Urinary Incontinence

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KEYWORDS

- Urinary incontinence • Stress incontinence • Urge incontinence
- Pelvic floor muscle training

KEY POINTS

- Many patients experience urinary incontinence but fail to report symptoms to a physician unless asked directly.
- Determining the type of urinary incontinence using history and physical examination is critical to effective treatment.
- The DIAPPERS mnemonic may help physicians recall reversible causes of urinary incontinence that should be ruled out in newly diagnosed individuals.
- Lifestyle modifications are helpful for urge, stress, and mixed incontinence.

INTRODUCTION

Urinary incontinence is a common, although often underreported, condition. Estimates suggest that approximately 20 million women and 6 million men in the United States experience urinary incontinence during their lives.[1] Furthermore, up to 77% of women in nursing homes may have urinary incontinence.[2] Despite such prevalence, only 25% of individuals affected by incontinence seek or receive treatment.[2] Nevertheless, urinary incontinence has significant impacts on quality of life and overall health for patients. Higher rates of depression and social isolation have been noted for patients with urinary incontinence.[3,4] Also, higher rates of hospitalization, urinary tract infection, pressure ulcers, and admission to long-term residential care as well as lower work productivity, general health, and quality of life are noted in populations with urinary incontinence compared with those without.[5–8] Although not often sought out, a variety of treatment options exist that can significantly improve symptoms. Lifestyle modifications, medications, and surgical options improve incontinence episode frequency and ultimately improve quality of life and general health for those individuals impacted.

PATHOPHYSIOLOGY

Urinary incontinence can be defined simply as the loss of bladder control or unintentional voiding. Urinary incontinence can be classified as stress, urge, mixed, overflow, or functional. Defining the underlying cause of incontinence episodes is critical for appropriate treatment.

Stress incontinence develops when the urinary sphincter becomes weak and fails to function appropriately. Clinically, patients will note involuntary loss of urine with increased abdominal pressure, effort, or physical exertion.[9] Laughing, coughing, and exercise are common triggers of stress incontinence episodes. This type of incontinence is common in men after prostate surgery.[10] It is also common in women, as an estimated 50% of women under age 65 years with urinary incontinence have stress type.[11]

Urge incontinence results from overactivity of the detrusor muscle.[12] As the name suggests, a common patient complaint is involuntary loss of urine associated with feelings of extreme urgency to void with limited time to appropriately toilet.[9] The diagnosis of mixed incontinence should be given to patients who display features of both stress and urge type. Mixed incontinence is more common than urge type alone, as only 10% of women have isolated urge incontinence, whereas 30% have mixed type.[11] Although mixed incontinence is less common than stress type, studies have shown that women with mixed or urge incontinence may have lower quality-of-life scores than those with stress alone.[13]

Overflow incontinence results from obstruction or impaired detrusor contractility that leads to bladder distention, such as seen in men with benign prostatic hyperplasia leading to obstruction.[10,14]

Individuals may also suffer from functional incontinence, whereby cognitive or mobility impairment prevents an individual from appropriately toileting independently with no underlying bladder or neurologic pathologic condition.[14,15]

RISK FACTORS

Multiple risk factors for urinary incontinence have been identified. For women, high parity, history of vaginal deliveries, and menopause are risk factors for the development of urinary incontinence.[16–18] Similarly, men who have undergone prostate surgery may be higher risk for incontinence. In both cases, damage to neural control of the bladder or pelvic floor muscles or direct mechanical trauma to the pelvic floor is thought to underlay the development of urinary incontinence.[19] Obesity and increasing age are risk factors for both genders in the development of urinary incontinence.[16–18] After age 80, both genders are equally affected by urinary incontinence.[20]

DIAGNOSIS

The diagnosis of urinary incontinence can be readily made by a physician simply by asking if the patient is experiencing episodes of unintended loss of urine. Because the condition is often embarrassing for patients, individuals may not report incontinence unless directly asked by a physician. Once a diagnosis of urinary incontinence has been made, however, the physician must perform a more thorough history to accurately assess the underlying cause or type of incontinence.

