The Role of the Primary Care Physician in the Management of Bladder Dysfunction

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Urinary incontinence is a major health challenge for primary care physicians. Unfortunately, the majority of incontinent patients remain untreated. Primary care physicians are ideally positioned to screen for and manage urinary incontinence. A knowledge of basic micturition physiology is important for the physician to accurately identify the cause of incontinence and arrive at the correct treatment course. To this end, this article reviews the physiology of the lower urinary tract, describes the clinical types of urinary incontinence, and outlines a stepwise approach for the primary care physician to the basic evaluation and management of patients with this condition.
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Key words: Bladder function • Lower urinary tract • Urinary incontinence • Postvoid residual urine volume

Urinary incontinence is a multifactorial syndrome produced by a combination of genitourinary pathology, age-related changes, and comorbid conditions that impair normal micturition, the functional ability to control urination, or both.

Prevalence and Impact

The prevalence of urinary incontinence increases with age, and the condition affects women more than men by a ratio of 2:1. Urinary incontinence afflicts 15% to 30% of elderly persons living at home, one third of those in the acute-care setting, and at least half of those in nursing homes.[1] The condition may cause morbidities such as cellulitis, pressure ulcers, urinary tract infections, falls with fractures, sleep deprivation, social withdrawal, depression, and sexual dysfunction.[1-3] In addition, urinary incontinence impairs quality of life, affecting the patient's emotional well-being, social functioning, and general health. Estimated annual urinary incontinence–related costs totaled more than $26 billion in 1995.[4]

Primary care physicians are ideally positioned to screen for and manage urinary incontinence.[5,6] The majority of men and women, particularly those aged 60 years or older, use a family practitioner or internist to obtain ongoing medical care. Persons aged 75 years or older average 6.5 physician office visits per year.[7] For patients who are enrolled in some managed care plans, a primary care physician may be the only feasible pathway to specialized treatment when deemed necessary.

Unfortunately, the involvement of primary care physicians in the management of urinary incontinence is suboptimal. A recent publication reported that primary care physicians asked only 22% of patients aged 60 years or older about symptoms of incontinence and that the rate of assessment was below 50%.[8] There are challenges facing primary care physicians in their efforts to deal with this important health condition, including difficulties in implementing established guidelines, lack of agreement within the guideline principles, lack of outcome expectancy of the interventions, insufficient awareness, lack of familiarity, and lack of knowledge. Thus, primary care physicians need to take a more active role in assessing and managing urinary incontinence.

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A knowledge of basic micturition physiology is important in understanding the causes and treatment of urinary incontinence and will help the practitioner identify the type of incontinence and suggest the correct treatment course. More important, this working knowledge can prevent the prescription of an inappropriate treatment or drug, thus preventing many adverse effects.

