Chapter 1

Assessment of Urinary Incontinence (UI) in Adult Patients

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Additional information is available at the end of the chapter

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Abstract

The diagnosis and assessment of urinary incontinence (UI) are variable. In general, diagnosis is made in primary care using clinical evaluation (a good history and physical examination), bladder diary and validated symptom scales. Condition-specific diagnosis is made in secondary care, and it often involves interventional tools such as urodynamic studies. The evidence available on the accuracy and acceptability of the assessment of UI is inconsistent and variable. A structured data collection tool was used for initial assessment of UI. Some key questions are required for initial assessment of UI in order to diagnose the type of UI. This chapter includes a gender-specific evaluation based on history and clinical examination. Pelvic organ prolapse (POP) in female patients is associated with UI and POP diagnosis, and staging is made by clinical examination only, while male patients are examined for prostate obstructive urinary symptoms. Basic evaluation includes bladder diary in cases of overactive bladder and stress test, for stress urinary incontinence. Other diagnostic tests include urine analysis, uroflowmetry and measurement of post-void residual volume in cases of neurogenic bladder and benign prostate hypertrophy. Patients referred to specialist require further assessment of UI using urodynamic testing, electrophysiological test and imaging.

Keywords: assessment, adult, male, female, urinary incontinence

1. Introduction

Urinary incontinence (UI), the involuntary leakage of urine, often remains undetected and undertreated [1]. Estimates of prevalence vary depending on the population studied and the instruments used to assess severity. The prevalence of UI increases with age. Women are generally reluctant to initiate discussions about their incontinence and urinary symptoms due to embarrassment, lack of knowledge about treatment options and/or fear of surgery.

The objectives of initial assessment are to establish a presumptive or disease-specific diagnosis by excluding other conditions that mimic UI. The treatment is offered according to the level of bother and impact of UI on patient's quality of life (QoL). A detailed assessment is required to initiate initial treatment or to plan complex testing, which may require specialist referral. It also aids in the assessment of the level of improvement after any intervention from information obtained from patient or care providers.

A critical step in the evaluation of urinary incontinence is the use of up-to-date terminology to describe different types of UI and their associated lower urinary tract symptoms (LUTS). LUTS includes both storage and emptying symptoms in distinction to overactive bladder syndrome (OAB) that describes the subset of storage symptoms urgency, frequency and nocturia with or without the symptoms of UI.

The terminology defined below is adopted from a review available from the 5th International Consultation on Incontinence [2]. The use of standardized terminology during the taking of the history of the types of UI ensures uniformity in the assessment of symptoms that lead to diagnose various types of UI.

Male LUTS are a frequently encountered constellation of symptoms that consist of both storage and emptying functions of the lower tract. The index male patient with LUTS is either an elderly male with bothersome dysfunction of storage, voiding and/or the post-micturition period that often consists of a combination of frequency, urgency, nocturia, as well as hesitancy, weak stream and feeling of incomplete emptying. The other index male patient is a young male with mostly storage symptoms and sometimes voiding as well.

2. Terminology

Stress urinary incontinence (SUI) is referred to as involuntary urinary loss of effort or physical exertion, e.g. sporting activities or of sneezing or coughing.

Urgency urinary incontinence (UUI) is a condition referred to as involuntary loss of urine associated with a desire to void.

Postural urinary incontinence is a condition of involuntary loss of urine associated with change of body position, e.g. rising from a seated or lying position.

Mixed urinary incontinence (MUI) is the complaint of involuntary loss of urine associated with urgency and also with exertion, effort, sneezing or coughing.

Incontinence associated with chronic retention of urine is defined as a complaint of involuntary loss of urine, which occurs in conditions where the bladder does not empty completely as indicated by a significantly high residual urine volume and/or a non-painful bladder, which remains palpable or percussable after the individual has passed urine. (Note: The International Continence Society (ICS) no longer recommends the term overflow incontinence. A significant residual urine volume denotes a minimum volume of 300 mL, although this figure has not been well established).

Nocturnal enuresis: Complaint of involuntary loss of urine that occurs during sleep.

Continuous (urinary) incontinence: Complaint of constant involuntary loss of urine.

Insensible (urinary) incontinence: Complaint of urinary incontinence where the individual is unaware of how it occurred, the first sensation of which is a feeling of being wet.

Coital incontinence (for women only): Complaint of involuntary loss of urine with coitus. This symptom can be further divided into that occurring with penetration or intromission and that occurring at orgasm.