An appropriate history for a patient with urinary incontinence should include an assessment of reversible causes. The DIAPPERS mnemonic created by Resnick provides an easy way to remember the common reversible causes of incontinence, which include:

- D: Delirium
- I: Infection

- A: Atrophic vaginitis
- P: Pharmaceuticals, such as alpha-adrenergic antagonists, ACE inhibitors, calcium channel blockers, diuretics, COX 2 selective NSAIDS, opioids, skeletal muscle relaxants, antidepressants, antipsychotics, alcohol, antihistamines, anticholinergics, and thiazolidinediones.[21,22]
- P: Psychological disorders, such as depression
- E: Excessive urine output secondary to overconsumption of fluids, medications, or chronic conditions, such as diabetes
- R: Reduced mobility
- S: Stool impaction[23]

Once reversible causes have been excluded, the physician must determine the type of urinary incontinence that the patient is experiencing. Eliciting typical symptoms and triggers can help to categorize the type of incontinence. Standardized questionnaires may simplify the process of determining type of incontinence. The 3 Incontinence Questions, for example, has been shown to have a sensitivity of 0.86 for stress incontinence and 0.75 for detecting urge incontinence in middle-aged and older women.[24]

A physician should also consider how other medical and surgical history may contribute to incontinence episodes. For instance, a patient with stress incontinence and chronic cough secondary to chronic obstructive pulmonary disease (COPD) may benefit most from treating the COPD to decrease coughing-triggered incontinence.

In addition to a thorough history, a physical examination focused on anatomic abnormalities and evidence of contributing causes may be helpful in determining the type of incontinence the patient is experiencing.[21,25] The physical examination should include a prostate or gynecologic examination to help rule out contributing causes.[26] If a diagnosis of stress incontinence is suspected, the physician should perform the cough stress test to confirm the diagnosis.[14,27,28] While in the dorsal lithotomy position with a full bladder, a patient is asked to relax his or her pelvic muscles and cough once during the cough stress test. If no leakage occurs, the test should be repeated with the patient in a standing position. A positive test, defined as leaking within 5 to 15 seconds after coughing, confirms the diagnosis of stress incontinence.[22,29,30]

Laboratory studies are not routinely indicated unless the history or physical examination suggests a specific cause, such as polyuria secondary to diabetes. Nonetheless, many physicians find it helpful to obtain a urinalysis and a serum creatinine test to rule out urinary retention, infection, and other reversible causes.[21]

Requesting patient-completed voiding diaries may help a physician to determine patterns or triggers associated with a particular type of incontinence. For example, patients with urge incontinence frequently report awakening 2 or more times per night to void, whereas those with stress incontinence rarely report nighttime symptoms.[31,32] A voiding diary should include a record of all incontinent episodes as well as all continent voiding episodes over a period of time. Three days of record should be sufficient to aid with diagnosis and treatment plans.[33–35]

Although imaging need not be ordered for every patient, if a physician suspects a patient has overflow incontinence, a postvoid residual may be helpful in confirming the diagnosis.[36] A postvoid residual volume may be calculated after the patient has emptied his or her bladder using either ultrasound or intermittent bladder catheterization to quantify the amount of urine remaining in the bladder.[27] A postvoid residual volume of greater than 200 mL is diagnostic of overflow incontinence, whereas a residual volume of less than 50 mL rules out overflow incontinence as a contributor to a patient's symptoms.[21]

TREATMENT

Treatment of urinary incontinence may include lifestyle modifications, medication, or surgical intervention. Treatment recommendations vary by type of urinary incontinence, yet treatment of all types focuses primarily on improved quality of life for the patient rather than disease-oriented outcomes. Thus, treatment modalities should be chosen based on patient preference.[2,21] For all patients with urinary incontinence, psychological intervention should be considered because it may help to improve coping skills and overall quality of life.[37]

Urge Incontinence

Patients with urge incontinence often cite urinary frequency, urgency, and nocturia as the most bothersome symptoms experienced.[20] Depending on the most concerning symptom, patients may use behavioral modifications, medications, devices, or surgery to help alleviate concerns.[38]

