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# Management of Urinary Incontinence in Women

## Clinical Applications

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### CLINICAL CONTEXT

#### Patient A

During a routine health maintenance visit, a 42-year-old white woman complains of urine leakage with coughing and sneezing. The problem first started 3 years ago during her last pregnancy, but has gotten worse over the past year. Although the amount of urine lost is usually small and can be controlled with a panty liner, she is self-conscious about the associated odor and the potential for visible urine leakage. She is a teacher and is particularly self-conscious when she is standing at the chalkboard in front of a group of students.

The patient's medical history is unremarkable, but her obstetrical history is significant for 4 vaginal deliveries, the first of which required use of forceps. She takes no prescription medications and does not smoke. Her caffeine intake consists of 750 mL (25 oz) of coffee per day. Her review of systems is remarkable for a 9-kg (20-lb) weight gain over the past year and constipation requiring the occasional use of over the counter laxatives. Her general physical examination, including neurological, mental status, abdominal, pelvic, and rectal examinations, is remarkable only for a body mass index of 32. There is visible urine leakage immediately upon coughing, while

See also p 986.

Urinary incontinence, defined as involuntary loss of urine, is a common health problem among women. The prevalence rate is between 12% and 55% for having ever experienced urinary incontinence. It is associated with poor self-rated health, impaired quality of life, social isolation, and depressive symptoms. However, physicians are usually not the ones to initiate discussion about incontinence with their patients. We present clinical cases to illustrate common scenarios in which a physician may be able to help a female patient manage her urinary incontinence by specifically addressing associated factors and offering treatments to improve or possibly even cure her symptoms. Several evidence-based effective nonpharmacological, pharmacological, and surgical treatment options are outlined.

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in the lithotomy position. Her postvoid residual urine volume is 20 mL and a urinalysis is unremarkable.

#### Patient B

A 78-year-old black woman, accompanied by her daughter, is seen in the office during a routine assessment after recently being discharged from an inpatient stroke rehabilitation program. She experienced a stroke 3 months ago and has some residual weakness in her left lower extremity. Although she has no significant cognitive deficits, she now requires assistance with many of her activities of daily living, which has led to her sharing accommodation with her daughter. Upon further questioning, it is revealed that since the stroke she has also experienced urgency and associated urinary incontinence but denies any other urinary tract- or voiding-related symptoms. The patient finds the unexpected loss of urine embarrass-

ing and her daughter feels it adds burden to caregiving.

The patient's medical history is remarkable for systolic hypertension, diabetes, and a hysterectomy at age 58 years. Her medications include hydrochlorothiazide, glyburide, and aspirin. She is a nonsmoker and does not consume any caffeinated beverages. She has 2 biological children, both of whom were delivered vaginally. She is a retired secretary and completed 1 year of secretarial college after graduating from high school.

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Her general physical examination, including neurological, abdominal, pelvic, and rectal examinations, is remarkable for a blood pressure of 180/80 mm Hg, left-lower extremity weakness, and an unstable gait. Her Folstein MiniMental State score is 28 out of 30. Her postvoid residual volume is 35 mL and a urinalysis is unremarkable. Her hemoglobin A<sub>1c</sub> is 8.4% and the results of her renal function tests are normal.

### Do People With Urinary Incontinence Seek Treatment From Health Care Practitioners?

Only 13% to 51% of incontinent women have talked to a health care practitioner about their urinary incontinence.<sup>1-4</sup> Increased frequency, severity, duration, and impact of incontinence on quality of life are all associated with an increased likelihood of accessing health services for this problem.<sup>1-5</sup> Although studies showed that patients often initiated discussion of their symptoms with their physician, they usually did not specifically schedule a visit for this purpose.<sup>4,5</sup> If the physician did not respond when the patient mentioned her symptoms, the patient was often too embarrassed to broach the issue again or declined to because of fear of the examination or of invasive treatments.<sup>5</sup> Some patients interpreted the lack of response from their physician as an indication that no treatments were available. This literature highlights the fact that practitioners ought to initiate discussion about incontinence and be prepared to discuss management options if a problem is identified.

### How Do You Determine What Management Strategy Is Best?

The first step in managing urinary incontinence is to identify its impact on the patient and to explore the patient's desire for treatment. The next step is to identify the type of urinary incontinence and associated symptoms. Voiding is under parasympathetic control and occurs when the detrusor muscle contracts and the sphincter tone relaxes, thus resulting in the bladder pressure exceeding the urethral pres-

sure. In contrast, urine storage is under sympathetic control and occurs when the urethral pressure exceeds the bladder pressure. The brain also performs an important role, and the decision to void is normally under voluntary control. Anatomical and/or neurological abnormalities can change this pathophysiological process and result in involuntary urine leakage.