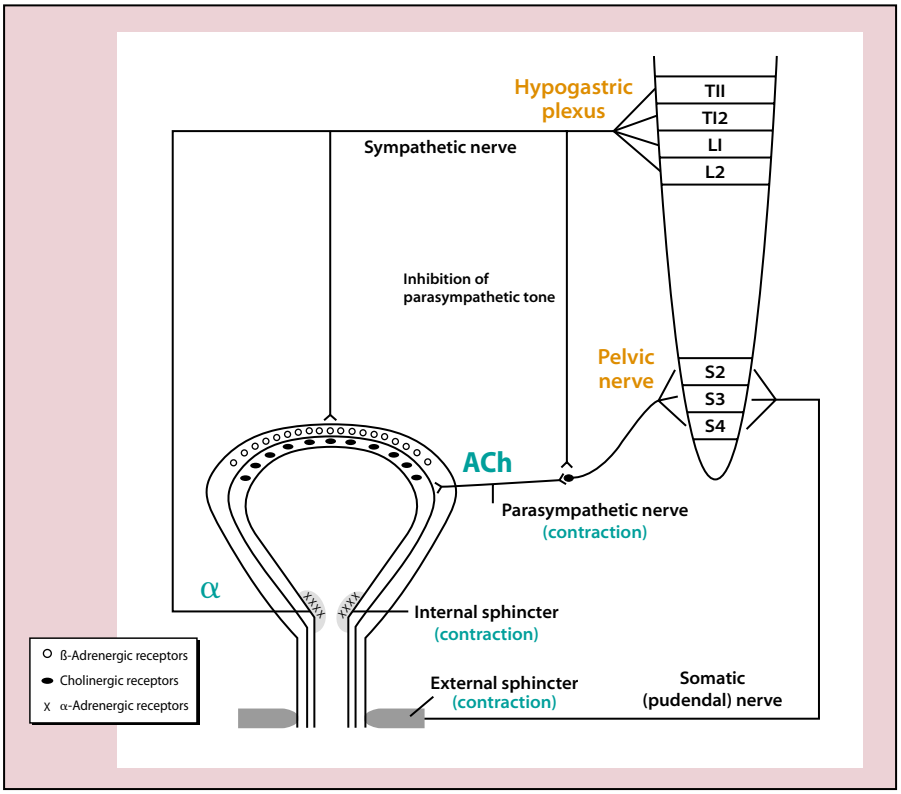

Figure 1. *Schematic illustration of bladder innervations through sympathetic, cholinergic, and somatic nerves. L1 and L2, lumbar nerves 1 and 2; S2-S4, sacral nerves 2-4; T11 and T12, thoracic nerves 11 and 12; ACh, acetylcholine.*

Lower Urinary Tract Anatomy and Physiology

The lower urinary tract includes the bladder, the urethra, and 2 urethral sphincters. The internal sphincter lies in the proximal urethra at the bladder neck and is composed predominantly of smooth muscle. The external sphincter lies distally at the level of the urogenital diaphragm and is composed of striated muscle. Innervation of the lower urinary tract is derived from the parasympathetic S2 to S4 region, the sympathetic T11

Table 1
Causes of Transient Incontinence

DIAPPERS
Delirium/dementia
Infection
Atrophic vaginitis/urethritis
Pharmaceuticals
Psychiatric causes
Endocrine causes
Restricted mobility
Stool impaction

From Resnick NM, Yalla SV. *N Engl J Med.* 1985;313:800-805.[16]

to L2 region, and the somatic voluntary nervous system, which lies in the S2 to S4 region.

The parasympathetic nervous system innervates the detrusor. Increased cholinergic activity increases the force and frequency of detrusor contraction, whereas reduced activity has the opposite affect. The sympathetic nervous system innervates both the bladder and the urethra, with its effect determined by local receptors. Although adrenergic receptors are sparse in the bladder body, those normally present are ß-receptors—their stimulation relaxes the bladder. Receptors in the bladder base and proximal urethra are α-receptors—their stimulation contracts the internal sphincter. Thus, activation of the sympathetic nervous system facilitates storage of urine in a coordinated manner. The somatic nervous system is the primary source of innervation of the urogenital diaphragm and external sphincter (Figure 1).

The central nervous system integrates control of the urinary tract; the pontine micturition center mediates synchronous detrusor contraction and sphincter relaxation, whereas higher centers in the frontal lobe, basal ganglia, and cerebellum exert inhibitory and facilitatory effects. Storage of urine is mediated by detrusor relaxation and closure of the sphincters. Detrusor relaxation is accomplished by central nervous system inhibition of parasympathetic tone, whereas sphincter closure is mediated by a reflex increase in the activity of the α-adrenergic and somatic nervous systems. Voiding occurs when detrusor contraction is stimulated by the parasympathetic nervous system and coordinated with sphincter relaxation.[9]

Etiology

Urinary incontinence occurs as the result of one of the following basic abnormalities:

- The outlet is open when it should be closed.
- The outlet is closed when it should be open.
- The detrusor fails to contract.
- The detrusor contracts when it should not.

Clinical Types of Incontinence

Transient Incontinence

Transient incontinence is incontinence that is related to an acute medical condition or caused by a medication. The common causes of transient incontinence are summarized in the mnemonic DIAPPERS (Table 1). Transient incontinence is precipitated by remediable factors. The condition affects approximately one third of community-dwelling older persons and accounts for half of the cases of incontinence among hospitalized older persons. The primary care physician's role is to identify and remedy the causes of acute incontinence, paying special attention to medications, including over-the-counter drugs. Medications that may interfere with bladder function are listed in Table 2.

Detrusor Overactivity (Urge Incontinence)

Detrusor overactivity, or urge incontinence, is characterized by the contraction of the detrusor when it should not contract. Detrusor overactivity and urinary urgency are discussed in detail elsewhere in this supplement (see Pelman, p. S16).

