

EVALUATION OF URINARY INCONTINENCE IN WOMEN

STEVEN P. PETROU, FABIO BARACAT

Department of Urology, Mayo Medical School, Mayo Clinic, Jacksonville, Florida, USA

ABSTRACT

A large segment of the population will be plagued with urinary incontinence. This report is an objective approach to the evaluation and categorization of female urinary incontinence. Insight is provided into the subtypes of urinary incontinence including the physical examination, laboratory testing, and special diagnostic testing. The reader is provided with a guideline to assist in the diagnosis and treatment of female urinary incontinence.

Key words: urinary incontinence; female; stress; urinary sphincter; urination disorders

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INTRODUCTION

The cost of caring for and treating incontinence can be impressive. As the population ages, this expense will increase substantially over the upcoming decades (1). Although urinary incontinence can affect both men and women, this discussion will focus on the systematic approach to the evaluation and categorization of female urinary incontinence.

ETIOLOGY

Many physicians simply classify female urinary incontinence into either stress or urge inconti-

nence (Table-1) (1). A more refined yet still simple and practical classification can expand these 2 symptoms into 4 common variants of incontinence seen in women: urge, stress, overflow, and total incontinence (Table-2).

Urge incontinence is the involuntary loss of urine associated with an abrupt and strong desire to void (1). Often urge incontinence is associated with detrusor over activity. This is termed detrusor instability. When there is a known neurologic cause for this bladder over activity, it is termed detrusor hyperreflexia (2).

Stress incontinence is the involuntary loss of urine during coughing, sneezing, laughing, or other

Table 1 - Two main types of incontinence.

	Stress Incontinence	Urge Incontinence
Symptom (patient history)	Leak with activities which increase abdominal pressure (e.g., coughing)	When urge to void occurs, she leaks before she can get to the toilet
Sign (observation on exam)	Leak of urine through urethra which exactly coincides with cough or strain	Spontaneous leak (without cough or strain) or leak which persists after cough is finished
Condition (proven by urodynamics)	Leak of urine when abdominal pressure is elevated, and detrusor is not contracting	Involuntary detrusor contractions associated with urine leak

Table 2 - Female urinary incontinence classification – based on symptoms.

Urgency Incontinence	Associated with an abrupt and strong desire to void; Detrusor instability associated with overactivity of detrusor muscle; Detrusor hyperreflexia associated with a known neurologic cause.
Stress Urinary Incontinence (SUI)	Associated with loss of urine with activity, which increases abdominal pressure.
Overflow Incontinence	Associated with large urine residuals in the bladder; Over distention of the bladder.
Total Incontinence	Associated with continuous leakage of urine. Seen in patients with vesical vaginal fistulas, Type 3 SUI, congenital ectopic ureter placement.

physical activities that increase abdominal pressure. This may be secondary to urethral hypermobility, weakness of the intrinsic urethral sphincter or both. Stress incontinence can be further classified into four types (Table-3). In Type-0, the patient complains of urinary leakage, however testing and examination cannot demonstrate the incontinence (Figure-1). Type-1 incontinence occurs with stress maneuvers and a small measure of descent of the urethra bladder neck is seen. Type-2 incontinence is present with descent of the urethra bladder neck area of 2 cm or more (Figure-2). Type-3 demonstrates an open urethra (“lead pipe”) and bladder neck area without bladder contraction. The urethra bladder neck area may be fibrotic (previous surgery or trauma) neurologically impaired or both (Figure-3). Type-3 is also known as intrinsic sphincter deficiency (3).

**Figure 1 - Type-0 incontinence. Testing and examination cannot demonstrate the incontinence.****Table 3 - Categories for female stress urinary incontinence (SUI).**

Type 0	Examiner is unable to demonstrate incontinence in patient with history of SUI.
Type 1	SUI on examination, less than 2 cm descent of urethra bladder neck area with Valsalva maneuvers.
Type 2	SUI on examination with greater than 2 cm descent of urethra bladder neck area.
Type 3	Urethra and bladder neck areas are open at rest (“lead pipe urethra”).

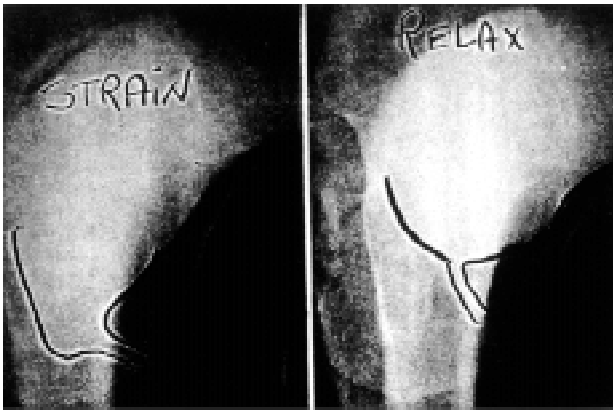


Figure 2 - Type-2 incontinence. Descent of the urethra-bladder neck area of 2-cm or more.

