Several studies have demonstrated the efficacy of bladder training.72,77,78 The most definitive randomized trial of outpatient bladder training in older women demonstrated a mean 57% reduction in frequency of incontinence episodes77 (eTable 1).

**Behavioral Lifestyle Changes.** Behavioral lifestyle changes are generally used in addition to a primary behavioral inter-
vention such as pelvic floor muscle training, but can be sufficient treatments alone. Lifestyle changes include caffeine reduction, fluid management, and weight reduction. Caffeine, in addition to being a diuretic, has also been reported to be a bladder irritant for many women. It increases detrusor pressure and is associated with detrusor instability. Reducing caffeine intake can reduce both stress and urgency incontinence. To avoid withdrawal symptoms, caffeine reduction should be approached gradually and may include mixing caffeinated and decaffeinated beverages incrementally.

Based on our experience, a 24-hour fluid intake and voiding diary of patient’s recall of types and amounts of fluid consumed in a usual day can provide very helpful information (level of evidence C). For patients with unnecessarily high fluid intake, reducing excess fluids can relieve problems with sudden bladder fullness and incontinence. Many older women attempt to control incontinence by restricting their fluid intake, which can be helpful at certain times, such as before activities that involve extended time without bathroom access or within a few hours of bedtime. However, restricting overall fluid intake is not recommended because it can place these women at risk of dehydration. Although it may seem counterintuitive, it is usually advisable to encourage consumption of at least 6 eight-ounce glasses of fluid each day.

Weight loss studies have shown significant improvement in incontinence following bariatric surgery and with as little as a 5% weight reduction in more traditional weight loss programs. However, evidence is lacking for the effectiveness of weight loss as a treatment for incontinence in older women. All these behavioral interventions are safe and reversible, but they do require the active participation of a motivated patient and the time of a knowledgeable clinician. Behavioral interventions are commonly implemented by advance practice nurses, physical therapists, or other professionals who have developed the appropriate expertise.

Although they are not curative in the majority of women, most women can achieve significant reductions in symptoms and improved quality of life. Because behavioral treatment usually works gradually at first and relies on patient self-management, it is important to provide patients with regular follow-up to sustain behavioral change over time. Mrs. F learned pelvic floor muscle exercises during her initial treatment, but she may not have achieved optimal benefit before discontinuing her regimen. Behavioral treatments should be a mainstay in the care of older women with incontinence.

**Medications.** Medication was shown to be less effective than behavioral therapy in a comparative effectiveness trial (81% vs 69% reduction of UI episodes). Also, medications have adverse effects (TABLE 2). Since Mrs. F’s initial pharmacologic treatment with hyoscyamine, more bladder-selective agents have been approved by the US Food and Drug Administration for labeling for use in UI (Table 2). The initial dose for older patients should be the lowest available dose administered daily, even for short-acting medications. As-needed dosing, such as before a social outing, can be quite useful as well. Evidence for older women including cognitive effects is presented in eTable 2.

**Antimuscarinic Medications.** Actions of antimuscarinic medications include improving urgency incontinence by blocking acetylcholine-induced stimulation of postganglionic muscarinic receptors on detrusor smooth muscle that induce bladder contractions. Metabolic changes occurring with aging should be considered when prescribing antimuscarinic medications, including reduced clearance of agents with first-pass hepatic metabolism (oxybutynin, darifenacin, tolterodine, and solifenacin) and reduced renal function with agents with primarily renal clearance (tolterodine and trospium). Because older patients tend to be taking a number of medications, many of which have anticholinergic properties, consideration should be given to additive effects.

**Use of Estrogen.** A systematic review of the effects of vaginally administered estrogen reported significant improvement in frequency, nocturia, urgency, incontinence episodes, and bladder capacity in postmenopausal women. In doses used for treatment of genital atrophy (1/2 g of unconjugated estrogen cream 3 times a week) serum levels were low and endometrial thickness unchanged. An intravaginal estrogen ring that releases very low levels of estrogen over a 3-month period is a convenient method of administration for many women. Consistent with the evidence, Mrs. F may have had improvement in her symptoms with vaginal estrogen and worsening when it was discontinued after her breast cancer diagnosis.

**Other Treatments**

**Pessaries.** Pessaries are intravaginal support devices used to treat pelvic organ prolapse and stress incontinence in women. Even very frail older women can do well with pessaries because they can be removed, cleaned, and reinserted every 4 to 6 weeks in the clinic. In a controlled trial of pessary and behavioral treatment for stress incontinence, both treatments alone and in combination provided patient satisfaction rates of 50% at 12 months (eTable 3).

**Percutaneous Tibial Nerve Stimulation.** With percutaneous tibial nerve stimulation, neuromodulation occurs through projections from the posterior tibial nerve to the sacral nerve plexus at the S2-S4 junction, targeting improvement of urinary urgency, frequency, and urgency incontinence. Electrical stimulation of the posterior tibial nerve can be performed via a fine needle inserted percutaneously near the ankle. Treatments last 30 minutes and are performed in a clinic setting once weekly for 12 weeks and then repeated as needed. A randomized controlled trial with 1-year follow-up showed significant and lasting improvement with percutaneous tibial nerve stimulation (eTable 3).