*Stress incontinence* involves involuntary urine leakage on effort or exertion, or from sneezing or coughing<sup>6</sup> and is usually related to increased urethral mobility and/or poor intrinsic sphincter function. *Urge incontinence* is involuntary leakage accompanied by or immediately preceded by urgency,<sup>6</sup> and it usually indicates detrusor overactivity. Another common type of urinary incontinence is *mixed incontinence*, which is the combination of stress and urge incontinence. Returning to our clinical scenarios, Patient A appears to have stress urinary incontinence while patient B has symptoms consistent with urge incontinence.

After identifying the type of urinary incontinence, clinicians should screen for risk factors, particularly those that are potentially modifiable (BOX). Although there is insufficient evidence from controlled trials that treating factors associated with urinary incontinence results in improvement, the 1996 Agency for Health Care Policy and Research Clinical Practice Guidelines<sup>7</sup> and the consensus statement by the Scientific Committee of the First International Consultation on Incontinence<sup>8</sup> recommend that risk factors be identified and modified. Considering the risk factors outlined in the Box, Patient A is a white multiparous woman who has had vaginal deliveries with and without forceps. More importantly she should be counseled about her modifiable factors such as weight reduction, caffeine intake reduction, and nonpharmacological ways to prevent constipation. Patient B has had 2 vaginal deliveries and a hysterectomy and has multiple comorbid illnesses that include stroke, diabetes, and systolic hypertension. The management for Pa-

tient B should focus on optimization of her blood pressure and diabetes. An alternative to diuretic therapy for her hypertension could also be considered. Her functional impairment may be affecting her ability to reach the toilet and efforts should be taken to optimize her functional status, including appropriate environmental modifications.

A general physical examination should also be performed as part of this initial assessment.<sup>7</sup> This includes neurological, mental status, abdominal, rectal, and pelvic examinations. Direct observation of urine loss can be performed using a cough stress test. Instantaneous urine leakage upon coughing is consistent with stress incontinence. The assessment should also include an estimation of the postvoid residual urine volume. This can be done, after the patient voids, using an ultrasound bladder scanner or through in-and-out bladder catheterization. Laboratory tests performed should include a urinalysis and other tests as appropriately indicated.

The specific treatments used to manage urinary incontinence will be dependent on the patient's unique circumstances and preferences, and this will require clinicians to explore the benefits and risks of the treatment options<sup>7</sup> including nonpharmacological, pharmacological, and surgical management options (TABLE 1). However, it is generally agreed that the first treatment choice should be the least invasive option with the lowest risk for adverse events. This would generally mean that nonpharmacological options should be considered before pharmacological or surgical options.

Pelvic floor muscle training, or Kegel exercises, involves isolation and contraction of the pelvic floor musculature, which play a role in the maintenance of continence. To strengthen the pelvic floor musculature, several pelvic floor muscle contractions should be performed during each session, each contraction should be held for several seconds, and several sessions should be performed each day. It is also important to ensure that the patient is actu-

**Box. Factors Independently Associated With Urinary Incontinence in Women\***

**Modifiable Factors**

**Gynecological**  
 Cystocele  
 Uterine prolapse  
 Nonnormal gynecological examination  
 Poor pelvic floor muscle contraction

**Urological and Gastrointestinal**  
 Recurrent urinary tract infections  
 Dysuria  
 Fecal incontinence  
 Constipation  
 Bowel problems

**Comorbid Diseases**  
 Diabetes  
 Stroke  
 Elevated systolic blood pressure  
 Cognitive impairment  
 Parkinsonism  
 Arthritis  
 Back problems  
 Hearing and visual impairment

**Medications**  
 Diuretics  
 Estrogen  
 Benzodiazepines  
 Tranquilizers  
 Antidepressants  
 Hypnotics  
 Laxatives  
 Antibiotics

**Smoking**

**High Caffeine Intake**

**Higher Body Mass Index**

**Functional Impairment**

**Nonmodifiable Factors**

**Gynecological Factors**  
 Hysterectomy in older women  
 Prolapse surgery

**Pregnancy Related Factors**  
 Vaginal delivery  
 Forceps delivery  
 Cesarean section  
 Increased parity  
 Fetal birth weight

**Age**

**White Race**

**Higher Education**

**Childhood Enuresis**

**Presence of 2 or More Comorbid Diseases**

\*Based on evidence presented in the accompanying Scientific Review.

