Incontinence

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Omar M. Aboumarzouk, Jan Adamowicz, Piotr L. Chłosta, and Tomasz Drewa

15.1 Definitions

Urinary incontinence (UI) is defined as an involuntary loss of urine. It is subdivided into (a) stress incontinence whereby involuntary loss of urine is on physical exertion or effort or on sneezing or coughing, (b) urgency incontinence is involuntary loss of urine when associated with or preceded by urgency, and (c) mixed incontinence is a mixture of the two types whereby involuntary loss of urine is associated with both urgency and on physical exertion or effort or on sneezing or coughing. Urgency is defined as 'the complaint of a sudden compelling desire to pass urine' [1].

Two main pathophysiological entities that cause UI are bladder abnormalities and sphincter abnormalities. Bladder abnormalities include detrusor overactivity (DO) and low bladder compliance (LBC). DO is characterized by spontaneous or provoked

O.M. Aboumarzouk, MBChB, MSc, PhD, MRCS (Glasg) (✉)
College of Medicine, Islamic University of Gaza, Gaza, Occupied Palestine
e-mail: aboumarzouk@gmail.com

J. Adamowicz
Department of Tissue Engenering and Urology, Collegium Medicum,
University of Nicolaus Copernicus, Toruń, Poland

Katedra i Klinika Urologii Collegium, Medicum Uniwersytetu Jagiellońskiego,
ul. Grzegórzecka 18, Kraków, Poland

P.L. Chłosta, MD, PhD, DSci, FEBU
Department of Urology, Jagiellonian University in Krakow,
ul. Grzegorzecka 18, Krakow 31-531, Poland
e-mail: piotr.chlosta@gmail.com

T. Drewa
Department of Urology, Nicolaus Copernicus Hospital, Batory 17-19 str.,
Toruń 87-100, Poland

Katedra i Klinika Urologii Collegium, Medicum Uniwersytetu Jagiellońskiego,
ul. Grzegórzecka 18, Kraków, Poland
e-mail: tomaszdrewa@wp.pl, sekurol@med.torun.pl

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involuntary detrusor contraction during the filling phase of the micturition cycle and shows various patterns such as phasic, terminal, or in combination DO [1]. Phasic DO is characteristically wave form contractions +/− UI and may or may not have any sensation to void. Terminal DO is a single involuntary contraction which cannot be suppressed and leads to UI. DO incontinence is involuntary detrusor contraction in patients with normal sensation, whereby urgency is experienced just before incontinence episodes. DO are of two main types, neurogenic, which is caused by a neurological condition (supraspinal lesions: stroke, Parkinson disease, hydrocephalus, brain tumour, brain traumatic injury, multiple sclerosis; suprasacral spinal lesions: spinal cord injury or tumour, multiple sclerosis, myelodysplasia, transverse myelitis), and idiopathic DO with no specific cause found but can be associated with bladder infection, stones, tumors, and foreign body or bladder outlet obstruction.

LBC is characterized by having an abnormal decreased volume to pressure relationship, whereby there is an increase in the intravesicular pressure as the bladder fills with urine. It is mainly caused by changes in the elastic properties of the bladder wall, changes in the bladder muscle tone, or a combination. Causes of LBC are either neurogenic (myelodysplasia, Shy-Drager syndrome, suprasacral spinal cord injury or lesions), operations (hysterectomy or abdominoperineal resection of the rectum), or non-neurogenic (more collagen/elastic property changes related) (tuberculous cystitis, radiation cystitis, long-term catheterisation, bladder outlet obstruction).

Sphincter abnormalities vary between men and women. In men, it is more commonly due to damage to the sphincter mechanism after prostate surgery or in rare instances caused by trauma, radiation therapy, or neurological abnormalities. While in women, the sphincter weakness can be caused by urethral hypermobility (anatomical support defect, i.e. prolapse) or intrinsic sphincter insufficiency. Urethral hypermobility is more commonly due to pregnancy, vaginal delivery, or pelvic/gynecological operations. Intrinsic sphincter insufficiency can be seen in patients who had previous urethral surgery (urethral diverticulum or anti-incontinence surgery), pelvic radiation therapy, or neurological damage or insults (herniated disks, diabetic neuropathy, multiple sclerosis, spinal cord tumors, after extensive pelvic surgery).

15.2 Medical History

A complete history is always vital to establish a direction of management, dividing the history into specific questions of the presenting complaint of incontinence, followed by general questions.

Specific question of incontinence should be tailored around identifying precipitating or aggravating factors and establishing a predominant type of incontinence and association with other urinary symptoms. The main risk factors associated with UI are listed in Table 15.1 and should be asked on or about during the history taking.