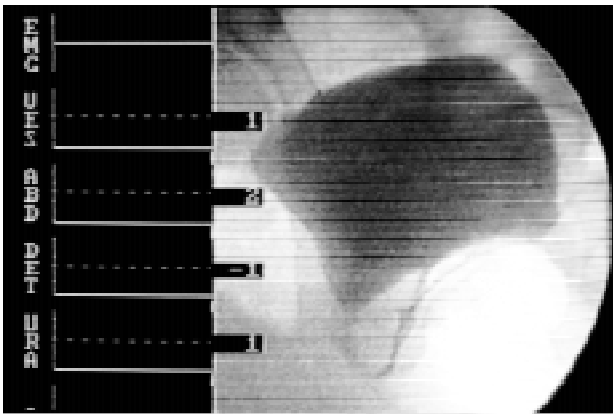


Figure 3 - Type-3 incontinence. The examination demonstrates an open urethra ("lead pipe") and bladder neck area, without bladder contraction.

Involuntary loss of urine associated with over distention of the bladder is termed overflow incontinence. This may be secondary to a damaged detrusor muscle resulting in detrusor weakness. Urethral obstruction can also lead to bladder over distention and overflow incontinence (4). Conditions that may cause this state include diabetic neuropathy, spinal cord in-

Table 4 - Urinary incontinence mnemonic DIAPERS.

D	Delirium, dementia, diabetes
I	Infection, inflammation
A	Atrophy of the vaginal tissues
P	Pharmacology, psychologic
E	Excessive urine output
R	Restricted mobility
S	Stool impaction, sacral nerve root pathology

jury, nutritional deficiency, drug side effects, fecal impaction, or post-surgical states.

Total incontinence is the constant loss of urine. Vesicovaginal fistulas, ectopic ureteral openings and severe intrinsic sphincter deficiency (Type-3) stress incontinence are common (3).

In addition to the aforementioned common reasons for female incontinence, other causes need to be considered. One needs to consider that often multiple causes are present in patients with urinary incontinence. A mnemonic for various causes of urinary incontinence is DIAPERS (Table-4). D is for delirium, which may lead to inability to control the bladder. I is for infection and inflammation which may lead to dysuria and bladder over activity. A, is for atrophic vaginitis that may lead to anatomic states predisposing to incontinence. P, is for pharmacology and psychological. Some drugs such as hypnotics, diuretics, anticholinergics, and alpha blocks may lead to altered states that can cause incontinence (Table-5). Depression may lead to a lack of care regarding situation and result in incontinence. E is for excessive urine production associated with diet, endocrine conditions or expanded volume states (congestive heart failure, venous insufficiency). R is for restricted mobility, which leads to poor toilet access. S is for stool impaction, which can lead to urgency or overflow incontinence.

Table 5 - Medications and incontinence.

- Antihypertensives
- Antidepressants
- Caffeine
- Hypnotics
- Muscle relaxants
- Antihistamines
- Diuretics
- Hormones (? Thyroid)

EVALUATION

Evaluation should categorize and quantify incontinence to optimize treatment choices (5). The history should include important facts such as duration and symptoms of incontinence. Associated symp-

toms such as dysuria, hesitancy, dribbling, diminished flow, suprapubic pain or hematuria should be established. A complete list of medications should be obtained. Previous therapies and their efficiency should be delineated. The amount of leakage perceived and the daily pad usage should be recorded. A voiding diary is an excellent aide in quantification of severity of incontinence. This is usually obtained for a 24-hour period.

Physical examination should include a complete abdominal and gynecological examination as well as a brief neurologic exam. The patient's history will help direct the exam to specific areas.

ABDOMINAL EXAMINATION

One should note whether any tenderness or distention is present in the lower abdomen. Inflammation or distention of the bladder can elicit this finding. A bladder sonographic scan or catheterization can be performed to measure the post-void residual. It should be determined if the kidneys are enlarged or if tenderness is present in the costo-vertebral area. A careful search should be done in the back to see if any scars exist, which indicates previous surgery or trauma.