Functional incontinence: Complaint of involuntary loss of urine that results from an inability to reach the toilet due to cognitive, functional or mobility impairments in the presence of an intact lower urinary tract system.

Post-prostatectomy incontinence (PPI) generally is used for stress urinary incontinence following radical prostatectomy for prostate cancer. However, the term is also used for post-transurethral prostatectomy for benign prostate hypertrophy (BPH). Although small degrees of incidental incontinence may go virtually unnoticed, larger degrees of incontinence can have a major impact on a man's quality of life.

2.1. Bladder storage symptoms

Bladder storage symptoms are experienced during the bladder filling.

Increased daytime urinary frequency: Complaint that micturition occurs more frequently during waking hours than previously deemed normal. Traditionally, seven episodes of micturition during waking hours were considered as the upper limit of normal, although it may be higher in some populations.

Nocturia: Complaint of interruption of sleep one or more times because of the need to void. Each void is preceded and followed by sleep. (Note: The number of nocturia episodes and the degree of bother based on number have been questioned and the threshold of 2–3 per night has been suggested.) [3–5].

Urgency: Complaint of a sudden, compelling desire to pass urine, which is difficult to defer (Note: The 'all or none' nature of 'urgency' has been questioned.) [6].

Overactive bladder syndrome (OAB): Urinary urgency, usually accompanied by increased urinary frequency and nocturia, with or without urgency urinary incontinence, in the absence of urinary tract infection (UTI) or other obvious pathology.

2.2. Diagnostic evaluation

2.2.1. History and physical examination

The initial assessment includes a very good history and the use of validated questionnaire to know the type of urinary incontinence and its impact on patient's quality of life (QoL). A detailed history enables to diagnose complicated cases of UI-like UI associated with pelvic

organ prolapse (POP), MUI, neurogenic bladder dysfunction and continuous UI secondary to diverticulum or fistula.

A good history should also identify patients who need rapid referral to an appropriate specialist. These include patients with associated pain, haematuria, history of recurrent urinary tract infection (UTI), pelvic surgery (particularly pelvic organ prolapse surgery) and UI associated with known abnormality of the urinary tract. Women with obstetric history including complicated labour followed by continuous UI are suggestive of a fistula. A detailed gynaecological history may help to understand the underlying cause, for example, polycystic ovarian disease and associated insulin resistance leading to UI among women of younger age group [7].

The medical history should include history of smoking and chronic cough, chronic obstructive pulmonary disease (COPD), congestive heart failure and diabetes. A poor glycaemic control and medication for cardiac disease are associated with UI.

Use of questionnaires may facilitate disclosure of embarrassing symptoms, ensure that symptoms are not omitted and standardize information for audit and research. In the absence of questionnaire use, **Table 1** summarizes key questions for the initial assessment of urinary incontinence.

The International Modular Questionnaire (ICIQ) was developed to meet the need of a universally acceptable standard guide for the selection of questionnaires to be used in clinical practice and research [8]. Urine output is greatly dependent upon the quantity and type of fluids taken during the day. Patients' record of volume and frequency of micturition provides an excellent record for discrimination of the physiologic influences on the pattern and frequency of micturition. This is called frequency volume charting. Use of additional information like

Do you leak urine?
If yes then do you feel the leak of urine?
If yes then does it occur with urgency and on the way to toilet? (Identify trigger factor such as key in latch.)
Do you wake up at night to void, if yes then how frequent?
If urinary leak is without sensation then questions related to neurological/cognitive deficits should be asked co-existing diseases (diabetes, heart disease, neurological impairment should be ruled out).
Do you leak urine when you cough, sneeze, laugh and during physical exertion? (Identify circumstances, e.g. sexual activity, posture change.)
Duration of the symptoms?
Frequency of leak accidents and the amount of leak.
Associated symptoms of pelvic organ prolapse (POP), fecal incontinence (FI) should be asked along with identification of risk factors as complicated deliveries, pelvic surgery, and chronic constipation.
Impact on personal and social life?
Episodes of urinary tract infection or haematuria?

Table 1. Key questions in the` initial assesment of urinary incontinence.

fluid intake, use of pads, activities during recording or symptom scores constitutes the bladder diary. It is recommended by European Association of Urology (EAU) guidelines that micturition frequency volume charts (FVCs) or bladder diaries should be used to assess male LUTS with a prominent storage component or nocturia. It is also recommended that these records be performed for at least 3 days for validation. Each module provides questions related to core symptoms and impact on health-related quality of life (HRQL). ICIQ provides evaluation of lower urinary tract symptoms (LUTS), urinary incontinence, vaginal symptoms and bowel symptoms although more extensive information can be found on www.iciq.net.

