COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS, SINGAPORE 2006

CONSENSUS GUIDELINES ON THE INVESTIGATIONS OF FEMALE URINARY INCONTINENCE:

HISTORY & UROGYNAECOLOGICAL EXAM INATION

Urinary Incontinence

Urinary incontinence has been defined by the International Continence Society as involuntary loss of urine that is a social or hygienic problem[1].

HISTORY

Before any investigations are performed a detailed history should be ascertained. Lower urinary tract symptom (LUTS) are divided into three groups: storage, voiding and postmicturition symptoms. The definitions of the symptoms are obtained from the most recent report on the standardization of terminology in lower urinary tract function[1].

Storage symptoms

Storage symptoms are experienced during the storage phase of the bladder.

Increased daytime frequency is the need to void too often by day.

Nocturia is the need to wake up at night one or more times to void.

Urgency is a sudden compelling desire to pass urine that is difficult to defer.

Urinary incontinence is (1) any leakage of urine; (2) an involuntary loss of urine that is a social or hygienic problem.

Stress urinary incontinence is involuntary leakage on effort or exertion, or on sneezing or coughing.

Urge urinary incontinence is involuntary leakage accompanied by or immediately preceded by urgency.

Mixed urinary incontinence is involuntary leakage associated with urgency and also with exertion, effort, sneezing or coughing.

Enuresis is any involuntary loss of urine.

Nocturnal enuresis is loss of urine during sleep.

Continuous urinary incontinence refers to continuous leakage.
Other types of urinary incontinence may be situational, for example the report of incontinence during sexual intercourse or giggle incontinence.

Voiding symptoms

Voiding symptoms are experienced during the voiding phase.

Slow stream is reported by the individual as a perception of reduced urine flow usually compared with previous performance or in comparison to others.

Intermittent stream (intermittency) is a urine flow that stops and starts, on one or more occasions, during micturition.

Hesitancy is difficulty in initiating micturition, resulting in a delay in the onset of voiding following readiness to pass urine.

Straining to void describes the muscular effort used to either initiate, maintain or improve the urinary stream.

Postmicturition symptoms are symptoms experienced immediately after micturition

Feeling of incomplete emptying is a feeling experienced after passing urine.

Postmicturition dribbling is the involuntary loss of urine immediately after finishing passing urine.

Each of the above LUT symptoms should be qualified as (0) = absent, (1) = present occasionally or (2) = present frequently.

Current drug history, past medical, surgical, obstetrical & gynaecological histories are also important.

PHYSICAL EXAMINATION

The weight and height should be measured to calculate the body mass index (BMI).

The abdominal examination should be performed to identify the presence of surgical scars, hernias or abnormal masses.

UROGYNAECOLOGICAL EXAMINATION

Urogynaecological examination should begin with the inspection of the vulva for atrophy, dermatoses secondary to vaginal infections and discharge, e.g., Candida, Trichomonas and Gardnerella, or urinary incontinence. The internal genitalia should also be examined for atrophic changes, abnormal vaginal discharge or urine, pelvic organ prolapse and abnormal pelvic masses. The poorly-oestrogenised vaginal tissue has a thinned and dry epithelium with loss of transverse rugae in its lower two-thirds[2].

One of the earliest systems of evaluating prolapse, which gained widespread usage, was that developed by **Porges** in 1963[3]. He recommended two separate sets of observations – at *rest* and with *straining*. He also sounded the uterus to exclude cervical elongation. However, he discouraged the then-common practice of applying traction on the cervix with a tenaculum as it did not simulate a life situation. The reference point for this system was the *introitus*:

Slight or 1st degree = Cervical descent within the introitus
Moderate or 2nd degree = Cervical descent outside the introitus
Marked or 3rd degree = Complete eversion of the uterus

One of the most widely used grading systems currently in use was published by **Beecham** in 1980[4] in which prolapse was rated in degrees during *straining* which he believed to be an accurate determinant of the patient's symptoms. The reference point for this system was also the *introitus* using the similar classification as Porges's.