NEUROLOGIC ASSESSMENT

A brief neurologic exam should be part of any assessment for urinary incontinence. The patient's history should rule out any history of spinal cord trauma, multiple sclerosis, central lumbar disc prolapse, pelvic surgery, irradiation, or spinal cord tumor. The patient should be initially observed during her walking for her gait and balance. The deep tendon reflexes should be assessed for their strength and equality from the right and left sides. Both the pudendal (innervation of the pelvic floor muscles and striated urinary sphincter) and pelvic nerves (innervation of the detrusor smooth muscle of the bladder and internal urinary sphincter) originate from the sacral segments of the spinal cord (S2-S4). The ankle jerk reflex involved the S1 and S2 cord segment. Nerves from the S2 and S3 cord segments control flexion of the toes and arch of the foot. Ask the pa-

tient to abduct (spread) her toes to establish if the S3 efferent fibers are intact. Also, evaluate for bilateral strength of the leg muscles. A rectal examination gives one insight to the status of the sacral nerve roots 2 through 4. The presence of the anal wink (lightly stroke skin just lateral to the anus and look for drawing) or the cough reflex (contraction of the pelvic floor with cough) signifies an intact S2 and S4. A flaccid anal sphincter may indicate a poor detrusor muscle function since this area is also supplied by the same sacral nerve roots. To assess pelvic muscle function (S2 and S3), the examiner can have the patient tighten the pelvic muscles. A deepening of the buttock crease should be noted in a normal exam as well as the appearance of the lumbosacral spine (rule out mass or deformity). The presence of an anal wink and bulbocavernosus reflex suggests an intact S2-S4 reflex arc. Finally, one needs to assess the mental status of the patient to rule out dementia as a possible reason for incontinence.

VAGINAL EXAMINATION

A thorough exam includes a vaginal examination. Determine the adequacy of the introitus. The examiner can use the posterior blade of the speculum to see the anterior and posterior vaginal wall. The exam is usually best performed in the dorsal lithotomy position. Having the patient stand with one foot on a step stool is helpful if one suspects vaginal prolapse. One should note the health of the vaginal tissue; atrophic vaginal changes can indicate estrogen depletion. This condition can be associated with increased urethral and bladder sensitivity (sensory urge incontinence). The condition and position of the urethra should be noted. A bulging of the urethra might indicate inflammation or possible diverticulum. In a patient who has had a previous bladder suspension procedure a shortened urethra or sharp angle between the bladder neck may exist causing obstruction of the bladder outlet. If Valsalva maneuvers cause excessive descent of the urethral bladder neck area poor pelvic muscular support should be suspected. This finding is commonly seen with stress urinary incontinence. Finally, it should be noted whether any cystoceles, enteroceles, uterine prolapse, or rectoceles exist. During cysto-

cele examination, delineate whether there are central rugae, a lateral defect, or a central defect. If there is a large cystocele, then this should be reduced prior to checking for stress urinary incontinence to avoid a falsely negative examination.

In addition, be sure to assess pelvic muscle tone (place finger 5 cm inside the vaginal introitus in the 5 and 7 o'clock position). A good grading system to use is:

- 0 = during a maximum contraction the strength noted is no visible or palpable contraction;
- 1 = a very weak contraction, often barely perceived as a flick;
- 2 = a weak but clearly perceived contraction;
- 3 = well perceived, but is not maintained when moderate finger pressure is applied;
- 4 = a contraction with good force, but not maintained when intense finger pressure is applied;
- 5 = maximum strength with strong resistance to oppositional pressure.

LABORATORY TESTS

A clean catch urinalysis should be included. Special attention should be made to the specific gravity in those patients that suspected to have polydipsia or renal concentration abnormalities. Microscopic hematuria and/or pyuria suggest possible inflammation, infection or neoplasia. If a neoplastic condition is suspected, a urinary cytology should be considered. A urine culture and sensitivity can be obtained if infection is suspected. If there is a patient or family history of diabetes, then check the urine for glycosuria.

SPECIAL TESTS

Special tests such as cystourethroscopy or urodynamics may be of assistance in diagnosis. These tests should be applied in a select fashion and be used to address specific diagnostic questions. Not every patient needs every test. Urodynamic testing may include cystometry, uroflow determination, urethral pressure profile measurement, Valsalva Leak Point Pressure assessment, and video imaging (6).

One of the most straightforward ways of determining the presence or absence of stress urinary incontinence is a modified Marshall-Bonney test (7). This can be completed by checking a post-void residual and then instilling approximately 200 cc of normal saline into the bladder. The patient can then be asked to bear down or cough and the loss of fluid determined. If the patient has no leakage when supine then the test can be repeated in the upright position over a towel. This simple method of testing may obviate formal urodynamics in many instances. Examining in the upright position may also detect hidden cystoceles.

CONCLUSION

As with all medical conditions, the successful treatment of urinary incontinence rests with a correct diagnosis and subsequent appropriate therapy. As every successful journey must have a good start, so the successful treatment of the incontinent woman must begin with the correct evaluation and diagnosis.

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Correspondence address:

Dr. Steven P. Petrou
Department of Urology, Mayo Clinic
4500 San Pablo Road
32224, Jacksonville, Florida, USA
Fax: + + (1) (904) 953-2218
E-mail: petrou.steven@mayo.edu