Bladder training aims to increase the time interval between voiding episodes. The patient is asked to void according to a timetable rather than according to urinary urge. The initial voiding interval (usually 2-3 hours) is increased as tolerated until an agreed upon target voiding interval is reached. In an effort to avoid episodes of incontinence, the patient can be advised to perform pelvic floor muscle contractions if she experiences symptoms of urgency between scheduled voiding. Prompted voiding teaches dependent individuals when and how to initiate their own toileting or to respond when regularly prompted to toilet by a caregiver. Electrical stimulation consists of brief electrical impulses administered via needle or surface electrodes and is used to inhibit detrusor overactivity or to improve pelvic floor musculature.

Returning to our patients and using the evidence outlined in Part 1 of this series,<sup>9,10</sup> both patients may benefit from pelvic floor muscle training. Combining pelvic floor muscle training with bladder training may be even more effective. Patient B may also benefit from prompted voiding,<sup>11</sup> and electrical stimulation could be considered.<sup>12</sup> The cost of these nonpharmacological therapies depends on the methods used to implement them. In addition to direct costs, there is also the indirect cost of time that the patient has to commit to regular participation in these therapies.

Because Patient B has urge incontinence she may also benefit from anticholinergic drugs. The trials<sup>13-15</sup> suggest that she is less likely to experience adverse effects with tolterodine or extended-release oxybutynin. Extended-release tolterodine has also been found not to have age-related differences in its benefits or in adverse events.<sup>16</sup> The most commonly reported adverse effect from these anticholinergic drugs is dry mouth, but other adverse effects can occur (eg, tachycardia, confusion, dizziness, abnormal vision, dry eyes, urinary retention, headache, nausea/dyspepsia, constipation). Anticholinergic medications are also contraindicated in patients who have narrow angle glau-

**Table.** Effective Treatment Options for Women With Urinary Incontinence by Type of Incontinence

Treatment Option	Stress Incontinence	Urge Incontinence
Nonpharmacological	Pelvic floor muscle training Bladder training Prompted voiding	Pelvic floor muscle training Bladder training Prompted voiding Electrical stimulation
Pharmacological		Anticholinergic drugs (antimuscarinic) Tolterodine Oxybutynin
Surgical	Open retropubic colposuspension Suburethral sling procedure	

ally contracting her pelvic floor muscles and not her abdominal or rectal musculature. Physicians can help patients

isolate their pelvic floor musculature by assessing their ability to contract these muscles during pelvic examination.

coma, urinary retention, or gastric retention. However, cost of medication may be an important consideration. The cost in US dollars of a 30-day supply of oral tolterodine is about \$90, or \$80 for the long-acting formulation. Oxybutynin 5 mg taken orally twice daily costs approximately \$50 for a 30-day supply. A 30-day supply of oral oxybutynin extended-release costs \$80 to \$90, depending on dosage. Unlike the short-acting formulations, the long-acting formulations are administered only once per day. There are also transdermal formulations.

Duloxetine, a newly developed serotonin and norepinephrine reuptake inhibitor, may be beneficial in the management of stress incontinence (Patient A).<sup>17</sup> However, the drug is not without adverse effects (eg, nausea, dizziness, dry mouth, constipation), and the effectiveness of this drug in the population at large is not yet known.

### Which Patients With Urinary Incontinence Should Be Referred for Consideration of Surgical Interventions or Further Evaluation?

Patients with stress incontinence (Patient A) should be referred for consideration of surgical interventions if they have failed or are unable to adhere to other nonsurgical interventions, and they are interested in pursuing such options. Patients may want to discuss the various surgical options, so it is useful to have some knowledge of the different procedures and their effectiveness. Based on the evidence,<sup>18,19</sup> suburethral sling procedure and open retropubic colposuspension appear to be the most effective surgical options overall. Open retropubic colposuspension involves making an incision over the lower abdomen and lifting the tissues near the bladder neck and proximal urethra in the pelvic area behind the anterior pubic bones.<sup>18</sup> Suburethral sling procedure uses a combined abdominal and vaginal approach.<sup>19</sup> Strips of material are tunneled under the urethra and attached to either the rectus muscle or iliopectin-

al ligaments resulting in tightening of the sling and increased bladder support every time the woman contracts her rectus muscles. Potential complications associated with anti-incontinence surgery include perioperative complications (eg, infection, hemorrhage, pain, and urinary retention), pelvic organ prolapse, de novo urge symptoms and urge incontinence, and repeat incontinence surgery.

A referral for further evaluation by a urogynecologist, urologist, or gynecologist should also be considered if (1) the diagnosis is uncertain or a treatment plan cannot be established after a basic evaluation; (2) hematuria without infection is present; (3) incontinence is associated with recurrent symptomatic urinary tract infection; (4) there are persistent symptoms of difficult bladder emptying or abnormal postvoid residual volume (a postvoid residual volume of 100 mL to  $\geq 200$  mL is considered inadequate bladder emptying); (5) there is a history of previous anti-incontinence surgery or radical pelvic surgery; (6) the patient has symptomatic pelvic organ prolapse; or (7) the patient has neurological conditions such as multiple sclerosis or spinal cord lesions.<sup>7</sup> The assessment performed by an urogynecologist or urologist might include urodynamic studies, which may provide more objective findings and can be useful in directing therapy. A more complex assessment may also help diagnose subtle neurological or other injuries.