Baden and Walker proposed a method of classifying vaginal support by a *site-specific* examination during *straining*, in which six different anatomical reference points were assigned betweeen Grade 1 and 4 using the *hymen* as the reference point[5].

The vaginal profile evaluates *urethroceles, cystoceles, prolapse* and *rectoceles* according to a *half-way* system:

Grade 1 = Descent upto the midplane of the vagina
Grade 2 = Descent half-way to the hymen (from the mid-plane of the vagina to the hymen)
Grade 3 = Descent half-way through the hymen
Grade 4 = Complete eversion

Reference: Diagram 1 from Swift S, Theofrastous J. Aetiology and Classification of Pelvic Organ Prolapse
In: Textbook of Female Urology and Urogynaecology. Eds: Linda Cardozo and David Staskin. Pub: Isis Medical Media, London, 2001; 46: 576-585.

Baden proposed the evaluation of *enteroceles* using a system in which the vaginal length was divided into *quarters* and herniation to the hymen was assigned as grade 4.

Perineal lacerations were also graded:
Grade 1 = Involvement of the vaginal epithelium
Grade 2 = Involvement of the perineal body

Grade 3 = Involvement of the anal sphincter
Grade 4 = Laceration to the rectal mucosa

Drawbacks of all the above systems

Non-standardised and unvalidated making it difficult to communicate with colleagues and compare results of surgery for pelvic organ prolapse (POP).

The Quantitative Pelvic Examination

The quantitative pelvic organ prolapse (POP-Q) examination system has been adopted by the International Continence Society (ICS), the American Urogynecologic Society (AUGS) and the American College of Obstetricians and Gynecologist (ACOG). The final draft was published in 1996[6] and has been validated with high reproducibility between and within examiners[7,8].
The POP-Q examination measures the position of midline vaginal structures in centimeters relative to the (remnant of the) *hymenal ring*, a fixed and easily identified landmark. The examination is performed during *straining*, which reproduces the patient's complaints. Structures above the hymenal ring are measured in negative centimeters; those which prolapse beyond the hymenal ring are measured in positive centimeters. Any structure that descends to the level of the hymenal ring is measured in zero centimeters.

Nine measurements are recorded during the examination, with two taken anteriorly, two apically, two posteriorly, two externally, and vaginal length. The prolapse stage is defined by the structure that demonstrates the greatest degree of prolapse and the staging is defined relative to the hymenal ring:

Stage 0 = No descensus of pelvic structures during straining
Stage I = The leading surface of the prolapse does not descend below 1 cm above the hymenal ring
Stage II = The leading edge of the prolapse extends from 1 cm above the hymen to 1cm through the hymenal ring
Stage III = The prolapse extends more than 1 cm beyond the hymenal ring, but there is not complete vaginal eversion
Stage IV = The vagina is completely everted

Bimanual pelvic examination should be performed to ascertain the vaginal capacity, mobility, pelvic organs and to identify uterine fibroids and ovarian cysts.

The pelvic floor strength should be evaluated during its maximal contraction[9] and its strength graded using the Oxford Scale[10,11]:

Grade 0 = No contraction
Grade 1 = Flicker
Grade 2 = Weak contraction
Grade 3 = Fair contraction
Grade 4 = Strong contraction
Grade 5 = Strong and sustained contraction

The digital rectal examination should be performed to evaluate faecal impaction (which may result in overdistension and overflow incontinence in patients with chronic constipation, esp., the elderly), rectal masses and the external anal sphincter tone. The sacral reflex can be checked by stroking the skin lateral to the anus which will cause the contraction of the external anal sphincter. Perineal sensation reflects the function of S3,4. Similarly, the bulbocavernous reflex can be checked by gentle tapping of the clitoris which will produce a reflex contraction of the anal sphincter.

NEUROLOGICAL EXAMINATION

A simple neurological examination concentrating on voluntary vaginal (pelvic floor muscle) contraction, anal sphincter tone, bulbocavernosus and sacral reflexes and perineal sensation should be performed for all patients.

The tibialis anterior (L4,5) and toe extensor (L1, S1) can be tested by dorsiflexion, plantar flexion and toe extension. The abduction and spreading of the toes reflects the function of the lateral abductors (S3).