The patient should be questioned about the duration of incontinence, the onset and frequency of leakage, diurnal variation, and fluid consumption and type. Questioning whether or not the leakage occurs with physical activity, coughing, sneezing, and straining or if it is associated with a sense of urgency or without any sensation at all should be asked. If a mixture of the symptoms is present, which one is predominant? Determining if the patients' symptoms are bothersome and affect

Table 15.1 Main risk factors for incontinence

Risk factor in women	Risk factor in men
Increasing age [3]	Increasing age [4]
Obesity [5, 6]	Lower urinary tract symptoms [7]
Parity [5, 8, 9]	Urinary tract infections [10]
Pregnancy [11, 12]	Neurological disease [13, 14]
Vaginal delivery [15]	Diabetes [14]
Race [16]:	Prostatectomy [17]
Stress incontinence: white race Urge incontinence: black race	
Menopausal replacement therapy [18, 19]	Sedentary lifestyle/lack of exercise/impaired physical activity [10, 17]
Hysterectomy [20]	
Caffeine [21]	
Sedentary lifestyle/lack of exercise/impaired physical activity [22]	

their daily activities should also be asked to establish if risks of treatment complications of side effects outweigh the benefits of treatment. Alarming symptoms such as pain, dysuria, recurrent urinary tract infections, haematuria, or recent unexpected weight loss should be elicited; as may lead to more urgent investigations.

General questions to be asked include past medical and surgical history, in women the history should include questions regarding menstrual, gynacological and obstetric, and sexual histories. Drug and medication history, social, psychological, smoking, alcoholic, and work histories should also be asked about.

15.3 Diagnostics

Physical examination is the initial and vital step in establishing the diagnosis of incontinence. Physical examination of the body as a whole is vital and should ideally have started when the patient walks into the room looking for any neurological gaits or frailty. Look for a palpable bladder or previous surgery scars during the abdominal examination. In women, a pelvic examination should include the external genitalia, urethra, vagina, cervix, uterus, and adnexa. A digital rectal examination should be done to assess the prostate gland in men and the rectovaginal septum in women, identifying a rectocele or masses in the rectum, in addition for assessment of the anal sphincter tone (S2–4 function). A full neurologic examination is important as well.

Specific tests conducted during an exam include the Q-tip test and assessment of pelvic organ prolapse (POP) and the stress test. Q-tip test is done to evaluate urethra mobility. A Q-tip is inserted into the bladder through the urethra, and the angle that the Q-tip sits in while in its final position when the patient strains is measured. Hypermobility is considered when the Q-tip angle is more than 30° from the horizontal plane. Assessment for POP is performed in both lithotomy and standing positions with the aid of a speculum. Also stress test can be performed while using the speculum, involving the observation of urine loss during coughing or Valsalva manoeuvre.

Aiding both the history and examination are a series of investigations (questionnaires and tests) required to establish a functional diagnosis:

- Patient questionnaires such as symptom scores, symptom questionnaires, patient reported outcome measures (PROMS), or health-related quality of life (HRQoL) measures. These can not only assess severity of symptoms but also monitor the effects of treatment.
- Voiding diaries: the patient records the frequency and volume of urine voided, incontinence episodes, pad usage, fluid intake, and degree of urgency.
- Pad test: carried out by asking the patient to wear continence pads for a set period of time. The pad test was designed to quantify the volume of urine loss by weighing it before and after leakage. A measure loss of more than 1.3 g of urine in a 24-h period is considered positive.
- Urine dip stick and urinalysis: to detect the presence of haematuria, pyuria, glycosuria, or proteinuria. Nitrites and leucocyte esterase may indicate an infection, protein may indicate an infection or renal disease, blood may indicate in infection or malignancy, and glucose may indicate diabetes mellitus.
- Post-voiding residual (PVR) volume: defined as the amount of urine in the bladder after voiding. Can be measured either by an ultrasound scan or by the use of an in-out catheter. Used to detect impaired bladder emptying.
- Cystoscopy: looking for pathology either in the urethra (strictures, diverticulum, foreign bodies, fistulas) or bladder (tumors, stones, inflammation, foreign bodies, previous pelvic floor reconstructive surgical material eroding into the bladder).
- Urodynamics: used in patients with mix incontinence to distinguish urgency or obstructive symptoms and in patients with high PVRs or neurologic disease.
  - Simple urodynamics: determine bladder sensation, compliance, stability, and capacity, as well as outlet competence and PVR.
  - Multichannel urodynamics: more extensive evaluation of the filling/storage phase by filling cystometrogram and the voiding/emptying phase by uroflowmetry. Used in patients when conservative treatment fails, when the diagnosis is unclear, or diagnostic procedures are inconclusive; in patients who had radiation therapy, neurologic disease, or prior failed pelvic floor reconstruction or anti-incontinence surgery; or when patients describe symptoms which are not clinically elicited.
  - Videourodynamics (electromyogram (EMG) and fluoroscopic imaging): can demonstrate the anatomy in the upright position and can confirm incontinence in patients in whom the diagnosis is difficult and can provide an accurate measure of leak point pressure, used in assessing suspicion of detrusor-sphincter dyssynergia or primary bladder neck obstruction and evaluating for vesicoureteral reflux.
- Imaging:
  - Voiding cystourethrogram: can be used in patients with recurrent urinary tract infections looking for urethral diverticulum or vesicoureteric reflux. It can also provide visualisation of subtle leakage with coughing or straining and give information regarding the position of the bladder base and neck during voiding.
  - Ultrasound: looking for signs of high pressure disease such as hydroureteronephrosis, upper tract pathology (stones, tumours), and can also be used to assess the bladder neck for urine leakage and descent during stress [2].
  - Magnetic resonance imaging (MRI): to evaluate the anatomy of the bladder neck and urethra, pelvic floor relaxation, and POP and to identify urethral

