كلية : كلية الطب العام

القسم او الفرع : النسائية والتوليد

المرحلة: الخامسة

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اسم المادة باللغة العربية :امراض النساء

اسم المادة باللغة الإنكليزية : Gynecology

اسم المحاضرة السادسة والعشرون باللغة العربية: الامراض البولية النسائية

اسم المحاضرة السادسة والعشرون باللغة الإنكليزية :Urogynecology

محتوى المحاضرة الثالثة والثلاثون

Urogynecology

Urinary incontinence has a major impact on the quality of life of women. Through ignorance, embarrassment and a belief that loss of bladder control is a ‘normal’ result of childbirth and ageing, many women suffer for years before seeking help. An accurate diagnosis can be made and many women can be cured or improved by the use of various management strategies.

Urinary incontinence is defined as the complaint of any involuntary loss of urine, whereas continence is the ability to retain urine at all times except during micturition. Both continence and micturition depend on a structurally and functionally normal lower urinary tract.

Causes of urinary incontinence in women

Urethral incontinence will occur whenever the intravesical pressure involuntarily exceeds the intraurethral pressure. This may be due to an increase in intravesical (or detrusor) pressure or a reduction in urethral pressure or a combination of the two. Thus, the fault which leads to incontinence may lie in the urethra or the bladder or both.

Urodynamic stress incontinence (urethral sphincter incompetence)

Detrusor overactivity (neurogenic detrusor overactivity)

Retention with overflow

Fistulae: vesicovaginal, ureterovaginal, urethrovaginal, complex

Congenital abnormalities, e.g. epispadias, ectopic ureter, spina bifida occulta

Urethral diverticulum

Temporary, e.g. urinary tract infection, faecal impaction

Functional, e.g. immobility

Urodynamic stress incontinence

Urodynamic stress incontinence is defined as the involuntary leakage of urine during increased abdominal pressure in the absence of a detrusor contraction.

In isolation, the symptom of stress incontinence is a reasonably good predictor of the presence of an incompetent urethral sphincter. Urethral sphincter weakness in most cases is due to hypermobility, where the pelvic floor and ligaments cannot retain the urethra in position and it falls through the urogenital hiatus during increases in abdominal pressure, leading to loss of pressure transmission to the urethra and hence leakage of urine. Intrinsic sphincter deficiency (ISD) is less common and occurs where urethral closure pressure is low without any urethral mobility. ISD is due to weakness of the sphincter muscles and loss of the cushioning seal effect in the urethra.

Urethral sphincter weakness is associated strongly with a history of vaginal childbirth and various related risk factors, and with some non-obstetric factors. Obstetric risk factors act by a combination effect of stretching/damage to the pudendal nerves and overstretching, or even avulsion, of the pelvic floor muscles from their insertions on the pelvic side wall. Direct muscle damage results in loss of pelvic floor support and hence urethral hypermobility. Pudendal nerve damage causes both weakening of the pelvic floor muscles and urethral sphincter. It is now possible to identify levator muscle defects in symptomatic women by means of magnetic resonance imaging or transperineal/transvaginal ultrasound. Most risk factors may not be modifiable .

Risk factors for stress urinary incontinence

Multiparity (particularly vaginal births).

Forceps delivery.

Perineal trauma.

Long labour.

Epidural analgesia.

Birthweight >4 kg.

Increasing age.

Post menopause.

Obesity studies have shown that significant weight loss among obese women is associated with major improvements in urinary leakage symptoms.

Connective tissue disease.

Chronic cough (e.g. bronchiectasis or chronic obstructive pulmonary disease).

alpha-adrenergic antagonist for hypertension causes relaxation of the urethral sphincter.

Causes of urodynamic stress incontinence

- Urethral hypermobility
- Urogenital prolapse
- Pelvic floor damage or denervation
- Parturition
- Pelvic surgery
- Menopause
- Urethral scarring
- Vaginal (urethral) surgery
- Incontinence surgery
- Urethral dilatation or urethrotomy
- Recurrent urinary tract infections
- Radiotherapy
- Raised intra-abdominal pressure
- Pregnancy
- Chronic cough (bronchitis)
- Abdominal/pelvic mass
- Faecal impaction
- Ascites
- Obesity

Detrusor overactivity

Detrusor overactivity is defined as a urodynamic observation characterized by involuntary contractions during the filling phase that may be spontaneous or provoked. It is the second commonest cause of urinary incontinence in women and accounts for 30–40% of cases.

Women with DO will often complain of symptoms of OAB, but may not be incontinent unless the urethral sphincter function is compromised or the detrusor contractions are of very high pressure amplitude and overcome urethral resistance.

The aetiology of DO is poorly understood but laboratory studies have identified differences in sensory and interstitial nerves in the bladder wall of patients compared to controls, and alterations in the expression of several different neurotransmitters and their receptors.

The incidence is higher in the elderly and after failed incontinence surgery. The cause of detrusor overactivity remains uncertain and in the majority of cases it is idiopathic, occurring when there is a failure of adequate bladder training in childhood or when the bladder escapes voluntary control in adult life. In some cases detrusor overactivity may be secondary to an upper motor neuron lesion, especially multiple sclerosis. In such cases it is known as neurogenic detrusor overactivity. In men, detrusor overactivity may be secondary to outflow obstruction and may be cured when the obstruction is relieved. However, outflow obstruction in women is rare.

Risk factors for detrusor overactivity:

- Childhood bedwetting.
- Obesity.
- Smoking.
- Previous hysterectomy.
- Previous continence surgery. All continence surgery carries a risk of 5–10% of new DO.

Detrusor overactivity and overactive bladder

The symptoms of OAB are due to involuntary contractions of the detrusor muscle during the filling phase of the micturition cycle (termed detrusor overactivity).

However, OAB is not identical with detrusor overactivity as the former is a symptom-based diagnosis whereas the latter is a urodynamic diagnosis. It has been estimated that 64% of patients with OAB have urodynamically proven detrusor overactivity and that 83% of patients with detrusor overactivity have symptoms suggestive of OAB.

Clinical presentation of urinary incontinence

Symptoms of lower urinary tract dysfunction fall into three main groups: (i) incontinence; (ii) overactive bladder (OAB) symptoms; and (iii) voiding difficulties.

Stress urinary incontinence (SUI) is the most common complaint. It may be a symptom or a sign, but it is not a diagnosis. Apart from stress incontinence, women may complain of urge incontinence, dribble incontinence. Nocturnal enuresis (bed wetting) may occur on its own or in conjunction with other complaints. Symptoms of voiding difficulty include hesitancy, a poor stream, straining to void and incomplete bladder emptying.

Clinical assessment of incontinence

A detailed history should be taken to elicit the patient's presenting symptoms, to identify whether the patient has only stress incontinence symptoms, only OAB symptoms or mixed symptoms. If there are mixed symptoms, an assessment should be made as to which predominate. It is useful to record measures of severity, including: the number of episodes per day of frequency, urgency and leakage; whether continence pads are needed, and if so how many and what size; whether the patient needs to change her underclothes or outer clothes because of leakage; and what behaviour changes have been employed.

Commonly, women will have reduced their fluid intake and may limit their social activities to places where they already know about the position and cleanliness of toilet facilities. Associated symptoms of prolapse (see later), faecal incontinence symptoms (which patients rarely offer spontaneously) and any sexual difficulties should be sought, as well as a detailed medical history to identify potential predisposing factors and to identify any ongoing medical or surgical conditions that may impact on treatment (including comorbidities that may increase the risk of anaesthesia, or present cautions or contraindications to drug therapy). Remember to be alert for 'red flag' signs suggesting malignancy such haematuria, rectal bleeding or significant pain.