The deep tendon reflexes reflect the integrity of upper motor neuron (UMN) and lower motor neuron (LMN) function. The hyperactive deep tendon reflexes are suggestive of UMN lesion (associated with detrusor overactivity / hyper-reflexia). The hypoactive deep tendon reflexes are suggestive of LMN dysfunction (results in areflexic bladder).

When neurological disease is suspected or abnormalities are detected a full neurological examination should be performed or referral to neurologist made.

SIMPLE CLINIC TESTS

Simple clinic tests are an extension of history and physical examination which can be performed in the clinic by nurses, family physicians and gynaecologists, both in the institutions as well as private clinics. They are simple and cheap to perform requiring very little or no equipment and should enable a gynaecologist to reach a working diagnosis. A Urogynaecological Clinic screening of patients utilizing clinical assessment (history and physical examination) and the indicated simple clinic tests can cut down the number of unnecessary urodynamic investigations by 45% and improve the diagnostic accuracy by reducing the number of normal urodynamic diagnosis by 18.9%[12].

Simple clinic tests include: Intake-Frequency volume incontinence chart (urinary diary); erect stress test; simplified pad test (invasive & non-invasive); 1-hour ICS (International Continence Society) pad test; uroflowmetry; residual urine volume and urinalysis.

Intake-Frequency volume incontinence chart (Urinary diary)

This simple and informative chart is an accurate record of a patient's daily fluid intake, frequency and volume (if possible) of each micturition and episode and type of urinary incontinence. This is literally an extension of the patient's history recorded on a chart.

Indication

The urinary diary is considered a routine test for all patients complaining of storage symptoms (frequency, nocturia, urgency) and urinary incontinence. It is used as a baseline measuring tool and to assess treatment outcomes.

Instruction

For at least 48 hours[13,14] to 72 hours[15], ideally to include a weekday and weekend, the patient must record the time, volume (ml) and kind of fluid taken; time and volume (ml), if possible, of each void, whether this was associated with urgency; and the time when urinary leakage occurs. The patient should be advised not to alter her lifestyle, especially physical activities, diet, fluid intake or voiding habits during the recording period to reflect an accurate picture of her condition.

				Incontinent Episode (W)			
Time	**Fluid intake**	**Urine passed (ml or ✓) If urgent (U)**	**Urgency**	**Physical activity**	**Neither**	**Sex**	**Others**
6.30 am		350 (U)	W				
7 am	1 cup coffee 1 cup water						
7.30 am		150					
8.30 am		☑					
10 am	1 cup coffee						
11 am		☑ (U)	W				
12 noon	1 can Coke						
2 pm		☑					
3 pm	1 glass water						
4.30 pm		☑					
6 pm				W			
6.30 pm		200 (U)					
7 pm	1 bowl soup 1 glass water						
10 pm		300 (U)					
3 am		☑					

Diagram 2: Example of a Completed Intake-Frequency Volume Incontinence Chart (Intake-Urinary Diary)

Erect stress test

This is to qualify stress urinary incontinence.

Indication

Patients complaining of stress urinary incontinence in a private clinic setting where research, self-assessment of results of treatment are ‘not a priority’.

Instruction

The patient is advised not to empty her bladder, i.e., she should have a ‘comfortably-full’ bladder. She is then made to cough ‘naturally’ for at least 5 times in the erect posture with her feet apart, to demonstrate any stress incontinence of urine. If the latter is not seen the patient is asked to give another 5 stronger coughs.

Intepretation

1) This may be qualified as no stress urinary incontinence seen, or a few drops, ‘jet’ or flow instantaneous with coughing which is suggestive of mild, moderate or severe stress urinary incontinence respectively.
2) If urinary incontinence is seen not during (instantaneous) but just after (delayed) a cough/s, usually in a flow, sometimes until completion; this is suggestive of a cough provoked detrusor contraction / overactivity causing urge incontinence.

Advantage

Simple, quick, cheap and non-invasive.

Drawbacks

Cannot quantify incontinence and difficult to differentiate between stress and urge urinary incontinence. Therefore, cannot be used as an objective test in studies to report the results of surgical or conservative treatment for stress urinary incontinence / urodynamic stress incontinence.