To avoid an additional medication, Mrs. F tried percutaneous tibial nerve stimulation, but discontinued treatments after 8 weeks due to lack of response.

**Botulinum Toxin.** Although botulinum toxin is not currently approved by the US FDA for the treatment of ur-
gency incontinence and urgency/frequency, it is increasingly being used for patients whose symptoms are refractory to other treatments by injecting it cystoscopically into the detrusor muscle (level of evidence A).\textsuperscript{94-96} Adverse effects may include urinary retention with need for intermittent self-catheterization and increased risks of urinary tract infections. Few data exist addressing the use of botulinum toxin in older women. In a series of 21 older patients with urgency incontinence, 1 month after intradetrusor injection of botulinum toxin A, frequency decreased from 11 to 5 voids per day and pad use from 4 to 1 per day (eTable 3).

Surgery. Sacral neuromodulation therapy is an FDA-approved treatment for refractory urgency incontinence, as well as urinary urgency and frequency. The outpatient surgery involves implantation of an electronic device that stimulates the S3 sacral nerve. Studies report efficacy (defined as 50% improvement in symptoms and quality of life 12 months postprocedure [level of evidence A])\textsuperscript{42} in as many as 90% of participants but only 1 small study evaluated sacral neuromodulation in older patients and efficacy was achieved by 48% of participants (eTable 3).\textsuperscript{97}

Midurethral Sling. Although Mrs F was more bothered by her urinary urgency and frequency than by her stress incontinence, effective minimally invasive surgical procedures exist for the treatment of stress UI. The midurethral sling is an outpatient surgical procedure consisting of transvaginal placement of synthetic mesh beneath the midurethral area.\textsuperscript{98,99} Cure rates in older women ranged from 77% to 96% in cohort studies (level of evidence A; eTable 3).

Absorptive Products. As many as 50% to 80% of women use absorptive products for managing UI in addition to behavioral and medical/surgical treatments.\textsuperscript{100} Research comparing various absorptive products used in combination with other treatments is sparse.\textsuperscript{43,44} Major types of absorbent product designs include disposable and reusable designs. Disposable inserts designed for incontinence were more effective and preferred over menstrual pads for small volume incontinence in women (evidence level B).\textsuperscript{43}

Special Considerations for Treatment of Older Women With Cognitive Impairment. Modified evaluation and treatment approaches are needed when treating older women with cognitive impairment and incontinence. Urinary tract infection symptoms can be nonspecific in cognitively impaired individuals and can include worsening incontinence as well as decreased cognitive and functional status (Table 1).

An abdominal and a digital rectal examination are necessary to rule out constipation as a precipitating factor for UI in patients unable to monitor their frequency of bowel movements.\textsuperscript{41}

For women with mild cognitive impairment, we have found that a simplified behavioral program of caffeine reduction and timed voiding can be very helpful (level of evidence C). For women with cognitive impairment significant enough to require a caregiver, the active involvement of the caregiver is essential for optimal outcomes. Prompted

<table>
<thead>
<tr>
<th>Table 2. Antimuscarinic Medications Approved for Use in the United States for Overactive Bladder and Urgency Incontinence</th>
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<tbody>
<tr>
<td>Medication, Form</td>
</tr>
<tr>
<td>Darifenacin, tablets</td>
</tr>
<tr>
<td>Fesoterodine, tablets</td>
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<tr>
<td>Oxybutynin chloride</td>
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<tr>
<td></td>
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<tr>
<td>Tolterodine, tablets</td>
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<td></td>
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<tr>
<td>Solifenacin, tablets</td>
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<tr>
<td>Tolterodine, tablets</td>
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<td></td>
</tr>
<tr>
<td>Trospium, tablets</td>
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\textsuperscript{b}Data are adapted from http://www.drugstore.com/, accessed January 18, 2010.

\textsuperscript{c}Immediate-release oxybutynin chloride 2.5 mg is taken as one-half tablets.

\textsuperscript{d}Must be taken on an empty stomach.
Step 1: Review goals of incontinence treatment and patient preferences
Impact on quality of life is an important consideration

Step 2: Identify risk factors and treat modifiable factors listed in Table 1 (Also begin step 3)

Step 3: Trial of behavioral treatments
Pelvic floor muscle exercises and bladder control strategies (see text)

Reinforce during 4 to 6 weeks (1 to 2 visits)

Step 4: Assess adherence and response to behavioral treatments

Adequate response
Reinforce as needed

Inadequate response to behavioral treatments

Step 5: Stress incontinence symptoms most bothersome

Treatment options (consider in sequence)
1. More intensive behavioral therapy
2. Pessary (see eTable 3)
3. Surgery (see eTable 3)

Step 5: Urgency incontinence symptoms most bothersome

Treatment options
Medications (consider cost, low starting dosage, proactive adverse effect management, and consider usage as needed [see Table 2]) Continue behavioral treatment with pharmacologic treatment for optimal effectiveness

Not adherent to behavioral treatments

Determine reasons for nonadherence
Consider screening test for cognitive impairment