Physical examination should include general examination and an abdominal and pelvic examination.Abdominal examination will identify any surgical scars, evidence of obesity and the presence or absence of any pelvic mass that may be a factor in urinary frequency. The presence of a large fibroid uterus or ovarian cyst filling the pelvis is an uncommon finding, but will cause urinary frequency by occupying the space in the pelvis where the full bladder would normally lie. In such cases, surgical removal of the mass will be indicated and should improve the urinary symptoms. Pelvic examination of the incontinent woman ideally should be done in the lithotomy position using a right-angled Sims speculum to assess each vaginal wall adequately for associated prolapse. Visible leakage during coughing or Valsalva manoeuvre should be sought, and an assessment of the patient's ability to contract and hold the contraction of her pelvic floor muscles is essential.

Investigations

Midstream urine sample

A midstream urine (MSU) specimen should always be sent for culture and sensitivity prior to further investigation. Although the patient's symptoms are unlikely to be caused by a urinary tract infection, they can be altered by one.

Frequency–volume charts (Patient bladder diary)

It is often helpful to ask women to complete a frequency–volume chart or urinary diary. This is informative for the doctor as well as the patient and may indicate excessive drinking or bad habits as the cause of lower urinary tract symptoms. The frequency–volume chart (urinary or bladder diary) provides an objective assessment of a patient's fluid input and urine output. As well as the number of voids and incontinence episodes, the mean volume voided over a 24-hour period can also be calculated, as well as the diurnal and nocturnal volumes. Frequency–volume charts have the advantage of assessing symptom severity in the everyday situation.It include a patient bladder diary (for 3 days is usually adequate) to record the amount, type and frequency of drinks taken and to record the timing, frequency and volume of voids. This can be a useful exercise for the patient herself to take note of exactly what she is drinking and her voiding habits. The bladder diary will also allow the patient to record leakage episodes and urgency.

Pad test

Incontinence can be confirmed (without diagnosing the cause) by performing a pad weighing test. Many different types of pad test have been described based on the method for filling the bladder or length of the test.

It is possible to obtain an objective measure of urine leak by conducting a pad test. This is an investigation where the patient wears one or more preweighed sanitary pads for a variable length of time (between 1 hour in clinic and 24 hours at home) while performing specific provocation tests (e.g. hand washing, climbing stairs, coughing) or activities of daily living. The change in weight (g) is a measure of the amount of urine lost (ml). Only the 24-hour home pad test has been shown to be reliable and reproducible, and pad tests have become much less commonly done in the last 5–10 years.

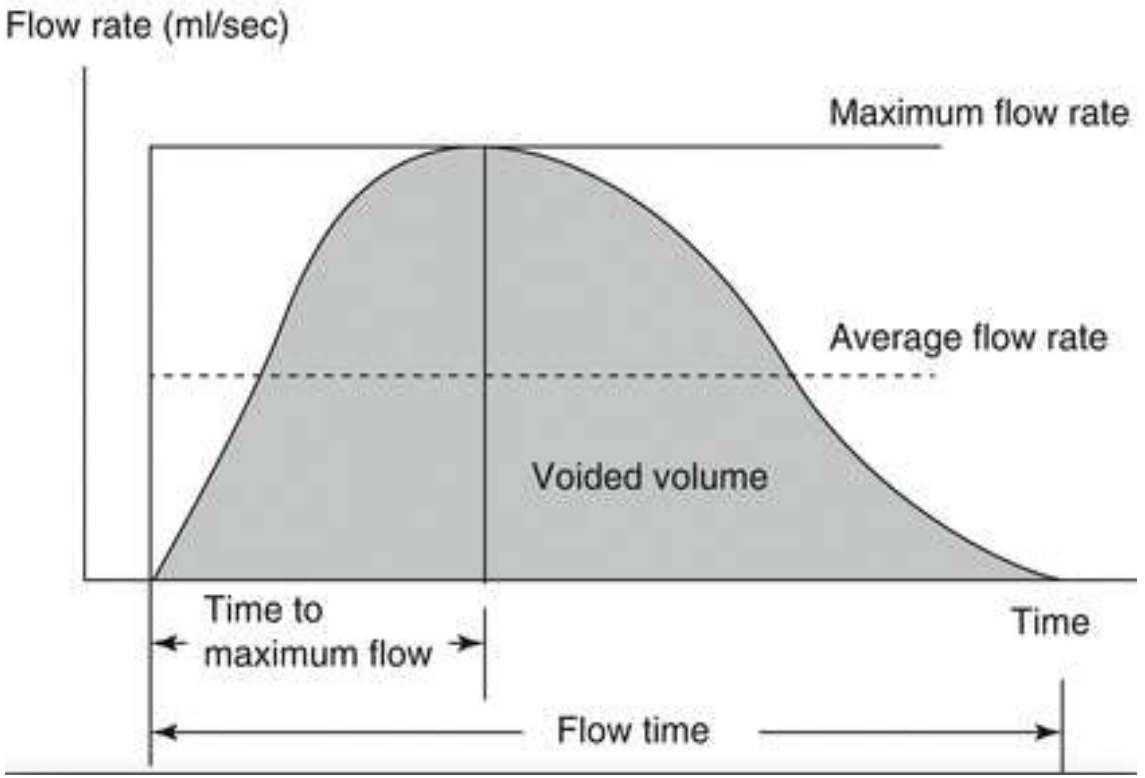
Urodynamics

Urodynamic studies comprise several investigations that are employed to determine bladder function.

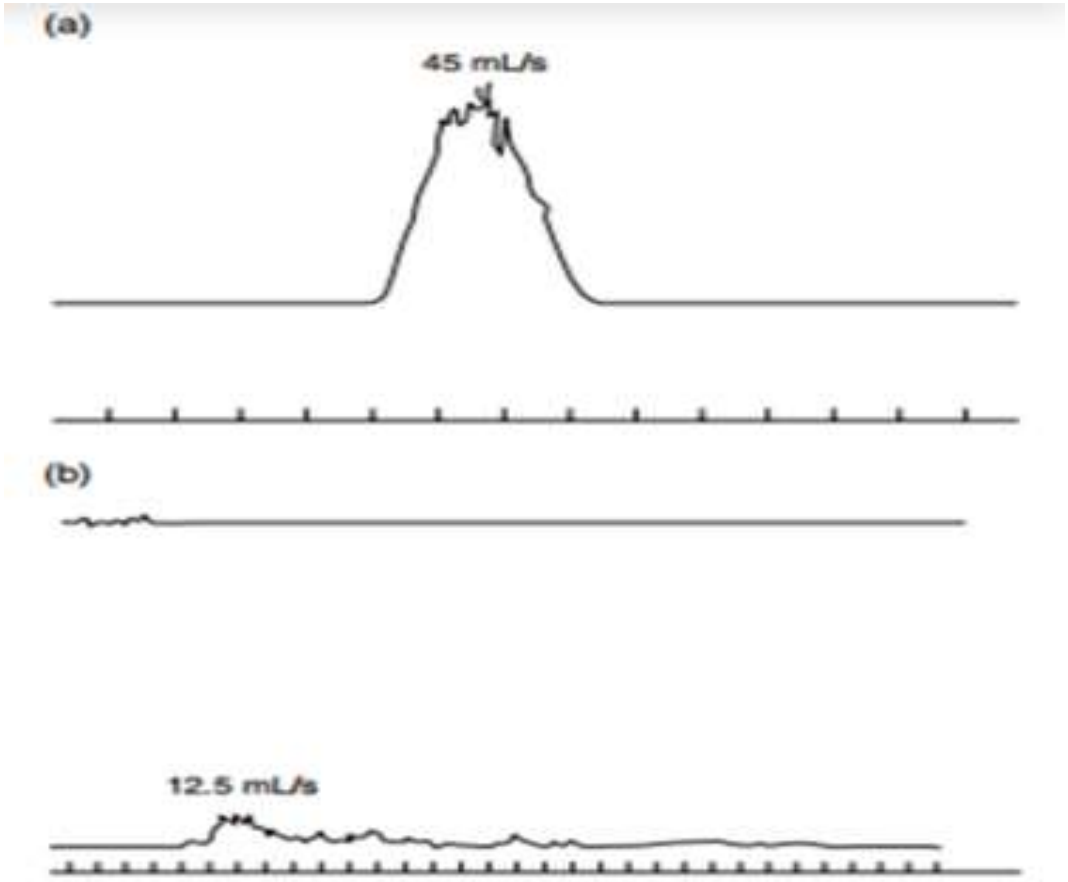
Uroflowmetry:

Uroflowmetry, the measurement of urine flow rate, is a simple test that can exclude the presence of outflow obstruction or a hypotonic detrusor, but on its own will not differentiate between the two. In order to obtain a flow rate, the patient is asked to void onto the flowmeter, in private, when her bladder is comfortably full. The maximum flow rate and volume voided are recorded. In women, the normal recording is a bell-shaped curve with a peak flow rate of at least 15mL/s for a volume of 150mL of urine voided. A reduced flow rate in an asymptomatic woman may be important if she is to undergo incontinence surgery as she is more likely to develop voiding difficulties in the postoperative period.