The International Prostate Symptom Score (IPSS) is an eight-item questionnaire, consisting of seven symptom questions and one quality-of-life question [9]. The IPSS score is used to categorize patients into four categories. This is helpful in deciding about treatment strategy. The categorization is 'asymptomatic' (0 points), 'mildly symptomatic' (1–7 points), 'moderately symptomatic' (8–19 points) and 'severely symptomatic' (20–35 points). There are many limitations to the use of IPSS, and these include lack of assessment of incontinence, of post-micturition symptoms and of bother caused by each separate symptom. Another limitation is that a basic minimum education level is required for filling the form. An alternate to this is a use of Visual prostate symptom score (VPSS), which is visual counterpart of the IPSS [10].

The International Consultation on Incontinence Questionnaire for Male LUTS (ICIQ-MLUTS) was created from the ICS male questionnaire. It is a widely used and validated patient completed questionnaire [11]. It contains 13 items, with subscales for nocturia and OAB, and is available in 17 languages [12]. The EAU guidelines recommend that a validated symptom score questionnaire including QoL assessment should be used during the assessment of male LUTS and for re-evaluation during and/or after treatment [12].

A clinical examination remains an essential part of the assessment of patients with UI. It is essential that all patient presented with UI should be mentally competent and be capable of independent toileting.

A careful abdominal examination should be performed for surgical scars, hernias, masses, organomegaly and distended bladder after voiding. The presence of hernias may indicate inherent connective tissue weakness, a possible contributor to incontinence. Masses may contribute to stress incontinence and, occasionally, may cause obstructed voiding with resultant overflow incontinence.

Pelvic examination should be performed as a routine gynaecological examination. It begins with the inspection of the external genitalia and urethral meatus. Evidence of atrophy, such as pallor and thinness of tissue, may indicate oestrogen deficiency. A red, fleshy lesion of the posterior urethra, a caruncle, may be another indicator of urogenital hypoestrogenism. The suburethral area should be inspected and palpated. A suburethral mass should raise suspicion for a urethral diverticulum. Any pelvic floor defect should be documented using pelvic organ prolapse (POP) grading. For standardization and uniformity in staging the degree of prolapse, it is recommended that pelvic organ prolapse quantification (POP-Q) method

should be used as shown in **Figure 1** [13]. POP-Q involves measurement of both anterior and posterior vaginal walls and cervical prolapse with reference to hymen and defines four stages of POP as shown in **Figure 2** [13].