Stress Incontinence

In the case of stress incontinence, the outlet is open when it should be closed. After urge incontinence, this is the second most common type of incontinence. Stress incontinence

Table 2
Pharmacologic Agents That May Affect Bladder Function

Agent	Effect
Alcohol	Polyuria, delirium, sedation
Sedatives, hypnotics	Sedation, confusion
Opiates	Fecal impaction, sedation, detrusor dysfunction
Diuretics	Polyuria, urgency, frequency
Calcium channel blockers	Detrusor relaxation
Anticholinergics	Urinary retention, overflow incontinence
Antipsychotics	Urinary retention, overflow incontinence
Tricyclic antidepressants	Urinary retention, overflow incontinence
α-Adrenergic blockers	Stress incontinence
α-Adrenergic agonists	Urinary retention
ß-Agonists	Urinary retention

results from failure of the sphincter mechanism to preserve outlet closure during bladder filling. The condition occurs coincident with increased intra-abdominal pressure in the absence of a bladder contraction. Leakage is due to impaired pelvic support or, less commonly, failure of the urethral closure. The latter intrinsic sphincter deficiency can be caused by trauma and scarring from anti-incontinence surgery in women and prostatectomy in men or by severe urethral atrophy. Stress maneuvers may trigger detrusor overactivity; with such stress-related urge incontinence, leakage occurs after a several-second delay following the stress maneuver. Neurologic conditions may also cause stress-type incontinence in which the nerves to the sphincter are destroyed by prior surgery, cancer, or cord lesions.

Overflow Incontinence

Overflow incontinence is characterized by an outlet that is closed when it should be open. This condition usually occurs because of mechanical obstruction due to prostatic hypertrophy, prostate cancer, urethral scarring, or a pelvic mass.

Overflow incontinence may also occur when the detrusor fails to contract because of a weak bladder muscle—as a result of neurologic illnesses, such as neuropathy from diabetes, syphilis, or vitamin B_{12} deficiency—or because of damage to the sacral plexus from a tumor or trauma. Anticholinergic medications and calcium channel blockers impair detrusor muscle contractions and may precipitate overflow incontinence. Outlet obstruction is the second most common cause of urinary incontinence in older men. Most obstructed men, however, are not incontinent. Parkinson disease, alcoholism, spinal tumors, disk herniation, and advanced degrees of spinal stenosis can all cause overflow incontinence.[10]

Functional Incontinence

Functional incontinence is defined as a loss of urine that is not related to bladder dysfunction but to impairments of physical and/or cognitive functioning, such as arthritis, muscle weakness, and environmental barriers.

Parkinson disease, alcoholism, spinal tumors, disk herniation, and advanced degrees of spinal stenosis can all cause overflow incontinence.

Evaluation

The evaluation by the primary care physician of a patient with urinary incontinence should focus on obtaining a patient history, performing a physical examination, determining postvoid residual urine volume (PVR), and performing urinalysis and urine culture testing.

Patient History

More than 50% of patients with incontinence do not volunteer information regarding their condition. Therefore, the primary care physician needs to ask specific questions about the signs and symptoms of incontinence. The history taking should focus on the frequency, severity, and duration of the symptoms; the pattern of the incontinence; and associated symptoms, such as straining to void, incomplete emptying, dysuria, hematuria, or the presence of any suprapubic or perineal discomfort. In addition, the physician should document the presence of other illnesses, such as cancer, diabetes, and neurologic diseases; a history of urinary tract infections; and past surgical history, especially in relation to the genitourinary tract. A medication list, including nonprescription agents, should be obtained. Functional assessment is recommended in the elderly.

A well-obtained patient history will help to identify reversible or persistent incontinence. Reversible causes, which are described in Table 1, should be addressed by the physician as an integral part of the evaluation and management of bladder dysfunction, because correcting these transient causes will lead to resolution of symptoms in most cases. If a pharmaceutical agent is suspected as the cause of incontinence (see Table 2), the drug should be discontinued, if possible, and another medication with a lower side-effect profile should be substituted.

In most instances, the patient history will help identify the type and likely cause of bladder dysfunction. A history of urine leakage during times of increased abdominal pressure suggests stress incontinence; a history of urinary dribbling suggests overflow incontinence; and symptoms of urgency and frequency suggest an overactive bladder. A recent change in functional status, nutritional balance, or fluid intake may be an indication of underlying infection or delirium. For patients with neurologic conditions, such as multiple sclerosis, spinal cord injury, or neuropathy, referral to a urologist