Behavioral or lifestyle modifications have been shown to improve urinary incontinence. Initial interventions should include modification of fluid intake and avoidance of bladder irritants, such as caffeine, alcohol, and artificial sweeteners.[39] Encouraging timed voiding every 1 to 2 hours can also greatly improve urge incontinence symptoms.[39] In addition, bladder retraining and pelvic floor muscle strengthening exercises have been shown to be beneficial for patients.[40] When performed properly, pelvic floor muscle exercises have been shown to be more effective than medications for reducing urge incontinence episodes.[41]

Pelvic floor muscle strengthening relies on the repetitive and selective contraction of specific muscles to improve strength, endurance, and muscle coordination, allowing the patient to improve voiding control and delay voiding to allow sufficient time to toilet.[42] Patients may seek out specialized physical therapists to aid in teaching effective muscle strengthening regimens. Furthermore, biofeedback and electrical or magnetic stimulation may also be added to training to allow for optimal improvement in muscle control.[42,43] Some studies have even shown benefit in referring at-risk patients for pelvic floor muscle training in the immediate and late postpartum period to prevent future incontinence.[44]

Although medication alone rarely eradicates urge incontinence episodes, pharmacologic treatment can be an important component in a comprehensive plan to improve incontinence.[20,45] Anticholinergic medications are the preferred first-line pharmaceutical agents for urge incontinence because they reduce detrusor overactivity by antagonizing the M2 and M3 muscarinic receptors in the bladder.[46] Common anticholinergic medications are listed in **Table 1**. Anticholinergic medications should be used by patients for 4 to 8 weeks to accurately ascertain the benefit of the therapy.[38] Unfortunately, side effects, such as tachycardia, palpitations, nausea, constipation, blurry vision, confusion, dry mouth, and urinary retention, are common. Physicians should recommend long-acting anticholinergic medications, such as fesoterodine, oxybutynin, tolterodine, trospium, darifenacin, and solifenacin, to help limit side effects.[38] Patients with narrow angle glaucoma and gastrointestinal obstruction should not use anticholinergic medications.[46] Furthermore, although 60% to 70% of patients in nursing homes have urinary incontinence, anticholinergic medications should be used with caution in this population because of worsening confusion and interaction between anticholinergic medications and cholinesterase inhibitors commonly used to treat dementia.[46]

Beta-adrenergic agonist medication, such as mirabegron, that acts on the beta-3 adrenergic receptors of the detrusor muscle to promote relaxation, is also an option

Table 1
Anticholinergic treatment of urge incontinence

Class	Medication	Dose (mg)	Route	Frequency
Nonselective M3	Propantheline (Pro-Banthine)	7.5–30	Oral	3–5 times daily
	Tolterodine (Detrol LA)	4	Oral	Daily
	Trospium (Sanctura)	20	Oral	2 times daily
	Solifenacin (VESIcare)	5–10	Oral	Daily
Selective M3	Darifenacin (Enablex)	7.5–15	Oral	Daily
Smooth muscle relaxant	Oxybutynin (Ditropan)	2.5–5	Oral	1–3 times daily
	Oxybutynin extended release (Ditropan XL)	5–30	Oral	Daily
	Oxybutynin transdermal (Oxytrol)	4.9	Transdermal	Twice per week
	Hyoscyamine (Levsin)	0.125–0.375	Oral	2–4 times daily

for pharmacologic treatment.[47] When using mirabegron, patients can expect to have 1 to 2 less incontinence episodes per day.[48] Commonly reported side effects with use of mirabegron include nausea, diarrhea, dizziness, headache, and increased blood pressure.[47]

When behavioral and oral pharmacologic interventions have proven ineffective, more invasive treatment modalities may be recommended for urge incontinence. For example, injection of onabotulinumtoxinA into the detrusor muscle may decrease incontinence and improve quality of life, as reported by patients on standardized questionnaires, for 3 to 6 months.[49] Similarly, posterior tibial nerve stimulators may be placed during an in-office procedure and can reduce incontinence in up to 75% of patients who have failed behavioral modification treatment.[38,50] Also, surgery to implant sacral, paraurethral, or pudendal nerve stimulators may also have a role in treatment of refractory urge incontinence.[51]