Simplified pad test (invasive & non-invasive)

Indication

To qualify and quantify urinary incontinence, especially, stress urinary incontinence.

Instruction

The patient is instructed to empty her bladder and it is then filled with 250-300 ml of 0.9% (normal) saline through a size 12-14 Foley catheter under aseptic technique. Any residual urine is measured and recorded first. She is then made to stand with her feet apart and cough ‘naturally’ 10 times. Any urinary incontinence is soaked up by a pre-weighed sanitary pad/s held against her vulva with one of her hands. The sanitary pad/s is then re-weighed ands the difference in weight (g) is recorded. As the specific gravity (SG) of 0.9% saline is 1 (similar to urine), 1g = 1 ml.

Advantage

Accurate measurement of residual urine and urinary incontinence, hence is a useful objective test to counsel patients on the severity of their stress urinary incontinence as well as to evaluate the outcome of treatment.

Drawback

Its invasiveness
To overcome the invasiveness of this test, the patient is instructed not to empty her bladder for at least 2 hours before the test. Her bladder volume should be ascertained with an abdominal bladder scan (e.g., Diagnostic Ultrasound Corporation's Bladder Scan TM BVI 2500). If the bladder volume is ≥250 ml she is made to perform the rest of the test as above.

Intepretation

A difference in the pad weight of ≥2g is taken as significant urinary incontinence.

1-hour International Continence Society (ICS) pad test[16]

Indication

To qualify and quantify urinary incontinence:
(i) as a routine assessment in studies/research-oriented Urogynaecological Units
(ii) if the erect stress / simplified pad test is positive, i.e., >2g / urinary incontinence is considered to be troublesome/severe
(iii) pre- and post-urodynamic stress incontinence surgery or conservative/medical treatment, especially, in studies/trials to evaluate the outcome of treatment

Instruction

0 min :	Apply a pre-weighed pad
	Drink 500 ml sodium-free fluid, sitting
30 min :	Walking, stair-climbing
45 min :	Sit/stand X 10
	Cough X10
	Run on the spot X 1min
	Pick up objects from floor
	Wash hands under running water X 1 min
60 min :	Collect & weigh pad
	Void & measure volume

Intepretation

A difference in the pad weight of ≥2g is taken as significant urinary incontinence.

Categorization of urinary incontinence according to weight gain in the 1-hour pad test

Some authors use this classification to further quantify the severity of urinary incontinence:
< 2g = Dry
2-10g = Slight to moderate
11-50 = Severe
> 50g = Very severe

Drawbacks

1) The 1-hour duration of the test
2) It is not standardized as:
   (a) the patient does not need to empty her bladder before commencing the test. i.e., she begins with a variable bladder volume
   (b) the investigator may prolong the duration of the test beyond the 1-hour period if he/she feels that this would reveal more urinary incontinence

Modified 1-hour ICS pad test

To standardize this test it should be modified 2-fold:

(i) The patient must pass urine before the test
(ii) The test should end after the 1-hour period irrespective of the amount of urinary incontinence

24-hour home pad test

This is supposed to be more physiological, sensitive and cost effective but less standardized than the 1-hour/modified 1-hour ICS pad test[17]. The normal pad test result should be <8 g/24 hours[18].

Uroflometry

Uroflowmetry is a simple, non-invasive and cost effective test requiring a stand alone flowmeter and a commode or toilet seat placed over it for women or as a part of urodynamic equipment. Uroflowmeters are based on three different principles: weight, rotating disc and dip-stick. The first two are the most widely used flowmeters.

Indication

(i) As a routine investigation, especially if surgery for stress urinary incontinence is contemplated, and to decide whether voiding cystometry is indicated after filling cystometry;
(ii) History suggestive of voiding difficulty: hesitancy, need to strain to void, intermittent or poor stream, sensation of incomplete emptying, need to revoid soon after voiding;
(iii) Palpable bladder after voiding.

Instruction

The patient is asked to void into a flowmeter when her bladder is comfortably full or at least two hours after her last void. Ideally the flowmeter should be placed in a quiet room so that the patient can void in private.