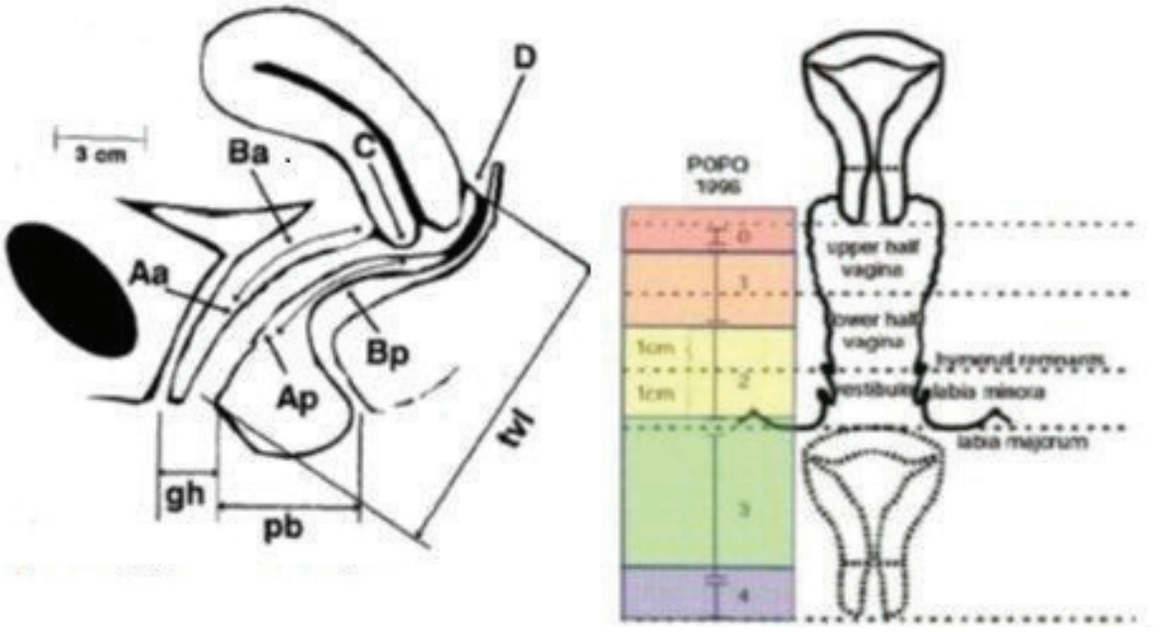

Figure 1. Pelvic organ prolapse quantification.

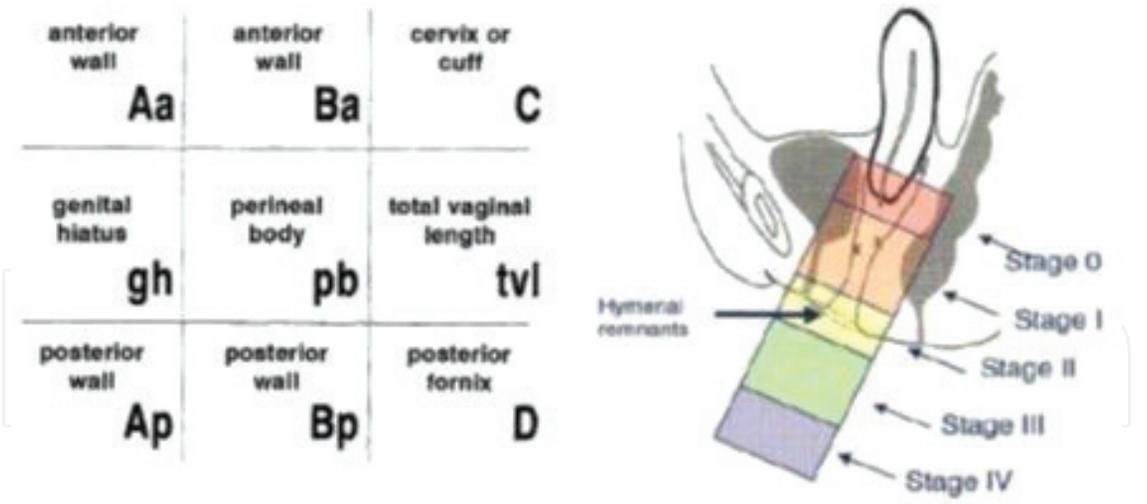

Figure 2. POP-Q staging.

2.2.2. Stress test

A cough test should be performed with comfortably full bladder in standing position and it may reveal SUI. Price and Noblett recently compared the accuracy of the cough stress to the pad test for diagnosing stress urinary incontinence [14]. The cough stress test demonstrated

superiority over the pad test with a sensitivity, specificity and positive and negative predictive values of 90, 80, 98 and 44%, respectively, for diagnosing stress urinary incontinence. A negative test is less useful because a false negative may result from a small urine volume in the bladder or from patient inhibition.

2.2.3. Q-tip test

This test is not routinely performed, and it was used to assess urethral hypermobility (also referred to as bladder neck hypermobility), present in most women who have primary SUI. Historically, the urethral cotton swab test (Q-tip test) was the most common test used to evaluate urethral mobility; it has questionable test-retest and inter-observer reliability [15]. Studies have demonstrated that almost all (over 90%) women with advanced point Aa prolapse will have a positive cotton swab test [16]. The role of urethral hypermobility testing is currently limited as it is unlikely to change management.

2.2.4. Examination of prostate

Men with BPH often present with paradoxical incontinence. Paradoxical incontinence or overflow incontinence is a condition, which clinically presents with UI, however, these patients are in urinary retention. The assessment of these patients often starts with physical examination following a careful history. The key to diagnosis is the presence of palpable bladder with prostomegaly.