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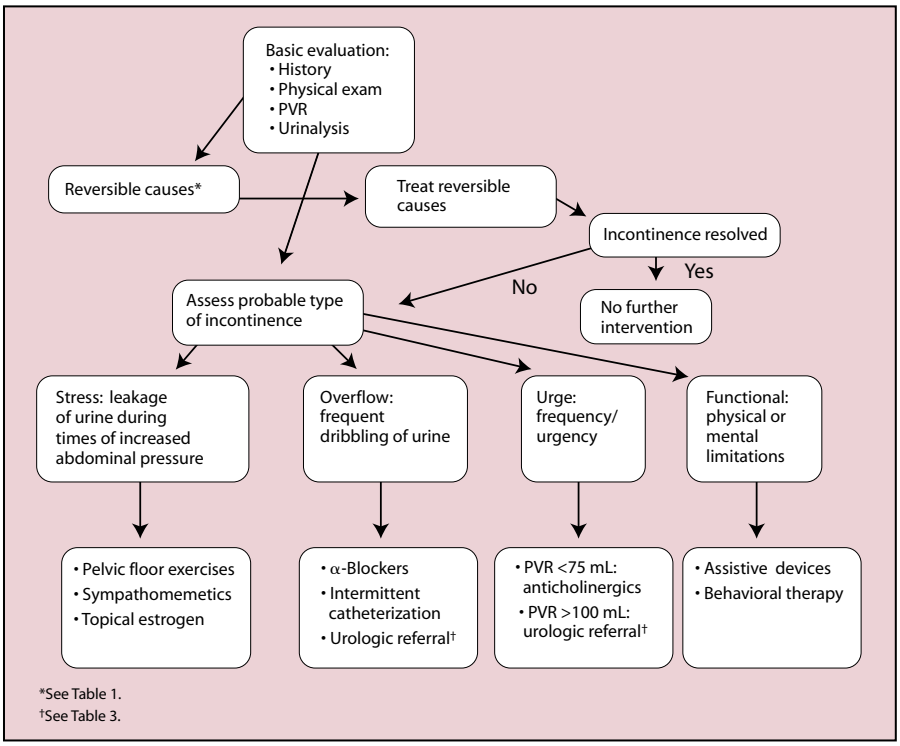

Figure 2. *Algorithm for primary care physicians for the evaluation and management of bladder dysfunction. PVR, postvoid residual urine volume.*

Table 3
Indications for Referral to a Urologist

- Uncertain diagnosis
- Recurrent urinary tract infection
- Hematuria
- Pelvic prolapse
- Prostate nodule
- Neurologic conditions
- PVR >200 mL
- Previous surgical interventions
- No response to therapy

PVR, postvoid residual urine volume.

should be made for a full evaluation and tailored management plan. Following the initial evaluation by a urologist, the primary care physician can monitor the treatment plan.

Physical Examination

The physical examination should identify other medical conditions that may be present, such as orthostatic hypotension, congestive heart failure, peripheral edema, and arthritis. Functional testing should be performed to assess the patient's functional abilities, mobility, and dexterity.

The stress test is conducted when the patient has a full bladder. He or she is asked to stand with feet apart and cough or strain to cause urine loss. Leakage amount and timing is documented. Usually, patients with sphincter incontinence lose a few drops of urine. In patients with mixed incontinence, the leak typically starts after abdominal pressure is relieved, but may start at the time of the stress, and continues for 5 to 10 seconds after release of abdominal pressure.[11]

Abdominal examination should include palpation of the bladder to determine if there is distention. Pelvic examination of female patients with incontinence is necessary to look for atrophic vaginitis, urethritis, pelvic muscle laxity, a pelvic mass, and/or the presence of a rectocele, cystocele, or pelvic prolapse. Rectal examination is also essential to look for skin irritation, resting tone, voluntary control of the anal sphincter, prostate enlargement or nodules in men, and fecal impaction. Neurologic examination should be performed, with emphasis on gait, mobility, mental status, perineal sensation, sacral reflexes, and signs of peripheral neuropathy or other neurologic illnesses.

PVR Measurement

PVR measurement is an essential component of the evaluation of patients with incontinence. PVR can be easily measured with an ultrasound bladder scanner. Optimally, the measurement should be made within 5 minutes of voiding. Measuring after an intentional void is better than after an incontinent episode.[9]

Laboratory Investigation

Urinalysis and urine culture are important because a urinary tract infection may be the precipitating cause of incontinence in many patients and the presence of hematuria may be indicative of a serious underlying condition in need of further evaluation. Basic laboratory evaluation should also include blood urea nitrogen, creatinine, serum electrolyte, and fasting blood glucose testing. The need for further testing

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and/or referral depends on the results of the initial basic assessment conducted by the primary care physician.

Diagnosis or Referral

Based on the evaluation described above, the primary care physician should be able to identify the type and cause of bladder dysfunction in most instances and tailor an intervention plan accordingly. Figure 2 illustrates a stepwise approach to the evaluation and management of bladder dysfunction by the primary care physician. Indications for referral to a urologist are summarized in Table 3.