No cognitive impairment
Offer other treatments (step 5)

Positive cognitive impairment screen
See Special Considerations for Treatment of Older Women With Cognitive Impairment

Assess response to treatment

Treatment ineffective or intolerable adverse effects

Medication ineffective: consider increasing dose of medication, proactive adverse effect management, or a change of medication (Table 2)
Intolerable adverse medication effects: decrease dose or change medications (Table 2)
Continue or intensify behavioral treatments

Treatment still ineffective

Consider other treatment options (see eTable 3)
Percutaneous tibial nerve stimulation
Sacral neuromodulation
Cystoscopic injection of Botulinum toxin

Assess response to treatment

Treatment effective

Continue to monitor effectiveness and manage adverse effects of medications

Assess response to treatment

Reinforce during 4 to 6 weeks (1 to 2 visits)

Adequate response
Reinforce as needed
voiding works very well to reduce incontinence episodes in individuals in community-dwelling settings, assisted living facilities, or nursing homes (level of evidence: C). A 3-day trial of prompted voiding can determine if quality of life is improved for the caregiver and patient. If unsuccessful, a check and change management strategy can contain incontinence and preserve dignity.

There is epidemiologic and case report evidence that cholinesterase inhibitors used to improve cognition may precipitate incontinence. The benefits of the cholinesterase inhibitor need to be balanced with the burden of incontinence in such cases to decide on medication withdrawal or change. Antimuscarinic medications should be used with caution in older patients with cognitive impairment. Careful monitoring for worsening mental status should be part of the instructions given to the caregiver. If improvement is not noted in 1 month or if the patient has a functional decline sooner, the medication should be discontinued.

In general in our experience, patients with dementia have cognitive and functional decline with surgical interventions (level of evidence C).

**STEP-WISE APPROACH TO TREATMENT**

A synthesis of the treatment of incontinence in older women is presented in the figure. The first step is to clarify goals of treatment and patient preferences. Some women are very satisfied with reducing their stress incontinence to the point of using a panty liner instead of a pad. Others would not be satisfied with this level of incontinence and may desire surgery as a first treatment. Surgery is now an option for many women who would not have been believed to be surgical candidates before the advent of less invasive procedures. Some older women with urgency incontinence might choose to take an antimuscarinic medication only on an as-needed basis, such as before leaving the house on a social outing.

The next step, identifying modifiable contributing factors to incontinence and treating them (Table 1), may be sufficient treatment for some women. Behavioral treatments should be the next line of therapy and can often be done concomitantly while treating modifiable contributing factors. The combination of components included in behavioral treatments should be individualized. Pelvic floor muscle training is a core component of most programs, but evidence exists that the bladder control strategies may be sufficient for some women. If a patient has cognitive impairment, timed voiding combined with caffeine avoidance is often the best choice. Reinforcement over several visits scheduled approximately 2 to 3 weeks apart is recommended to achieve optimal behavioral change.

If no progress is made after 4 to 6 weeks or if the patient wishes to add or substitute another therapy, the next step depends on which incontinence symptoms are most frequent or bothersome. If treating stress incontinence is prioritized, the next step may include a pessary or surgery. If urgency incontinence is prioritized, the next step is usually a medication, with selection based on cost and insurance coverage (Table 2). For women like Mrs F who do not want to add another medication, options include percutaneous tibial nerve stimulation, injection of botulinum toxin, or implantation of a sacral nerve stimulator (eTable 3).

It is important not to abandon behavioral therapy or medications when they are partially effective because there is evidence that outcomes may be improved by combining treatments—especially when done in a stepped manner. At all stages of treatment, optimal skin care and use of appropriate absorbent products are extremely important.

**WHEN TO REFER**

Like Mrs F, many older women are referred to a specialist for further evaluation and treatment of UI. Box 2 provides examples of when referral should be considered.

**CONCLUSION**

Although UI is common among women, the majority do not seek treatment, due not only to embarrassment, but also to the perception that incontinence is a normal and untreatable part of aging. As described in this article, using Mrs F as an example, there are many causes of incontinence and many approaches to treatment. Barriers to treatment in the form of attitudes and beliefs may be overcome with more widespread screening for UI and through public and professional education to increase awareness of all available diagnostic and treatment options.

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**Box 2. Reasons for Referral of Older Women With Urinary Incontinence for Specialty Evaluation**

**Conditions/Symptoms for Referral for Further Urologic, Urogynecologic, or Urodynamic Evaluation**

- Surgery or pelvic floor radiation within the past 6 months
- At least 2 urinary tract infections in a 12-month period
- Postvoid residual volume greater than 200 mL
- Asymptomatic microscopic or macroscopic hematuria (per guidelines)
- Incontinence with new-onset neurological symptoms, muscular weakness, or both
- Persistent bothersome symptoms after trials with behavioral treatment, drug treatment, or both
- Failure to isolate pelvic floor muscles in a patient desiring to try behavioral therapy
- No longer able to tolerate or lack of response to a pessary or other adjunctive treatment
- Pelvic pain associated with incontinence
- Pelvic organ prolapse past the introitus or less severe prolapse with discomfort

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