### CONCLUSIONS

The initial assessment of urinary incontinence can be done in the primary care physician's office, and there are effective nonpharmacological, pharmacological, and surgical options available to manage urinary incontinence.

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### REFERENCES

1. Roberts RO, Jacobsen SJ, Rhodes T, et al. Urinary incontinence in a community-based cohort: prevalence and healthcare-seeking. *J Am Geriatr Soc.* 1998; 46:467-472.

2. Stoddart H, Donovan J, Whitley E, Sharp D, Harvey I. Urinary incontinence in older people in the community: a neglected problem? *Br J Gen Pract.* 2001; 51:548-552.
3. Hannestad YS, Rortveit G, Hunskaar S. Help-seeking and associated factors in female urinary incontinence: the Norwegian EPINCONT Study. *Scand J Prim Health Care.* 2002;20:102-107.
4. Ricci JA, Baggish JS, Hunt TL, et al. Coping strategies and health care-seeking behavior in a US national sample of adults with symptoms suggestive of overactive bladder. *Clin Ther.* 2001;23:1245-1259.
5. Shaw C, Tansey R, Jackson C, Hyde C, Allan R. Barriers to help seeking in people with urinary symptoms. *Fam Pract.* 2001;18:48-52.
6. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. *Urology.* 2003;61: 37-49.
7. Fantl JA, Newman DK, Colling J, et al. *Urinary Incontinence in Adults: Acute and Chronic Management.* Rockville, Md: US Dept of Health and Human Services, Agency for Health Care and Policy Research. Clinical Practice Guideline No. 2 (1996 Update); March 1996; Publication 96-0682.
8. Scientific Committee of the First International Consultation on Incontinence. Assessment and treatment of urinary incontinence. *Lancet.* 2000;355:2153-2158.
9. Hay-Smith EJ, Bo K, Berghmans LC, Hendriks HJ, et al. Pelvic floor muscle training for urinary incontinence in women [Cochrane Review]. In: Cochrane Library, Issue 1. Chichester, England: John Wiley & Sons; 2003.
10. Wyman JF, Fantl JA, McClish DK, Bump RC, for the Continence Program for Women Research Group. Comparative efficacy of behavioral interventions in the management of female urinary incontinence. *Am J Obstet Gynecol.* 1998;179:999-1007.
11. Eustice S, Roe B, Paterson J. Prompted voiding for the management of urinary incontinence in adults [Cochrane Review]. In: Cochrane Library, Issue 1. Chichester, England: John Wiley & Sons; 2003.
12. Yamanishi T, Yasuda K, Sakakibara R, Hattori T, Suda S. Randomized, double-blind study of electrical stimulation for urinary incontinence due to detrusor overactivity. *Urology.* 2000;55:353-357.
13. Lee JG, Hong JY, Choo MS, et al. Tolterodine: as effective but better tolerated than oxybutynin in Asian patients with symptoms of overactive bladder. *Int J Urol.* 2002;9:247-252.
14. Malone-Lee J, Shaffu B, Anand C, Powell C. Tolterodine: superior tolerability than and comparable efficacy to oxybutynin in individuals 50 years old or older with overactive bladder: a randomized controlled trial. *J Urol.* 2001;165:1452-1456.
15. Appell RA, Sand P, Dmochowski R, et al. Prospective randomized controlled trial of extended-release oxybutynin chloride and tolterodine tartrate in the treatment of overactive bladder: results of the OBJECT Study. *Mayo Clin Proc.* 2001;76:358-363.
16. Zinner NR, Mattiasson A, Stanton SL. Efficacy, safety, and tolerability of extended-release once-daily tolterodine treatment for overactive bladder in older vs younger patients. *J Am Geriatr Soc.* 2002; 50:799-807.
17. Norton PA, Zinner NR, Yalcin I, Bump RC. Duloxetine vs placebo in the treatment of stress urinary incontinence. *Am J Obstet Gynecol.* 2002;187:40-48.
18. Lapitan MC, Cody DJ, Grant AM. Open retropubic colposuspension for urinary incontinence in women [Cochrane Review]. In: Cochrane Library, Issue 1. Chichester, England: John Wiley & Sons; 2003.
19. Bezerra CA, Bruschini H. Suburethral sling operations for urinary incontinence in women [Cochrane Review]. In: Cochrane Library, Issue 1. Chichester, England: John Wiley & Sons; 2003.