Both the uroflow trace and results are automatically generated, recording the maximum and average flow rates, time to maximum flow, flow time and volume voided.

Interpretation

The normal curve is bell shaped with a maximum flow rate of ≥15 ml/s for a volume voided of at least 150 ml[19]. A reduced maximum flow rate may be due to an inadequate voided volume or to voiding difficulties and warrants a voiding cystometry.

Nomogram charts are also available for the maximum and average flow rates for the volume voided, e.g., Liverpool Nomograms[20].

Residual urine volume

Indication

Similar to uroflowmetry.

Instruction

After completing the uroflowmetry one of the following may be performed to estimate the residual urine: catheterization, abdominal bladder scan[21] or portable bladder scan. The bladder volume (ml) is calculated by using the formula: Depth (D) X Height (H) (sagittal axis) x Width (W) (transverse axis) X 0.7 (±)21%.; 0.7 = correction factor because the shape of the bladder not circular until it almost full. These measurements are not reliable when the bladder volume is <50 ml.

Portable ultrasonic bladder scanners[22,23] have been specifically designed to make three dimensional measurements of the bladder and automatically calculate the residual urine volume. The scan predicted volumes underestimate catheterized volumes of 17 to 20 ml.

Intepretation

A residual urine volume >50 ml is considered abnormal and a voiding cystometry is indicated.

Urinalysis

Urinalysis may be a midstream or catheterised urine sample for culture and sensitivity. The alternative to urine culture is the microscopic examination of an unspun urine specimen. Pyuria is defined as >10 leucocytes/ml high power field and is present in the majority of women with acute urinary tract infection. Microscopic haematuria may be seen in about 50% of women with cystitis. Urine dipstick tests may also be used to screen patients for bacteriuria. In patients with the latter the dipstick will be positive for leucocytes, red blood cells, protein and nitrite. Infections caused by Enterococci will give a false negative nitrite test as they do not convert nitrate to nitrite.

Indication

(i) Symptoms and signs suggestive of cystitis, urethritis or urinary tract infection
(ii) Before urodynamic investigations

Up to 25% of women with cystitis may experience incontinence. Endotoxin produced by Escherichia coli has been shown to cause detrusor instability, or to act on α-adrenergic blockers[24] resulting in stress urinary incontinence. In a small study of 12 women with asymptomatic bacteriuria, 33% became continent after antibiotic treatment[25].

URODYNAMICS/ URODYNAMIC INVESTIGAIONS

This section summarises some of the salient features from the latest RCOG Study Group on Incontinence in Women, Chapter 6, the role of urodynamics[26]. Urodynamic studies have repeatedly shown the superiority of urodynamic studies over symptoms alone in diagnostic accuracy,[27-29] and the knock-on improved success rates for interventions when directed by urodynamic studies[30]. Furthermore, there is an important role for urodynamic studies in clinical research into female incontinence.

Urodynamic investigations range from the simple and non-invasive (uroflowmetry) to the invasive with varying degrees of complexity. The invasive studies carry a small risk of introducing infection (2-3% in most good units) but routine antibiotic prophylaxis not given except in special cases[31]. Invasive studies should not be performed in the presence of urinary tract infection. It is essential that all studies are performed safely with good quality control and in a dignified and private environment. Urodynamic investigations include:

- Uroflowmetry
- Filling and voiding cystometry
- Urethral function studies [Urethral pressure profilometry (UPP), valsalva leak point pressure (VLPP)]
- Ambulatory urodynamic studies (UDS)
- Video-urodynamics
- Electromyography (EMG)

In the Singapore context, urodynamics are mainly performed in the Government Restructured and National University Hospitals with dedicated Urogynaecology / Urodynamic Centre/Clinic/Division/Unit manned by HMDP Fellowship Urogynaecologist/s. Whereas in the private sector only Mount Alvernia Hosp possesses a urodynamic machine and uroflowmetry, filling and voiding cystometry and video-urodynamics are performed by an in-house urologist. However there are gynaecologists and urologists in the private sector who own their own urodynamic machines.

Uroflowmetry has been covered under simple clinic tests above.