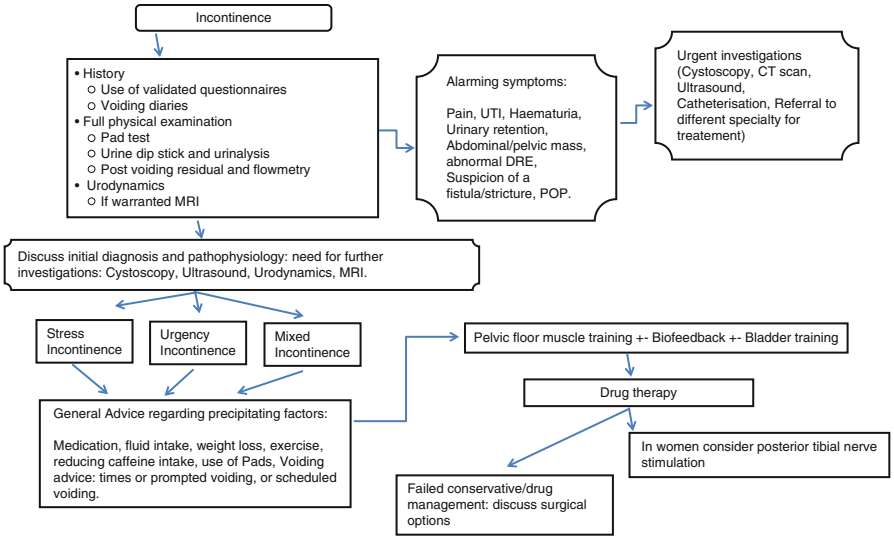

Fig. 15.1 Flow diagram of assessment and treatment of incontinence

diverticulum. MRI can be used to plan out surgical procedures (urethral diverticulum or pelvic floor reconstructions).

15.4 Differential Diagnosis

Differentiating between the different types of UI (stress, urgency, or mixed) can aid in the treatment. Also a distinction needs to be made from other types of incontinences:

- Overflow incontinence, which is the leakage of urine associated with urinary retention
- Nocturnal enuresis which is the loss of urine during sleep
- Post micturition dribbling which is dribbling loss of urine occurring after voiding due to pooling of urine in the bulbous urethra after voiding
- Extra-urethral incontinence which is urine leakage through passages other than the urethra, such as through fistulas or ectopic ureter, immediately after passing urine (See Fig. 15.1)

References

1. Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. NeurourolUrodyn. 2002;21(2):167–78. Epub 2002/02/22.
2. Martin JL, Williams KS, Sutton AJ, Abrams KR, Assassa RP. Systematic review and meta-analysis of methods of diagnostic assessment for urinary incontinence. NeurourolUrodyn. 2006;25(7):674–83; discussion 84. Epub 2006/10/04.
3. Hannestad YS, Rortveit G, Sandvik H, Hunskaar S. A community-based epidemiological survey of female urinary incontinence: the Norwegian EPINCONT study. Epidemiology of