Uroflowmetry



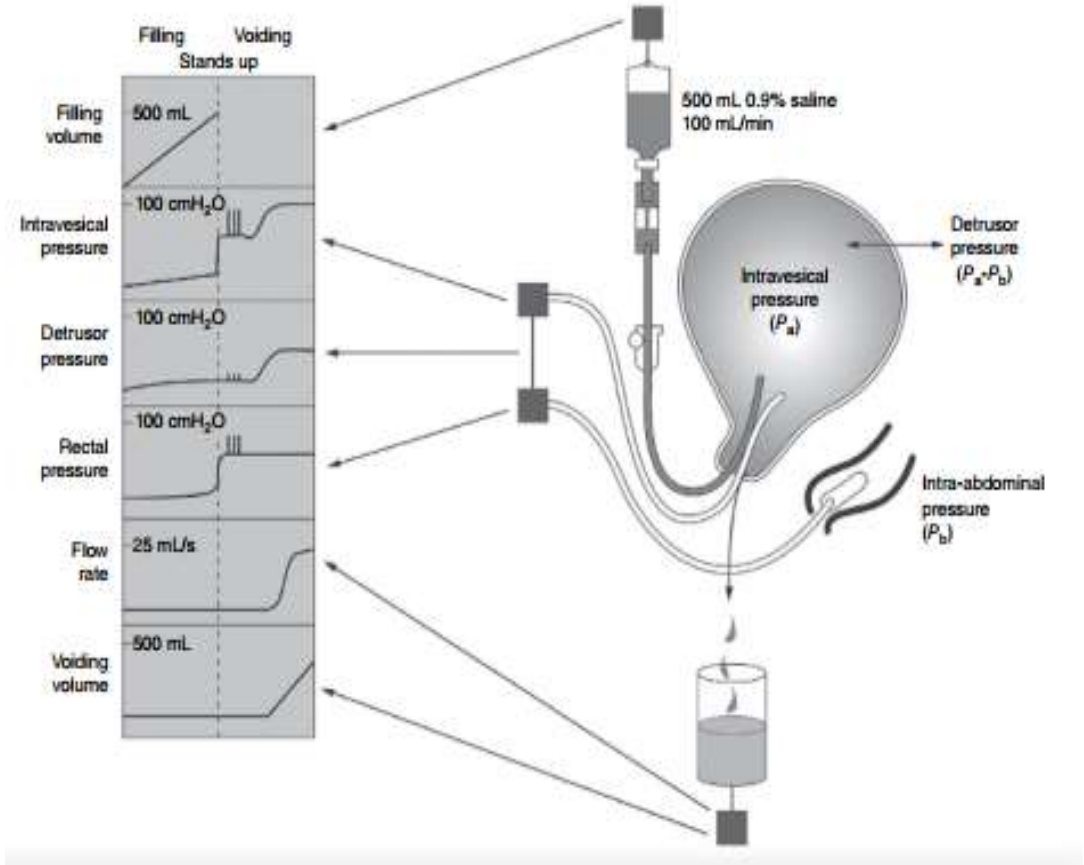
Uroflowmetry



Cystometry

Cystometry, which measures the pressure–volume relationship within the bladder, can differentiate between urodynamic stress incontinence and detrusor overactivity in the majority of cases. The bladder is filled with physiological saline via a urethral catheter. During bladder filling the intravesical (total bladder) pressure and the intra-abdominal pressure are measured. The rectal (or vaginal) pressure is recorded to represent intra-abdominal pressure and this is subtracted from the bladder (intravesical) pressure to give the detrusor pressure. This is called subtracted cystometry.

Subtracted cystometry



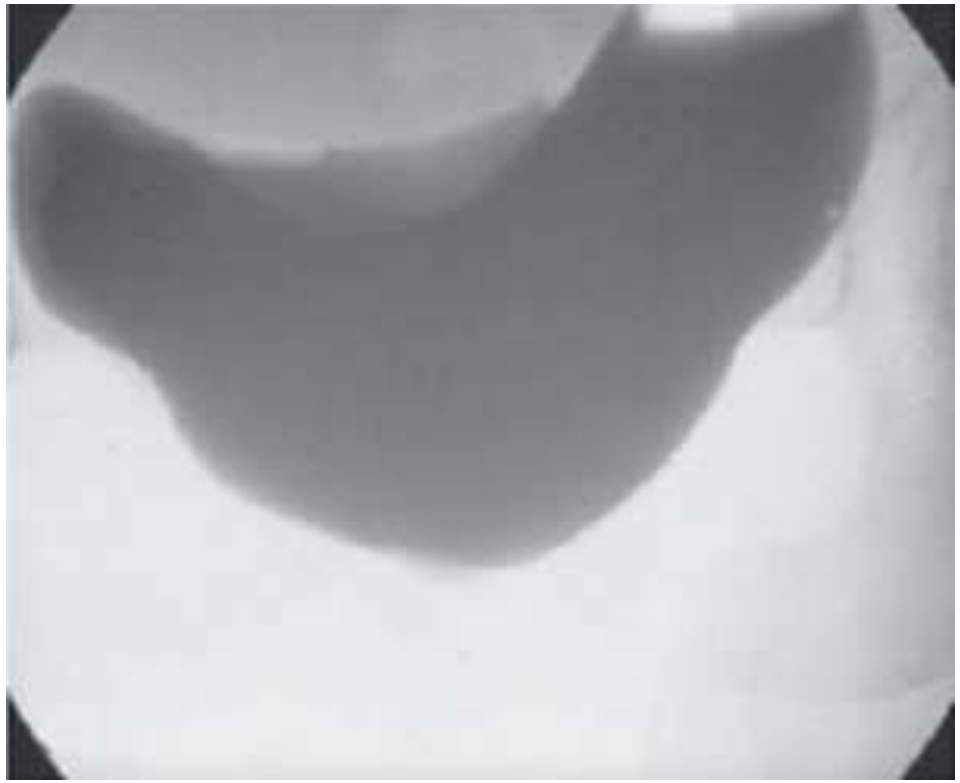
The information obtained from a subtracted cystometrogram includes sensation, capacity, contractility and compliance. The urinary residual volume is normally less than 50 mL, the first sensation of desire to void is normally at 150–250 mL and the cystometric bladder capacity is normally 400–600 mL. Under normal circumstances, the detrusor pressure does not rise by more than 0.03 cmH2O for 1 mL of bladder volume and there are no detrusor contractions during bladder filling.

Ideally, the bladder is filled with the woman sitting or standing and the filling catheter removed once capacity is reached. She is asked to cough several times and to heel bounce and any rise in detrusor pressure or leakage per urethram is recorded. She is then asked to pass urine and the detrusor pressure is measured and any urinary residual volume can be noted.

