Now with CPD points

Australian Doctor Education

You can now earn CPD points with How to Treat by completing quizzes online (www.australiandoctor.com.au/cpd) or in every issue.
See page 38 for details and this week's quiz.

Urogynaecology

INSIDE

The author

Dr Bernard T Haylen is a certified urogynaecologist (RANZCOG) at St Vincent's Clinic, Darlinghurst; the Mater Urodynamic Centre, Crows Nest; and the Randwick Urodynamic Centre, Randwick, NSW.

Introduction

UROGYNAECOLOGY is the area of gynaecology and female urology involving the assessment and treatment of lower urinary tract and pelvic floor dysfunction, including uterine and vaginal prolapse. Over the last 30 years, assessment using a combination of clinical features and specialised testing of lower urinary tract function (urodynamics) has allowed for greater accuracy in diagnosis.

There are four main conditions in urogynaecology: genuine stress incontinence, detrusor instability, voiding difficulties and vaginal and/or uterine prolapse (table 1). These conditions are not mutually exclusive and a combination of more than one of these conditions frequently occurs.

Treatment of these conditions includes physiotherapy for genuine stress incontinence, medications and behavioural techniques for detrusor instability, plus a wider range of surgical options for genuine stress incontinence and utero-vaginal prolapse of moderate to marked severity.

Other diagnoses may be made during the assessment of women presenting with the conditions described above. For example, clinical examination and vaginal ultrasound will detect intercurrent pathology such as fibroids or ovarian pathology in about 8% of cases.

Many more patients will present with other intercurrent gynaecological symptoms. Both these intercurrent symptoms and signs might affect final management. For instance, the findings of fibroids and/or ovarian pathology might involve hysterectomy and/or oophorectomy in addition to possible continence surgery.

Frequency and/or dysuria will be the presenting symptom in one-third of women with urogynaecological conditions. These symptoms may arise from a UTI or other lower urinary tract inflammation. Less commonly, a urethral diverticulum or fistula (eg, vesico-vaginal, urethrovaginal) may be found.

Table 1: Frequency of urogynaecological conditions in women with symptoms of lower urinary tract and pelvic floor dysfunction

Condition	Description	Frequency
Genuine stress incontinence	The condition of urinary incontinence due to weakness or incompetence of the bladder neck and urethral sphincter closure mechanisms. The symptom of incontinence of urine during exercise or coughing and sneezing (stress incontinence) is more likely with this condition	70%
Detrusor instability (or overactive bladder)	Abnormal contractions of the intrinsic bladder musculature (detrusor). Irritable bladder symptoms such as frequency, urgency, urge incontinence and nocturnal enuresis are more likely with this condition	25%
Voiding difficulties	Involves abnormally slow or incomplete micturition. When these are non-psychogenic in nature, they relate to either bladder outflow obstruction or a hypotonic or atonic bladder. Urinary tract infections can develop when there is a chronic high volume of residual urine	15-35% (depending on definition)
Vaginal and/or uterine prolapse	Abnormal descent into the vagina of the uterus, bladder (cystocoele), vaginal vault (enterocoele) or rectum (rectocoele)	65%

Epidemiology and pathogenesis

Epidemiology

URINARY incontinence is the predominant condition in urogynaecology and represents a major health issue: 34% of Australian women admit to urinary incontinence, with 11% describing the condition as having a significant impact on their lifestyle.

Childbirth, age, chronic constipation, prior hysterectomy and obesity have been shown to increase the incidence of female urinary incontinence.

The incidence of all types of bladder dysfunction increases after hysterectomy.

Pathogenesis

Genuine stress incontinence

There are three main causes of genuine stress incontinence in women. Childbirth is the leading cause, and denervation during vaginal delivery appears to be the pathogenic process.

Factors that increase the risk of genuine stress incontinence include vaginal delivery, increasing parity, baby weight over 4kg and prolonged pushing (over one hour) in the second stage of labour. The use of forceps or episiotomy does not seem to affect the risk significantly. Obesity and grandmultiparity may be contributory factors.

Caesarean section is protective against pelvic floor dysfunction compared with vaginal birth in the short to medium term, but the incidence of lower urinary tract dysfunction for women with all vaginal deliveries or all caesarean births becomes closer in the longer term.

There is a now evidence showing an increased incidence of all types of bladder dysfunction, particularly voiding difficulties, after hysterectomy. Urinary incontinence frequently predates hysterectomy, but the focus of the patient and her physician is often on the reason for the hysterectomy, and the incontinence may not be perceived as being significant until after the surgery.