incontinence in the county of Nord-Trondelag. J Clin Epidemiol. 2000;53(11):1150–7. Epub 2000/12/07.
4. Markland AD, Goode PS, Redden DT, Borrud LG, Burgio KL. Prevalence of urinary incontinence in men: results from the national health and nutrition examination survey. J Urol. 2010; 184(3):1022–7. Epub 2010/07/21.
5. Danforth KN, Townsend MK, Lifford K, Curhan GC, Resnick NM, Grodstein F. Risk factors for urinary incontinence among middle-aged women. Am J Obstet Gynecol. 2006;194(2): 339–45. Epub 2006/02/07.
6. Hunskaar S. A systematic review of overweight and obesity as risk factors and targets for clinical intervention for urinary incontinence in women. NeurourolUrodyn. 2008;27(8):749–57. Epub 2008/10/28.
7. Diokno AC, Brock BM, Brown MB, Herzog AR. Prevalence of urinary incontinence and other urological symptoms in the noninstitutionalized elderly. J Urol. 1986;136(5):1022–5. Epub 1986/11/01.
8. Grodstein F, Fretts R, Lifford K, Resnick N, Curhan G. Association of age, race, and obstetric history with urinary symptoms among women in the Nurses' Health Study. Am J Obstet Gynecol. 2003;189(2):428–34. Epub 2003/10/02.
9. Rortveit G, Hannestad YS, Daltveit AK, Hunskaar S. Age- and type-dependent effects of parity on urinary incontinence: the Norwegian EPINCONT study. Obstet Gynecol. 2001;98(6):1004–10. Epub 2002/01/05.
10. Ueda T, Tamaki M, Kageyama S, Yoshimura N, Yoshida O. Urinary incontinence among community-dwelling people aged 40 years or older in Japan: prevalence, risk factors, knowledge and self-perception. Int J Urol. 2000;7(3):95–103. Epub 2000/04/06.
11. Morkved S, Bo K. Prevalence of urinary incontinence during pregnancy and postpartum. Int Urogynecol J Pelvic Floor Dysfunct. 1999;10(6):394–8. Epub 1999/12/30.
12. Marshall K, Thompson KA, Walsh DM, Baxter GD. Incidence of urinary incontinence and constipation during pregnancy and postpartum: survey of current findings at the Rotunda Lying-In Hospital. Br J Obstet Gynaecol. 1998;105(4):400–2. Epub 1998/06/03.
13. Resnick NM, Yalla SV. Detrusor hyperactivity with impaired contractile function. An unrecognized but common cause of incontinence in elderly patients. JAMA. 1987;257(22):3076–81. Epub 1987/06/12.
14. Shamliyan TA, Wyman JF, Ping R, Wilt TJ, Kane RL. Male urinary incontinence: prevalence, risk factors, and preventive interventions. Rev Urol. 2009;11(3):145–65. Epub 2009/11/18.
15. Press JZ, Klein MC, Kaczorowski J, Liston RM, von Dadelszen P. Does cesarean section reduce postpartum urinary incontinence? A systematic review. Birth. 2007;34(3):228–37. Epub 2007/08/28.
16. Waetjen LE, Liao S, Johnson WO, Sampselle CM, Sternfield B, Harlow SD, et al. Factors associated with prevalent and incident urinary incontinence in a cohort of midlife women: a longitudinal analysis of data: study of women's health across the nation. Am J Epidemiol. 2007;165(3):309–18. Epub 2006/11/30.
17. Hunskaar S. One hundred and fifty men with urinary incontinence. I. Demography and medical history. Scand J Prim Health Care. 1992;10(1):21–5. Epub 1992/03/01.
18. Grady D, Brown JS, Vittinghoff E, Applegate W, Varner E, Snyder T. Postmenopausal hormones and incontinence: the heart and estrogen/progestin replacement study. Obstet Gynecol. 2001;97(1):116–20. Epub 2001/01/12.
19. Grodstein F, Lifford K, Resnick NM, Curhan GC. Postmenopausal hormone therapy and risk of developing urinary incontinence. Obstet Gynecol. 2004;103(2):254–60. Epub 2004/02/03.
20. Forsgren C, Lundholm C, Johansson AL, Cnattingius S, Zetterstrom J, Altman D. Vaginal hysterectomy and risk of pelvic organ prolapse and stress urinary incontinence surgery. Int Urogynecol J. 2012;23(1):43–8. Epub 2011/08/19.
21. Hannestad YS, Rortveit G, Daltveit AK, Hunskaar S. Are smoking and other lifestyle factors associated with female urinary incontinence? The Norwegian EPINCONT Study. BJOG. 2003;110(3):247–54. Epub 2003/03/12.
22. Danforth KN, Shah AD, Townsend MK, Lifford KL, Curhan GC, Resnick NM, et al. Physical activity and urinary incontinence among healthy, older women. Obstet Gynecol. 2007;109(3): 721–7. Epub 2007/03/03.