Determination of prostate volume is important to give an idea about the presence of prostatic enlargement and its presumed aetiology for obstruction. In men with symptoms suggestive of BPH, an accurate estimation of the degree of prostate volume enlargement is important for the choice of treatment, and for prediction of the treatment effect, the risk of acute urinary retention and the need for surgery. Digital-rectal examination (DRE) is the simplest way to assess prostate volume; however, its correlation with actual volume as determined by transrectal ultrasound (TRUS) is rather poor. DRE underestimates the prostate volume particularly with volume >30 mL [17]. A model of visual aids has been developed to help urologists estimate prostate volume more accurately [18]. One study concluded that DRE was sufficient to discriminate between prostate volumes more or less than 50 mL [19].

2.2.5. Pelvic assessment

Pelvic floor muscle contraction should be assessed by digital posterior vaginal wall examination, and any pelvic floor muscle dysfunction should be documented using the International Continence Society (ICS) terminology [20].

2.2.6. Neurological examination

A detailed neurological examination is not necessary in the initial evaluation of all women with incontinence unless patients present with sudden onset of incontinence (especially urgency symptoms) or new onset of neurologic symptoms [21]. In patients where there is a concern for neurological disease, a limited evaluation of lower extremity strength, reflexes and perineal sensation is required. Unilateral weakness or hyper-reflexia of the lower extrem-

ity may identify an upper motor lesion. Absent perineal sensation with decreased rectal tone is concerning for cauda equina syndrome.

2.2.7. Pad testing

Pad test is not routinely performed, and it is part of research studies only. Measurement of urine loss using an absorbent pad worn over a set period of time or during a protocol of physical exercise can be used to quantify the presence and severity of UI, and of response to treatment. The usefulness of pad tests in quantifying severity and predicting outcome of treatment is uncertain [22]. There is no evidence that one type of pad test is superior to another.

2.2.8. Voiding diaries

Voiding diaries include information on incontinence episodes, pad usage, fluid intake, degree of urgency and degree of UI. Several studies have compared patients' preference for, and the accuracy of, electronic and paper voiding diaries in voiding dysfunction [23–26]. A recent guideline on urinary incontinence by European Association of Urology recommends that patients with urinary incontinence should be asked to complete a voiding diary for 3–7 days to evaluate co-existing storage and voiding dysfunction. It is recommended by EAU guidelines that micturition frequency volume charts or bladder diaries should be used to assess male LUTS with a prominent storage component or nocturia. It is also recommended that these records be performed for at least 3 days for validation [27]. The ideal duration of a diary is not clear; however, 5th ICI recommends 1-day frequency volume chart (FVC) which includes the first morning void the following day as a reasonable tool to gain insight into voiding habits during normal daily routine [2].

2.3. Laboratory tests

Only a few clinical tests are necessary for the initial evaluation of a woman with urinary incontinence, as conservative treatment can be initiated based on the symptoms alone.

A urinalysis should be performed in all patients, and urine culture performed if a urinary tract infection (UTI) is suggested on screening. Urinalysis (dipstick or sediment) must be included in the primary evaluation of any patient presenting with LUTS to identify conditions, such as urinary tract infections (UTI), non-visible haematuria and diabetes mellitus. Urinalysis is recommended in most guidelines in the primary management of patients with LUTS [28, 29]. There is a limited evidence, yet general expert consensus that the benefits outweigh the costs [30]. The value of urinary dipstick/microscopy for diagnosing UTI in men with LUTS without acute frequency and dysuria has recently been questioned [31].

Urine cytology is indicated in patients without UTI who have visible or non-visible haematuria with risk factors for malignancy (e.g. extensive smoking history). Renal function tests are not required unless there is a concern for severe urinary retention resulting in hydronephrosis [32]. Other laboratory testing is determined by signs or symptoms elicited in history and physical exam.

2.3.1. Post-void residual

Female patients who present with storage-specific symptoms, with normal sensation and no complaints of decreased bladder emptying, and no anatomical, neurological, organ-specific or co-morbid risk factors for retention may not require the measurement of PVR urine. A PVR should be performed when decreased bladder emptying is suspected in patients with neurologic disease, recurrent urinary tract infections, history concerning for detrusor under activity or bladder outlet obstruction (BOO), history of urinary retention, severe constipation, pelvic organ prolapse beyond the hymen, new onset or recurrent incontinence after surgery for incontinence, diabetes mellitus with peripheral neuropathy or medications that suppress bladder contractility or increase sphincter tone [2].