Videocystourethrography

Videocystourethrography with pressure and flow studies, which combines cystometry, uroflowmetry and radiological screening of the bladder and urethra, can be a most informative investigation. It is relatively expensive and time-consuming and is only available in tertiary referral centers. Abnormal bladder morphology can be assessed as well as the presence of vesico-ureteric reflux, trabeculation or diverticula. Occasionally, a urethral diverticulum or vesicovaginal fistula may be identified.

Videocystourethrography image show extrinsic compression of the bladder by uterine fibroids

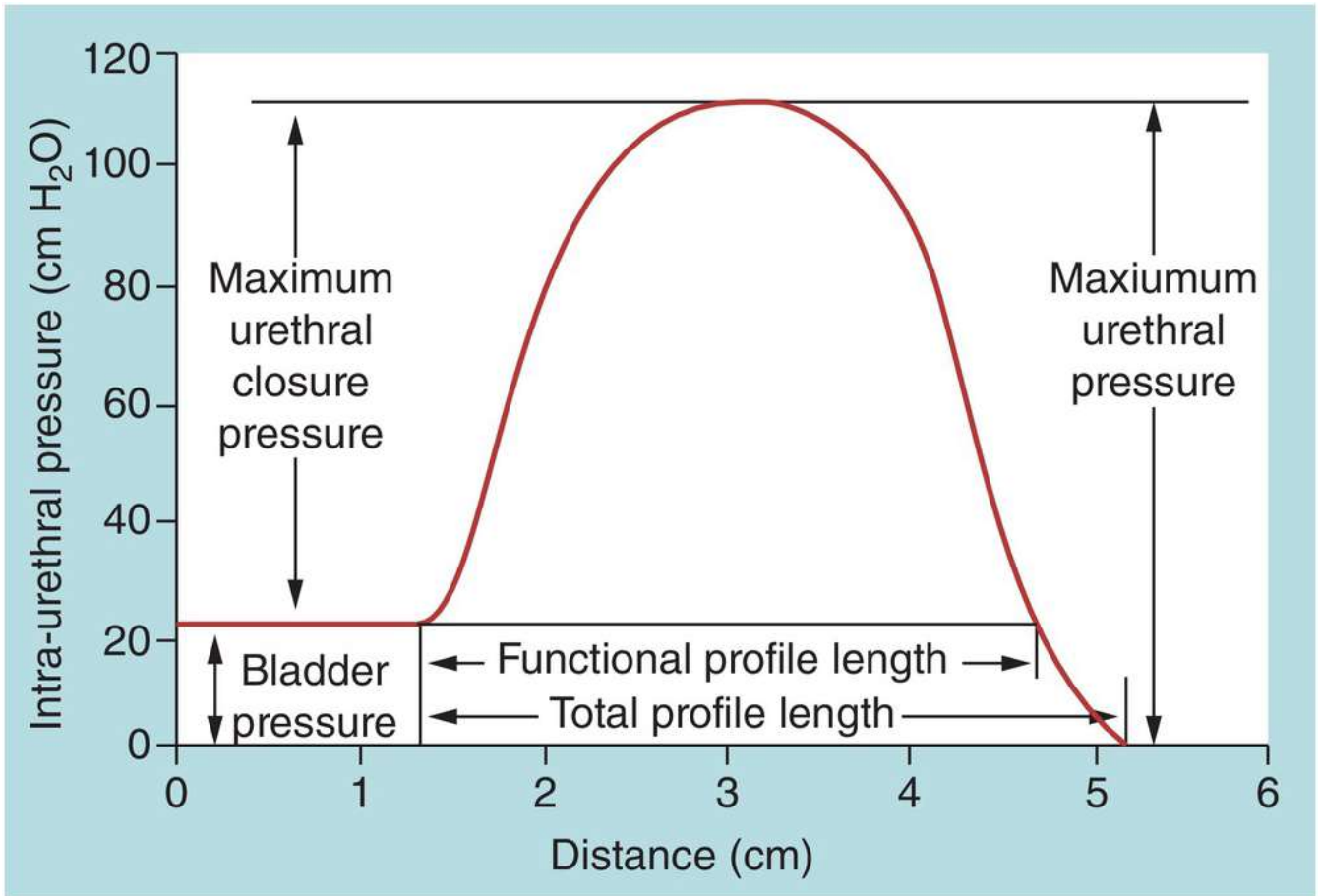


Special investigations

Urethral pressure profilometry

The resting urethral pressure profile (UPP) is a graphical record of pressure within the urethra at successive points along its length. Of particular interest are the maximum urethral closure pressure and functional urethral length. In addition, stress pressure profiles can be performed if the patient coughs repeatedly during the procedure. Urethral instability or relaxation can also be identified. It is helpful in women whose incontinence operations have failed and also in those with voiding difficulties.

Urethral pressure profilometry



Imaging of the urinary tract

Imaging of the urinary tract is mainly through ultrasound, X-rays or MRI. Intravenous urography has now largely been replaced by ultrasound of the upper urinary tract. However, a CT urogram is important in cases of haematuria. Additional pathology may be diagnosed, such as the presence of a ureteric fistula, a transitional cell carcinoma or calculi.

Ultrasound is now routinely used for assessing bladder volumes and assessing the upper urinary tracts. Transvaginal ultrasound does allow clear visualization of the urethra and urethral diverticula. Bladder wall thickness of an empty bladder can be measured transvaginally giving a reproducible and sensitive method of screening for detrusor overactivity (a mean bladder wall thickness >5 mm gave a predictive value of 94% in the diagnosis of detrusor overactivity). Measurement of bladder wall thickness has also been shown to have a role as an adjunctive test in those women whose lower urinary tract symptoms are not explained by conventional urodynamic investigations. . A pelvic and/or renal tract ultrasound may be indicated if there are symptoms of pelvic pain, clinical suspicion of a pelvic mass, haematuria, bladder pain or recurrent urinary tract infection. MRI is useful in diagnosing urethral diverticula and imaging the pelvic floor muscles.