For the other investigations, I have included the unedited ICS 2002 recommendations, provided by Drs HC Han, LC Lee and Arthur Tseng.

ICS 2002 RECOMMENDATIONS:

Cystometry:

1. Basic test to assess bladder sensation, detrusor activity, bladder capacity and compliance.
2. Aim is to reproduce symptoms of urinary incontinence, evaluating bladder function prior to intervention.
3. Screening for bacteriuria important to rule out UTI.
4. Prophylactic antibiotics at physician's discretion.
5. Multi-channel UDS more expensive than cough stress test and simple cystometry; has similar sensitivity for diagnosis of USI.

Summary:

- Basic test
- Good communication between patient and investigator important
- Pattern recognition for analysis of UDS result. Artefacts must be taken into account during interpretation.
- Evidence-based quantification of observation NOT yet possible.

UPP:

1. For determining competence of the urethral closure mechanism, attempt to distinguish between urethral hypermobility and intrinsic sphincter deficiency.
2. Urethral pressure recordings by standard techniques, all involve degree of approximation.
3. UPP results highly influenced by methodological and biological factors.
4. Significant overlap of measured variables between different groups of patients; diagnostic value of UPP limited.
5. Treatment by either periurethral bulking agents or suburethral sling procedures or mid-urethral tapes/slings (recent evidence, added by authors).

Little evidence that outcome of surgery is improved by patient selection based on ISD or hypermobility. (Please refer to page 15, **Stress incontinence as the only symptom**, last sentence, Ref 36-40 – added by authors – the diagnosis of ISD may influence the choice of surgical procedure).

VLPP:

1. One of few methods to evaluate urethral function in patients with stress incontinence, by direct measurement of urethral contribution to continence.
2. High values (90 – 100 cm H2O) suggest incontinence secondary to urethral hypermobility.
3. Low values (< 60cm H2O) suggest intrinsic sphincter deficiency.
4. Associated with:
    - Increased leakage on pad testing
    - Increased symptom severity of stress incontinence
5. Choice of suburethral sling procedure or periurethral bulking agent for ISD.
6. Clinical outcomes post-procedure in patients with low VLPP NOT consistent.

EMG:

1. Most useful for detrusor-sphincter dyssynergia
2. Valuable in judging effects of PFE, and used as part of biofeedback.
3. No convincing evidence that it improves outcome of incontinence treatment.

Summary:

1. Limited value in routine UDS work-up.
2. More useful in neurogenic conditions.
3. Therapeutic use in rehabilitation and/or biofeedback to improve pelvic floor function.

Video Urodynamics:

1. Used in complicated lower urinary tract dysfunction.
2. Not first-line investigation; considered by some to be 'gold-standard'
3. Advantage of simultaneous measurement of pressures and visualisation of anatomy.
4. Disadvantage of radiation exposure, high initial and running cost; also patient discomfort.
5. Some evidence for use in patients with myelodysplasia.

Summary:

1. No indication to perform in primary, uncomplicated stress/urge/mixed incontinence. (High level evidence)
2. Indicated for complicated pathology prior to surgery, OR when diagnosis remains unclear after simpler tests have been performed. (Low level evidence)
3. Defective bladder support diagnosed on with high reliability. (High level evidence)
4. May consider to do if choice of surgical procedure is based on type and degree of supporting tissue insufficiency; and if new procedure is being evaluated for ability to restore insufficiency. (Low level evidence)

Ambulatory UDS:

1. Monitors leakage, flow recordings, pressure in bladder and abdomen in an ambulatory setting.
2. Indicated in investigating:
   - Neurogenic lower urinary tract dysfunction
   - Enuresis in older children
   - Evaluation of pharmacotherapy
   - Electrotherapy
   - Failure of previous treatment
3. Predictive value NOT been well documented.

Summary:

1. Most commonly a second-line test, especially if conventional UDS testing fails
2. Sensitive but not specific method of urinary leakage detection – mixed incontinence symptoms or UI without objective leakage.