Management

After the basic evaluation, the management of urinary incontinence by the primary care physician should be based on an understanding of the underlying pathophysiology of the disorder and should be tailored to each patient. In general, fluid management should include avoiding caffeinated beverages and alcohol and minimizing evening intake if nocturnal urinary incontinence is bothersome. Constipation should be managed. If pads or protective garments are used, they should be chosen on the basis of patient sex and the type and volume of incontinence. The management of overactive bladder is discussed in detail elsewhere in this supplement (see Pelman, p. S16).

Stress Incontinence

Pelvic muscle exercises that strengthen the muscular component of urethral support are the cornerstone of noninvasive treatment of stress incontinence and may be prescribed by the primary care physician. Unfortunately, the exercises are often performed incorrectly or for insufficient duration. The pelvic muscle exercise instructions should focus on isolation of pelvic muscles; avoidance of buttock, abdomen, or thigh muscle contractions; moderate repetition of the strongest contraction possible (eg, 3 sets of 8 to 10 contractions held for 6 to 8 seconds 3 or 4 times per day); and contractions of progressively longer duration—up to 10 seconds if possible.[12]

Topical estrogen also may reduce stress incontinence in patients with atrophic vaginitis and urethritis. α-Adrenergic agonists stimulate urethral smooth muscle contraction and increase bladder outlet resistance. Phenylpropolamine has been demonstrated to cause subjective improvement in 30% to 60% of patients.[13] The recommended dosage is 25 mg twice daily. Possible side effects include nausea, dry mouth, insomnia, itching, and restlessness. This medication should be used with caution in hypertensive patients.

Surgical intervention may be required for patients who have a prolapse.

Overflow Incontinence

The management of overflow incontinence by the primary care physician depends on the cause of the disorder. For outflow obstruction caused by benign prostatic hypertrophy, a range of medical treatments are available. α-Blockers, such as terazosin and tamsulosin, in dosages of 0.4 mg to 0.8 mg daily have been shown to decrease smooth muscle tone in the bladder neck and improve urinary flow. Finasteride, a 5-α-reductase inhibitor, has been demonstrated to cause a regression of prostate enlarge-

Main Points

- Primary care physicians are ideally positioned to screen for and manage urinary incontinence. Unfortunately, the involvement of primary care physicians in the management of urinary incontinence is suboptimal.
- A knowledge of basic micturition physiology is important in understanding the cause and treatment of urinary incontinence and will help the practitioner identify the type of incontinence and suggest the correct treatment course. More important, this working knowledge can prevent the prescription of an inappropriate treatment or drug, thus preventing many adverse effects.
- Urinary incontinence occurs because the outlet is open when it should be closed, the outlet is closed when it should be open, the detrusor fails to contract, or the detrusor contracts when it should not.
- The clinical types of incontinence are transient incontinence, detrusor overactivity (urge incontinence), stress incontinence, overflow incontinence, and functional incontinence.
- The primary care physician's evaluation of urinary incontinence should include a history taking, physical examination, postvoid residual volume measurement, urinalysis, and urine culture.
- The physical examination of a patient with urinary incontinence should include a urine stress test, abdominal examination, pelvic examination in female patients, rectal examination, and neurologic evaluation.
- The management of urinary incontinence by the primary care physician should be based on an understanding of the underlying pathophysiology of the disorder and should be tailored to each patient.

ment; however, fewer men appear to benefit, the effect is more modest, and the benefit is more delayed compared with tamsulosin therapy.[14]

Underactive Detrusor

Management of detrusor underactivity is directed toward reducing residual volume, eliminating hydronephrosis (if present), and preventing urosepsis. Intermittent catheterization may be performed to decompress the bladder. Primary care physicians should pay special attention to contributing factors, such as fecal impaction and medications (anticholinergics, calcium channel blockers, antidepressants, antipsychotics), which should be discontinued if possible. A cholinergic agent, such as bethanechol chloride, is occasionally useful, but evidence for its efficacy is equivocal at best.[15] Cholinergic agents should be used only under the supervision of a urologist. Intermittent catheterization may be indicated for patients with known neuropathy or neurogenic bladder.

Conclusion

Urinary incontinence remains a major health challenge for primary care physicians. Unfortunately, the majority of patients with urinary incontinence remains untreated. Primary care physicians are in an ideal position to manage patients with incontinence. Following a stepwise approach to the basic evaluation and management of urinary incontinence would greatly help primary care physicians tackle this challenge and, more importantly, improve the quality of life of their patients. ■

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