Intravenous urogram showing a right duplex ureter

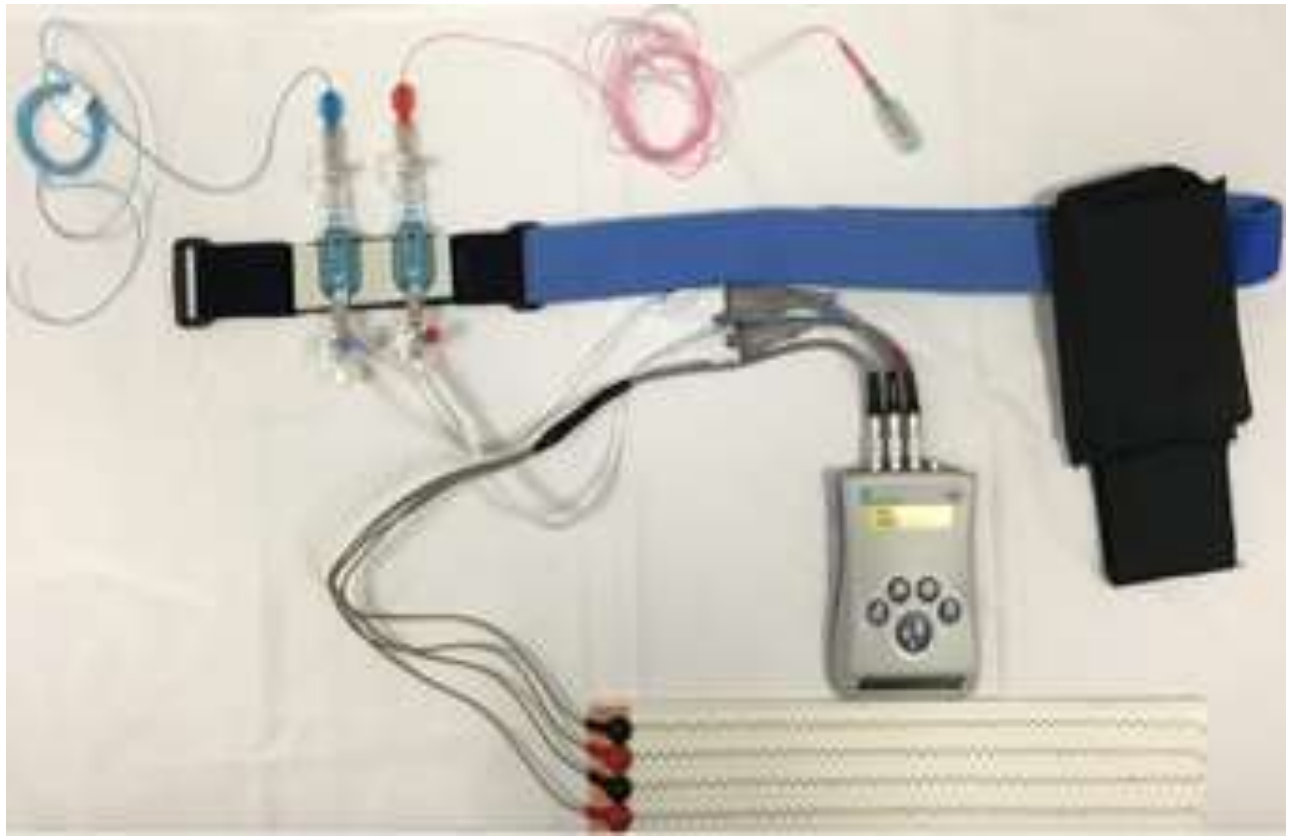
Electromyography

Electromyography can be employed to assess the integrity of the nerve supply to a muscle. The electrical impulses to a muscle fiber are measured following nervous stimulation. Two main types of electromyography are employed in the assessment of lower urinary tract dysfunction. The pudendal nerve is stimulated and potentials measured via the electrode. This is inaccurate as the muscular activity of the levator ani is not necessarily representative of that of the rhabdosphincter urethrae. Single-fiber electromyography is more accurate as it assesses the nerve latency within individual muscle fibers of the rhabdosphincter. Electromyography may be useful in the assessment of women with neurological abnormalities or those with voiding difficulties and retention of urine.

Ambulatory urodynamics

All urodynamic tests are unphysiological and most are invasive. Various authors have suggested that long-term ambulatory monitoring may be more physiological as the assessment takes place over a prolonged period of time and during normal daily activities. Ambulatory urodynamics is defined as a functional test of the lower urinary tract utilizing natural filling and reproducing the subject's everyday activities. Ambulatory urodynamics is useful in cases where the clinical and conventional urodynamic diagnoses differ, or when no abnormality is found on laboratory urodynamics. Ambulatory urodynamics has been shown to be more sensitive than laboratory urodynamics in the diagnosis of detrusor overactivity but less sensitive in the diagnosis of urodynamic stress incontinence, although its role in clinical practice remains controversial.

Ambulatory urodynamic equipment



Treatment of stress incontinence: Conservative treatment

Conservative treatment is indicated as first-line therapy if the patient is medically unfit for surgery or does not wish to undergo an operation, or in women who have not yet completed their families.

Pelvic floor muscle training:

Individualized exercise programmes are devised for each patient, to increase both the number of contractions that can be performed consecutively and also to increase the duration of 'hold' of each contraction. This two-pronged approach is important to build both strength of the muscle, both of which are essential to improve continence function. Successful adherence to a programme of pelvic floor exercises can lead to cure in over 50% of women and improvement in 75% or more. The major barrier to success is the woman's willingness to persevere with the exercises over a period of several weeks, in order to achieve maximum benefit, but the most obvious advantage is that a course of exercise carries no risk of complications! Pelvic floor exercises work for both stress incontinence and OAB. In the latter case, it is likely that the benefit is from improving muscle strength to give women the confidence to resist the urge without fear of leakage, and also by pelvic floor contraction having a reflex inhibition action on detrusor muscle contraction.

Weighted vaginal cones

These are currently available as sets of five or three, all of the same shape and size but of increasing weight (20–90 g). When inserted into the vagina, a cone stimulates the pelvic floor to contract to prevent it from falling out and this provides ‘vaginal weight training’. A 60–70% improvement rate has been reported using this technique and two studies have shown that cones are as effective as more conventional forms of pelvic floor re- education and require less supervision.

Weighted vaginal cones

Maximal electrical stimulation:

Maximal electrical stimulation can be carried out using a home device that utilizes a vaginal electrode through which a variable current is passed. The woman is able to adjust the strength of the stimulus herself and is instructed to use the device for 20 min daily initially for 1 month. Maximum electrical stimulation has been employed in both the management of urodynamic stress incontinence and detrusor overactivity, although it has not gained popularity.

Vaginal devices:

There are many women who, for various reasons, are not suitable for, or who do not wish to undergo, active treatment of their incontinence. However, they do require some sort of ‘containment’ of their leakage and vaginal devices may be suitable for use during exercise on a short-term basis.

Vaginal electrode for electrical stimulation and vaginal device

Medical therapy

Duloxetine is used very occasionally for incontinence. It is a combined serotonin and noradrenaline reuptake inhibitor, and has a dual licence for the treatment of depression in higher doses. Duloxetine acts at the micturition center in the sacral spinal cord to increase the sympathetic nerve output to the urethral sphincter and increase sphincter tone. Randomized trials have shown a 50% improvement or more in leakage symptoms in over one-half of the patients treated. However, the side-effects, including nausea, cause many women to stop treatment.

Surgery

Surgery is usually the most effective way of curing urodynamic stress incontinence, and a 90% cure rate can be expected for an appropriate, properly performed primary procedure. Traditional surgery for urodynamic stress incontinence aims to support the bladder neck and proximal urethra and in some cases to increase the outflow resistance. Undoubtedly, the results of suprapubic operations such as Burch colposuspension or the Marshall–Marchetti–Krantz procedure are better than those for the traditional anterior colporrhaphy with bladder neck buttress. Numerous operations have been described and many are still performed today.

Anterior colporrhaphy

Anterior colporrhaphy is only rarely performed for urodynamic stress incontinence. Although it is usually the best operation for a cystourethrocele, the cure rates for urodynamic stress incontinence are poor compared with those from suprapubic procedures. As prolapse is relatively easier to cure than stress incontinence, it is appropriate to perform the best operation for incontinence when the two conditions coexist.