PVR is assessed by transabdominal ultrasound, bladder scan or catheterization. Jalbani and Ather [33] noted that the bladder scan estimate is as accurate as catheterization for determining the PVR urinary volume. Its accuracy was also comparable when the urinary volume is <100 mL, and there was no significant effect of age, gender and body mass index. This system could replace the more invasive catheterization with excellent accuracy. High PVR is either due to obstruction (like benign prostatic obstruction, BPO, in ageing men) or poor detrusor contraction (frequently seen in diabetics). Higher PVRs are reliable marker for BPO. Two landmark studies, i.e. medical therapy of prostate symptoms (MTOPSs) and alfuzosin long-term efficacy and safety study (ALTESS) have assessed the impact of significant PVR and risk of disease progression. Both the medical therapy of prostate symptoms (MTOPSs) and alfuzosin long-term efficacy and safety study (ALTESS) studies showed that high baseline PVR is associated with increased risk of symptom progression [34, 35].

2.3.2. Role of Urodynamic

Urodynamic studies are defined as a functional study of lower urinary tract. It is an invasive procedure and includes filling and voiding cystometry, pressure flow studies, urethral sphincter electromyography (EMG), urethral function tests/urethral pressure profilometry and videourodynamics (VUDS). These studies involve the use of a double- or triple-lumen urethral catheter to fill the bladder and record bladder and urethral pressures (need triple-lumen catheter). Detrusor pressures are not directly measured. It is a calculated value for intra-bladder pressure (determined by bladder catheter) minus the intra-abdominal pressure (determined by rectal catheter).

It is not required in the initial evaluation of urinary incontinence in women whose symptoms are consistent with stress, urgency or mixed, incontinence [36]. A 2013 systematic review of 99 studies including over 80,000 women found that urodynamic testing can establish the diagnosis of urodynamic stress urinary incontinence but it cannot predict the outcome of surgical treatment [37]. A detailed account of commonly performed urodynamic testing is given below:

2.3.2.1. Uroflowmetry

Uroflowmetry provides a non-invasive easy to perform test to assess the dynamics of urinary flow. The amount of information provided by UFM, along with ultrasonic estimation of resid-

ual urine in the bladder, usually is enough in the routine evaluation of elderly men with lower urinary tract symptoms (LUTS). It is one of the most common performed urodynamic studies. The common clinical parameters used to assess the flow dynamics include maximum flow rate (Qmax) and flow pattern [38]. The diagnostic accuracy of uroflowmetry for detecting BPO is variable and is substantially influenced by threshold values. A threshold Qmax of 10 mL/s has a specificity of 70%, a PPV of 70% and a sensitivity of 47% for BOO. The specificity using a threshold Qmax of 15 mL/s was 38%, the PPV 67% and the sensitivity 82% [39].The main limitation of UFM is its inability to discriminate between poor detrusor function and bladder outlet obstruction (BOO), for which pressure flow studies are necessary.

2.3.2.2. Filling and voiding cystometry

Table 2 summarizes the indications for urodynamic studies comprising of filling and voiding cystometry.

Severe stress incontinence, previous pelvic radiation, previous anti-incontinence surgery
Overactive bladder not responding to conservative therapy
UI with voiding dysfunction
Voiding difficulty associated with UI and POP
Poorly definable or inconclusive history to support UI
Associated with diseases, which can affect the function of LUT/pelvic floor, e.g. diabetes mellitus, Parkinson's disease, cerebrovascular accident and prolapsed intervertebral disc

Table 2. Indications for urodynamic studies.

2.3.2.3. Ambulatory and videourodynamics

Ambulatory and videourodynamics are indicated only if the diagnosis is unclear after conventional urodynamics [40].

2.3.3. MRI Pelvic floor ultrasound and EMG

Imaging improves our understanding of the anatomical and functional abnormalities that may cause UI. In clinical research, MRI and EMG are used to evaluate urethral support in cases of SUI. There is a general consensus that MRI provides good global pelvic floor assessment, including POP, defecatory function and integrity of the pelvic floor support [32]. However, it is not considered useful in the evaluation of UI [33]. Ultrasound imaging can reliably be used to measure bladder neck and urethral mobility in cases of SUI but it is not routinely performed in the initial assessment of UI.

3. Conclusions

Urinary incontinence is of various types, and its initial assessment requires detailed history taking and clinical examination. Since the disease has major impact on patient's quality of

life hence the evaluation should lead to establish types of UI. Very few patients need invasive testing and usually urine analysis, culture, bladder diary, stress test are enough for initial assessment. Patients with neurogenic bladder and overactive bladder syndrome need specific testing for final diagnosis.

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