The role of urodynamic studies in the investigation of incontinence in women

This can be considered in the following four clinical settings, as suggested by the history. This very practical, evidence-based section, conclusion and definitions have been obtained from the latest RCOG Study Group on Incontinence in Women, Chapter 6, the role of urodynamics[26].

Stress incontinence as the only symptom

The probability of a diagnosis of urodynamic stress incontinence (USI) approaches 100% in women whose sole or main complaint is stress incontinence[32,33], particularly if the sign of stress incontinence is present. However, this sort of presentation is uncommon[34] and when other symptoms are present the likelihood of a diagnosis of pure USI falls to around 60%[35]. Thus, although it is appropriate to rely on clinical assessment when non-surgical intervention is being considered, if invasive therapy with associated morbidity is being contemplated then urodynamic studies should be employed. Filling cystometry should be used to confirm USI, and also to exclude detrusor overactivity. Pressure-flow studies should be used to assess the voiding pattern to give information about the likelihood of postoperative voiding difficulty. Urethral pressure studies and leak-point pressures (LPP) are used to assess urethral sphincter function, especially, in patients complaining of severe stress urinary incontinence with mild exertion, confirmed on objective pad tests and filling cystometry (USI). If a diagnosis of intrinsic sphincter defiency (ISD) is made (maximum urethral closure pressure <20 cm H_2O), this may influence the choice of surgical procedure[36-40].

Urge incontinence as the only symptom

The likelihood of observing detrusor overactivity during cystometry in women complaining of urge incontinence without stress approaches 100%[33]. Thus, if non-surgical treatment is being pursued it is appropriate to rely on clinical assessment. Urodynamic studies are indicated only in the research setting or when invasive intervention is being considered after the failure of lifestyle alterations or medical therapy. Filling cystometry provides evidence of detrusor overactivity in most cases but, if an explanation is not found, then ambulatory studies or urethral pressure studies may be required.

Mixed urge and stress incontinence symptoms

It is important to establish from the history which is the more troublesome complaint to the patient. In those women with mixed symptoms, especially, if urge is more severe than stress, initial treatment should be conservative or medical. However if this fails / if the urge symptoms are cured/improved but the stress symptoms persist, urodynamic studies are required to direct further therapy. Filling cystometry allows detection of both urodynamic stress incontinence and detrusor overactivity.

Incontinence with symptoms or signs of voiding difficulty

Although fewer than 10% of patients presenting with incontinence will complain of voiding difficulty, 25-90% will report such symptoms on direct questioning[41,42]. If there is a significant history of voiding symptoms or of previous anti-incontinence surgery, then filling cystometry, uroflowmetry and pressure-flow studies are appropriate[43]. If there is

evidence of increased detrusor pressure during filling (i.e. impaired bladder compliance) assessment of the upper urinary tract should be undertaken. As there are no clearly defined pressure-flow parameters for diagnosing obstruction in the female, there may be a role for video-urodynamics, to directly visualize any outlet obstruction.

Conclusion

The role of urodynamic studies is to reproduce the patient's symptoms and to provide a pathophysiological explanation to them. In the investigation of women with incontinence, urodynamic studies are indicated to:

- identify or rule out factors contributing to the incontinence and their relative importance
- gain information about other aspects of lower urinary tract dysfunction
- predict the outcome (including undesired effects) of an intervention
- confirm the effects of a treatment, or to understand the method of action of a particular
- treatment (especially in the assessments of new interventions)

- understand the reasons for failure of a given treatment

Definitions[1]

Urodynamic stress incontinence (USI) (previously known as genuine stress incontinence) is noted during filling cystometry and is defined as involuntary leakage of urine during raised intravesical pressure secondary to increased abdominal pressure and in the absence of a detrusor contraction.

Detrusor overactivity incontinence (previously known as detrusor instability incontinence) is incontinence resulting from an involuntary detrusor contraction. In a patient with normal sensation, urgency is likely to be experienced just before the leakage episode.

Thus, the diagnosis of urodynamic stress incontinence or detrusor overactivity incontinence can be made only after urodynamic investigation.

This consensus statement is produced on behalf of the College of Obstetricians and Gynaecologists, Singapore by:

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Valid until 2008
unless otherwise indicated

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