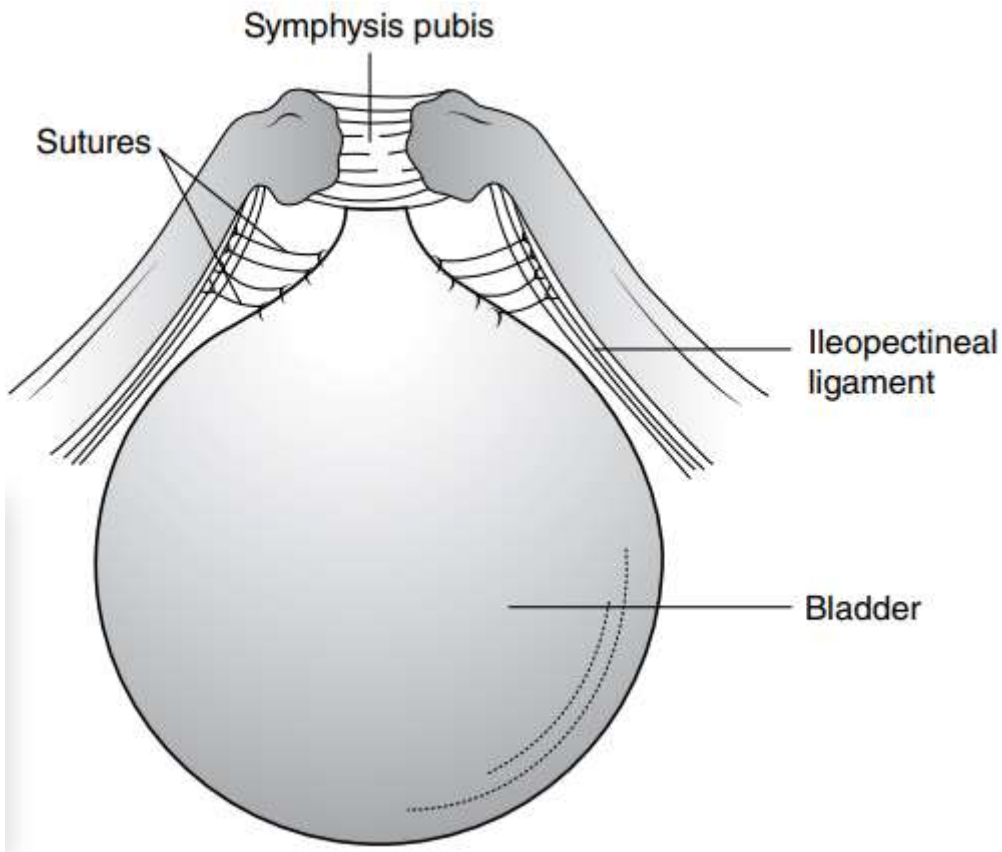
Marshall–Marchetti–Krantz procedure

The Marshall–Marchetti–Krantz procedure is a suprapubic operation in which the paraurethral tissue at the level of the bladder neck is sutured to the periosteum and/or perichondrium of the posterior aspect of the pubic symphysis. This procedure elevates the bladder neck but will not correct any concomitant cystocele. It has been largely superseded by Burch colposuspension because its complications include osteitis pubis in 2–7% of cases.

Colposuspension

Burch colposuspension was the primary procedure for stress incontinence for many years before the midurethral tapes were developed. At colposuspension, the retropubic space is opened via a Pfannenstiel incision in the abdomen, and the bladder reflected medially on each side to allow the placement of two or three sutures (either absorbable or permanent) into the paravaginal fascia on each side at the level of the bladder neck. These sutures are placed through the pectineal ligament on the pubic ramus on the same side, and then tied to provide support to the bladder neck and prevent descent during coughing or straining. The cure rate for incontinence is the same as for midurethral tapes (80–85%), and complications are similar.

Burch colposuspension



Sling procedures

Sling procedures are normally performed as secondary operations where there is scarring and narrowing of the vagina. The sling material can be either biological (autologous rectus fascia, porcine dermis, cadaveric fascia) or synthetic (Prolene). The sling may be inserted either abdominally or vaginally, or by a combination of both. Sling procedures are associated with a higher incidence of side effects and complications, especially after the insertion of inorganic material but mid- to long-term continence outcomes are superior to open colposuspension but there are increased rates of irritative symptoms.

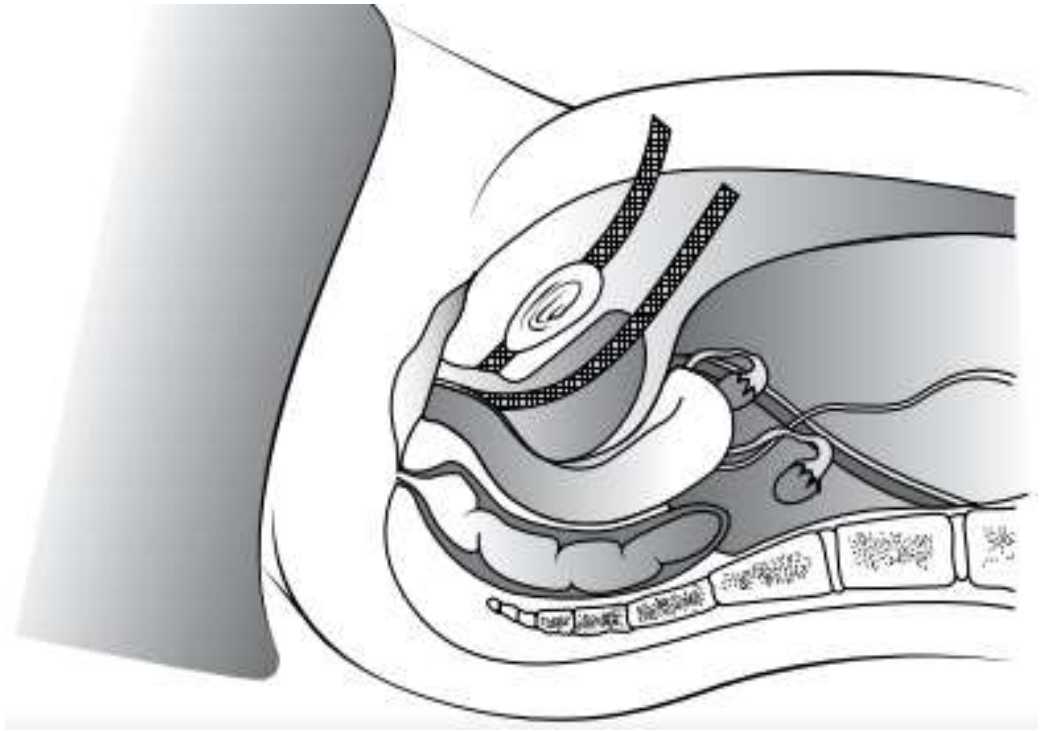
Mid-urethral tape procedures:

There are now several variations of midurethral tapes available, but the underlying principle is the same. A permanent, non-absorbable mesh of polypropylene woven into a tape approximately 1 cm wide is placed through a small vaginal incision under the midurethra and into a U shape behind the pubic symphysis, via two small suprapubic incisions (a retropubic placement), or into a hammock shape behind the inferior pubic rami and through the obturator foramen, via a small incision in each groin (a transobturator placement). The midurethral tapes have a cure rate for stress incontinence of 80–85%, and this high success rate persists in the long term (10 years or more). Complications specific to midurethral tapes relate to the non-absorbable polypropylene they are manufactured from. There is a low rate of the tape interfering with vaginal wound healing, leading to exposure of the central portion of tape, or of later erosion of the tape through the vaginal skin at other places along its length.

Common operative complications include:

- Voiding difficulty (usually short term) in 2–5%.
- Bladder perforation during the procedure (2–5%).
- Onset of new OAB symptoms after surgery (5%).

Tension-free vaginal tape in situ under the mid-urethra and exiting suprapubically



Urethral bulking agents

A third option for surgery is periurethral injections of material that bulk up the bladder neck and coat the urethral mucosa to prevent leakage. Three products are widely available (Macroplastique, Durasphere and Bulkamid). These are all synthetic polymer materials. The procedure is performed under local anaesthetic and is available for women deemed too medically unfit or frail for a formal anaesthetic, or for women with residual leakage after a tape or colposuspension. Cure rates after these procedures are of the order of 60–80% but longerterm cure is less effective, so some patients require two or more treatments. High-quality data from randomized trials of these products are lacking, so most clinicians will use these as third-line or ‘rescue’ therapy, although in some settings women are choosing injectables as first-line treatment in view of the possibility of being treated in an ‘office’ setting.

Artificial urinary sphincter

An artificial sphincter is a device that may be employed when conventional surgery fails. It is implantable and consists of a fluid-filled inflatable cuff that is surgically placed around the bladder neck. A reservoir containing fluid is sited in the peritoneal cavity and a small finger-operated pump is situated in the left labium majus. The three major components are connected via a control valve. Under normal circumstances the cuff is inflated and thus obstructs the urethra. When voiding is desired the pump is utilized to empty the fluid in the cuff back into the balloon reservoir so that voiding may occur. The cuff then gradually refills over the next few minutes. Artificial sphincters are associated with many problems: they are expensive, the surgery required to insert them is complicated and the tissues around the bladder neck following previous failed operations may be unsuitable for the implantation of the cuff. In addition, mechanical failure may occur, necessitating further surgery. However, there is a place for these devices and their technology is likely to improve in the future.