Stress Incontinence

Whereas urge incontinence results from an overactivity of the detrusor muscle, stress incontinence is the result of a weakening of the urinary sphincter, allowing leakage of urine that is exacerbated by increased intra-abdominal pressure. Lifestyle interventions have been shown to be effective for treatment of both types of incontinence. Weight loss and increased physical activity have been shown to decrease frequency of incontinence symptoms.[39,52] Pilates, yoga, Tai chi, and core training may be particularly helpful for incontinence symptoms.[53] Complementary therapies, such as acupuncture, hypnotherapy, and reflexology, have also been shown to have some benefit.[54–56] Patients should also be educated on managing fluid intake and coordinating intake with toileting schedule to facilitate fewer incontinence episodes.[39] Elimination of contributing factors, such as treatment of constipation and chronic cough, can also help to decrease stress incontinence episodes.[39] Although the mechanism is not well understood, smoking cessation is effective for improving incontinence of both the stress and the urge type.[39]

Although lifestyle changes should be recommended for both urge and stress incontinence patients, no medications are approved for the treatment of stress incontinence. Alpha-adrenergic agonists, such as pseudoephedrine, may have some benefit, although significant adverse effects limit practical usefulness.[57] However, some patients may benefit from taking an alpha-adrenergic agonist twice daily or 1 hour before exercise.[57] Similarly, Cymbalta has been shown to have some benefit

in reducing stress incontinence episodes, but adverse effects also limit its off-label use in practice for only stress incontinence as an indication.[58]

Although few pharmacologic options exist for stress incontinence, mechanical devices may prove quite effective for patients as part of a treatment regimen. Intraurethral plugs and extraurethral seals may be fitted that can prevent leakage, whereas pessaries may be used to support the bladder neck and thereby stop stress incontinence events.[59] Pessaries have been shown to be low risk, low cost, and rapidly effective and to have minimal contraindications for patients.[38]

Surgical intervention is often viewed as a last resort in treatment of urinary incontinence because of potential complications of an invasive procedure. However, for stress incontinence, surgery may prove to be quite beneficial and may be a first-line treatment. Ultimately, 30% of women with stress incontinence will choose to undergo surgery.[60] Surgery can be expected to improve incontinence symptoms for many women with improvement rates as high as 90% noted in some studies with complication rates of less than 5%.[2]

Interestingly, stress incontinence treatments have not often been compared in head-to-head effectiveness trials, so physicians should use clinical judgment and patient preference to help guide recommendations for treatment modality to individual patients.[38]

Mixed Incontinence

Mixed incontinence should be treated with strategies for stress and urge incontinence using patient-reported predominant symptoms as a guide for which treatment to use first. Of note, patients with mixed incontinence who undergo surgical treatment of stress incontinence often experience improvement in urge symptoms as well.

Overflow Incontinence

Overflow incontinence occurs when the bladder is unable to empty effectively resulting in overfilling of the bladder with subsequent spillover incontinence. Treatments therefore focus on targeting the underlying pathologic condition contributing to bladder ineffectiveness to facilitate bladder emptying. If medications are causing bladder ineffectiveness, such as occurs with anticholinergic therapies, then those medications should be tapered or discontinued.[38] If neurologic disease has resulted in impaired detrusor innervation, then intermittent or indwelling catheter placement will be the most effective treatment strategy.[38]

Functional Incontinence

Functional incontinence results not from pathologic condition within the genitourinary system, but rather from an ailment that results in cognitive or motor difficulty that leads to the inability for the patient to reach the toilet in a timely appropriate manner. Treatment focuses on assisting with toileting to ensure that the bladder is emptied regularly.[38]

Referral

Physicians in primary care should consider referral of patients to a urologist or urogynecologist when incontinence symptoms are associated with recurrent symptomatic urinary tract infections, new-onset neurologic symptoms, marked prostate enlargement, or pelvic organ prolapse past the introitus. Significant pelvic pain, persistent hematuria, persistent proteinuria, previous pelvic radiation, a postvoid residual greater than 200 mL, or uncertain diagnosis should also prompt referral.[30,61]

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