Treatment of detrusor overactivity

Treatment for detrusor overactivity aims to re-establish central control or to alter peripheral control via bladder innervation. The fact that so many different types of treatment are available for this condition shows that none is universally successful.

Bladder retraining

For women with OAB or mixed incontinence, pelvic floor muscle training is combined with a form of bladder drill or bladder retraining. Bladder drill involves re-educating the patient (and her bladder) to increase the interval between voids, to re-establish normal frequency. For many women with OAB, the urgency and associated leakage (or fear of leakage) leads them to establish a pattern of voiding whenever they are aware of bladder filling sensations. An awareness of bladder filling is a normal physiological signal that occurs once or more than once as the bladder fills, but before full bladder capacity is reached. Bladder retraining (in conjunction with pelvic floor muscle training) includes teaching the woman about normal bladder sensation, the rate of urine production (usually 1–2 ml/min) and normal bladder capacity (350–500 ml), and then encouraging her to practice delaying voiding for several minutes beyond when she would normally void. It is usual do to this in a stepwise fashion, to push back voiding in 5 or 10 minute steps, rather than trying to hold for a whole hour. Bladder retraining can be very successful in reducing frequency and urgency, but like pelvic floor exercises, it requires perseverance and determination on the part of the patient.

Medical treatment

Medical treatments for urinary incontinence are primarily aimed at treatment of OAB symptoms and DO. Because the parasympathetic nerves stimulate the detrusor muscle to contract, anticholinergic medications have been the mainstay of medical treatment for many years. There is a wide range of different compounds and preparations available. The main site of action of anticholinergic drugs is the motor endplate of the neuromuscular junction, where they antagonize the action of acetylcholine at the muscarinic receptors and inhibit detrusor contraction. In the last 5 years, it has become apparent that acetylcholine is also an important neurotransmitter in the afferent, sensory pathways in the bladder and thus the drugs also have a direct effect in reducing the perceived sensations of bladder filling by inhibiting receptor-mediated afferent signals.

Drugs that have a mixed action:

Oxybutynin The effectiveness of oxybutynin in the management of patients with detrusor overactivity is well documented. A double-blind placebo-controlled trial found oxybutynin to be significantly better than placebo in improving lower urinary tract symptoms, although 80% of patients complained of significant adverse effects, principally dry mouth or dry skin. These can be mitigated by slow- release preparations or alternative methods of administration (e.g. topical or intravesical).

Anticholinergic medications

1.Oxybutynin: 2.5–5 mg up to three times daily; first-choice medication recommended by the UK National Institute for Health and Care Excellence (NICE); modified release preparation 5 mg oncedaily; increase weekly by 5 mg up to 20 mg daily.

2.Propiverine: 15 mg one to three times daily.

3.Trospium: 20 mg twice daily.

4.Tolterodine: 2 mg twice daily; reduced to 1 mg in hepatic impairment; modified release preparation 4 mg once daily.

5.Fesoterodine: 4 mg once daily, maximum 8 mg once daily (fesoterodine is related to tolterodine).

6.Solifenacin: 5 mg once daily; can be increased to 10 mg once daily.

7.Darifenacin: 7.5 mg once daily.

All anticholinergic drugs have similar efficacy, with published randomized studies demonstrating a decrease in urgency and incontinence episodes in the range of 1–2 per day, compared with placebo. The side-effect profile is similar across all drugs, with dry mouth, constipation and blurred vision being the most common. Mirabegron is a more recently developed medication for OAB, which is a beta 3-adrenergic agonist. Mirabegron acts upon the sympathetic neurons innervating the bladder, to enhance relaxation of the detrusor. Therefore it is acting more on the storage function of the bladder than do anticholinergic medications, which act by suppressing voiding. Mirabegron can be used simultaneously with an anticholinergic drug.

Antidepressants

Imipramine has been shown to have systemic anticholinergic effects and blocks the reuptake of serotonin. Some authorities have found a significant effect in the treatment of patients with detrusor overactivity, although others report little effect. In light of this evidence and the serious adverse effects associated with tricyclic antidepressants, their role in detrusor overactivity remains of uncertain benefit, although they are often useful in patients complaining of nocturia or bladder pain.

Antidiuretic agents

Desmopressin is a synthetic vasopressin analogue. It has strong antidiuretic effects without altering blood pressure. The drug has been used primarily in the treatment of nocturia and nocturnal enuresis in children and adults. Desmopressin is safe for long-term use; however, the drug should be used with care in the elderly owing to the risk of hyponatraemia.

Intravesical therapy

The neurotoxin botulinum toxin A (marketed as Botox) has been shown in recent randomized trials to be a highly effective treatment. Botulinum toxin is a long-acting molecule that prevents the release of neurotransmitter vesicles from the motor end-plate and causes a flaccid paralysis in the treated muscle. A single intramuscular injection can last for 3–6 months. Botulinum toxin is administered via a flexible or rigid cystoscope and injected in multiple sites across the dome of the bladder, to abolish the involuntary detrusor contractions that cause symptoms. Reduction of urgency and leakage episodes of over 50–80% have been reported, and continence rates in excess of 40%. The major drawback of this treatment is a voiding difficulty rate of 8–15% which, if it occurs, can persist for the duration of treatment effect and be troublesome for the patient to manage. However, many patients are able to self-catheterize with little difficulty and still find that this gives them a high degree of social independence, compared to before treatment.

Neuromodulation

Peripheral neuromodulation

The tibial nerve is a mixed nerve containing L4–S3 fibers and originates from the same spinal cord segments as the innervation to the bladder and pelvic floor. Consequently, peripheral neuromodulation may have a role in the management of urinary symptoms. Peripheral neuromodulation may offer an alternative therapeutic option for those patients with intractable OAB who have failed to respond to medical therapy, although it remains less cost-effective than treatment with antimuscarinic agents.

Sacral neuromodulation

Stimulation of the dorsal sacral nerve root using a permanent implantable device in the S3 sacral foramen has been developed for use in patients with both idiopathic and neurogenic detrusor overactivity. The sacral nerves contain nerve fibers of the parasympathetic and sympathetic systems providing innervation to the bladder as well as somatic fibers providing innervation to the muscles of the pelvic floor. The latter are larger in diameter and hence have a lower threshold of activation, meaning that the pelvic floor may be stimulated selectively without causing bladder activity.

Although neuromodulation remains an invasive and expensive procedure, it offers a useful alternative to medical and surgical therapies in patients with severe intractable detrusor overactivity.

Surgery

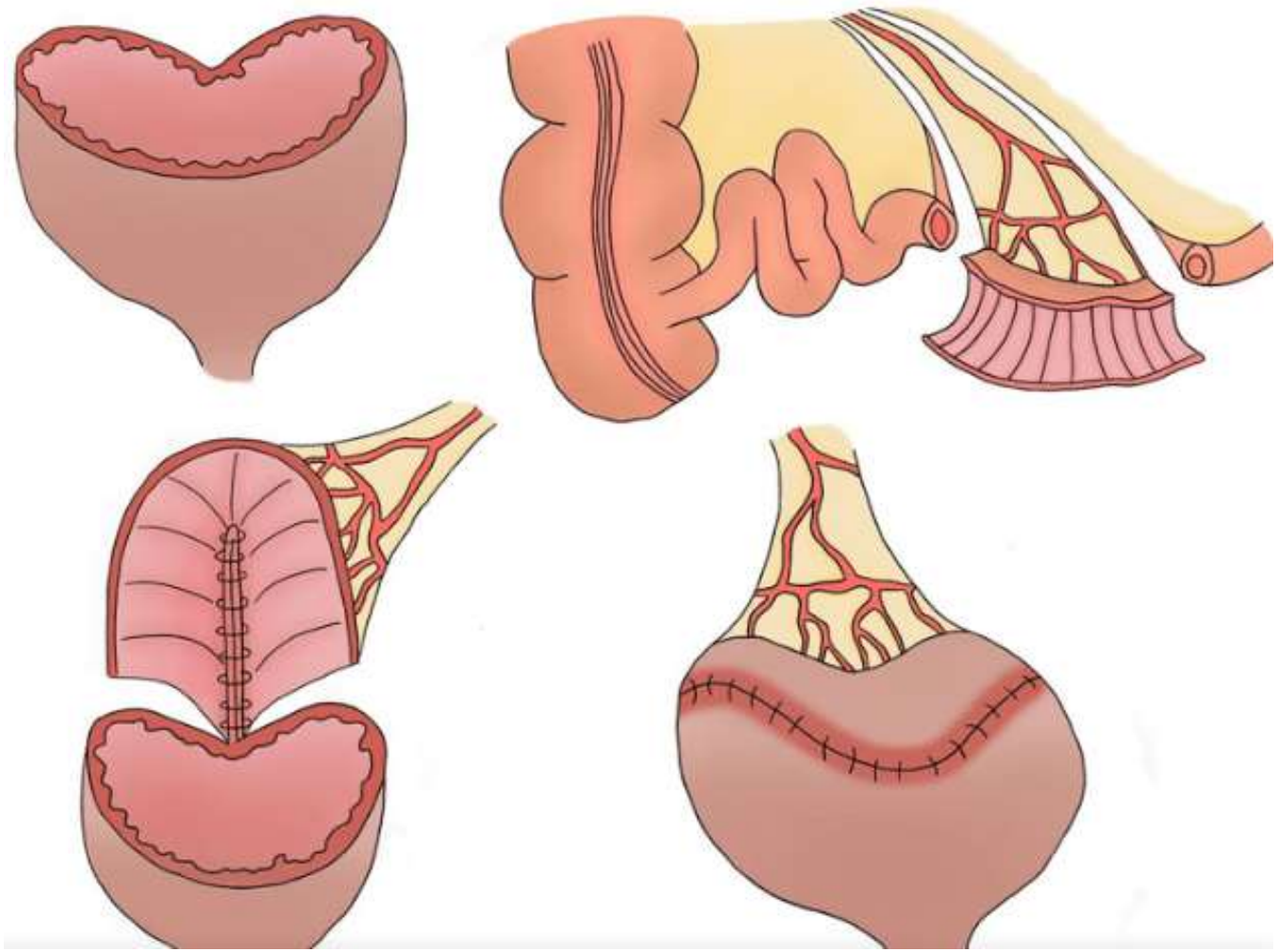
For those women with severe detrusor overactivity that is not treatable by simple types of treatment, surgery may be employed.

Clam cystoplasty:

In the clam cystoplasty, the bladder is bisected almost completely and a patch of gut (usually ileum) equal in length to the circumference of the bisected bladder (about 25 cm) is sewn in place . This often cures the symptoms of detrusor overactivity by converting a high-pressure system into a low-pressure system, although inefficient voiding may result. Patients have to learn to strain to void, or may have to resort to clean intermittent self-catheterization, sometimes permanently. In addition, mucus retention in the bladder may be a problem, but this can be partially overcome by ingestion of 200 mL of cranberry juice each day inaddition to intravesical mucolytics such as acetylcysteine.

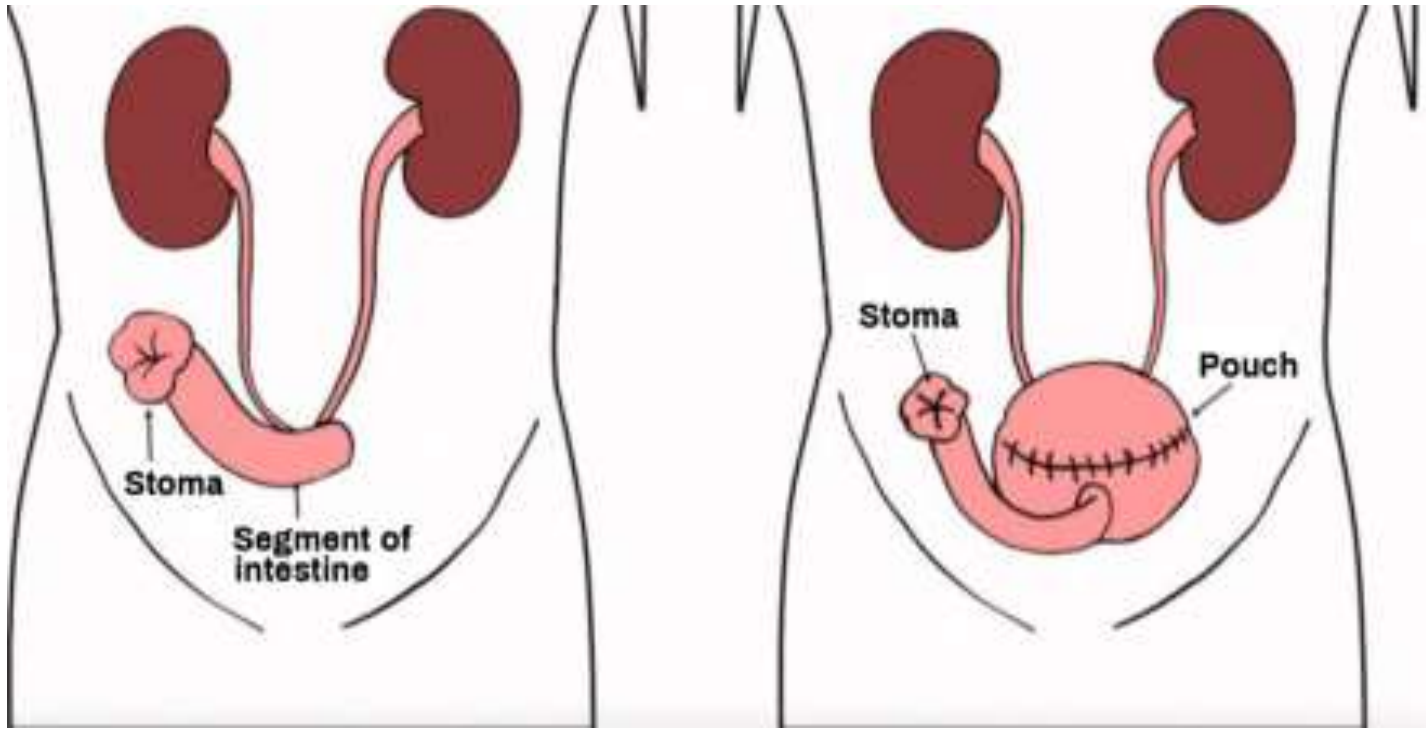
The chronic exposure of the ileal mucosa to urine may lead to malignant change. In addition, metabolic disturbances such as hyperchloraemic acidosis, vitamin B12 deficiency and occasionally osteoporosis secondary to decreased bone mineralization may occur.

Clam cystoplasty



Urinary diversion

As a last resort for those women with severe detrusor overactivity or neurogenic detrusor overactivity who cannot manage clean intermittent catheterization, it may be more appropriate to perform a urinary diversion. Usually this will utilize an ileal conduit to create an abdominal stoma for urinary diversion. An alternative is to form a continent diversion using the appendix (Mitrofanoff) or ileum (Koch pouch), which may then be drained using self-catheterization.


Stoma
Segment of intestine
Stoma
Pouch

Mixed incontinence

Those women with both detrusor overactivity and urodynamic stress incontinence pose a difficult management problem. The detrusor overactivity is initially treated with antimuscarinic agents but if there is persistent SUI once the urgency and urgency incontinence is treated, then continence surgery is performed. However, if urge incontinence still predominates, surgery may aggravate the woman’s symptoms.

Thank you