The mean age for women presenting with symptoms of lower urinary tract and pelvic floor dysfunction is 55 — within a few years of the average onset of menopause. However, placebo-controlled trials have failed to demonstrate a significant beneficial effect of topical or systemic oestrogens on urinary incontinence.

Figure 1: Detrusor instability.

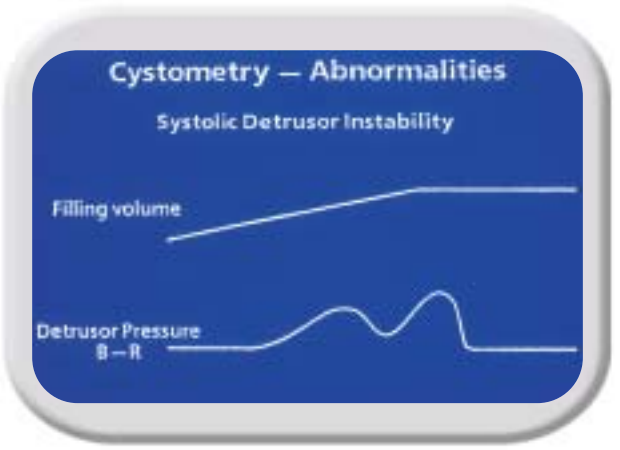
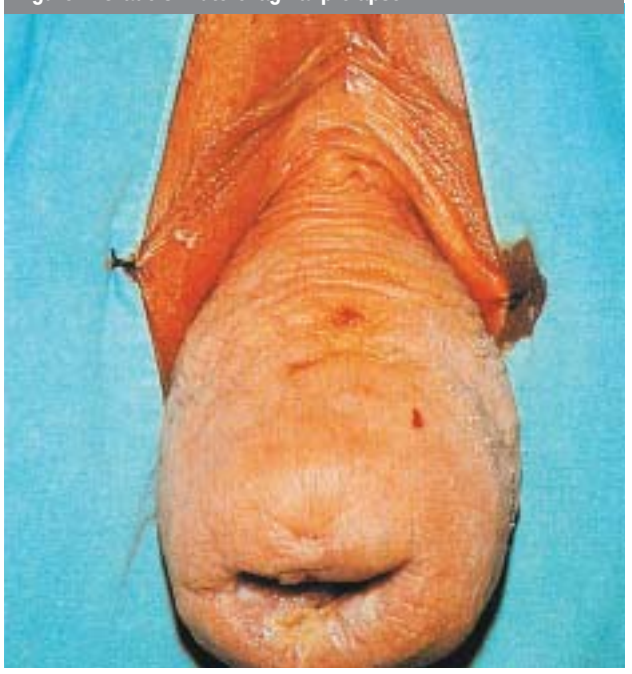


Figure 2: Grade 3-4 uterovaginal prolapse.



Detrusor instability (overactive bladder)

Detrusor instability (figure 1) is thought to be related to either the absence of inhibitory neurotransmitters or greater spontaneous contractility of the detrusor muscle in some women. Neurogenic causes include cerebral (frontal lobe), brainstem (pontine) or spinal lesions above the sacral micturition centre at the S2-4 level. Detrusor instability can be secondary to bladder outflow obstruction, including that associated with prolapse or prior pelvic floor or continence surgery. Bladder infection or inflammation will exacerbate detrusor instability.

Voiding difficulties

The most common voiding difficulty is related to bladder outflow obstruction. Causes can include:

- Medications (eg, tricyclic antidepressants);
- Infection;
- Distal (atrophic) urethral stenotic changes;
- Extrinsic urethral pressure (pelvic tumour or fibroid);
- Intrinsic urethral narrowing (multiple surgical procedures);
- Obstruction secondary to prolapse;
- Postoperative effects;
- Psychogenic factors.

An underactive (hypotonic or atonic) bladder is a less common cause of voiding difficulties. Bladder underactivity may be related to postpartum urinary retention, bladder over-distension and lower motor neuron lesions such as peripheral neuropathy in diabetes.

Uterine and vaginal prolapse

Prolapse of the uterus or vagina (figure 2) is associated with the same conditions that can lead to genuine stress incontinence (see left). Prolapse can also occur after earlier prolapse surgery or after certain types of continence surgery such as colposuspension, in which the vaginal axis is deviated anteriorly, leading to increased tension in posterior and apical aspects of the vagina and causing subsequent prolapse.

Signs and symptoms

Symptoms

IN general, women present with more than one symptom of lower urinary tract and pelvic floor dysfunction. Symptoms may be grouped as follows:

- Incontinence: symptoms with stress (coughing, exercise), or urge (sudden desire to void), coital leakage or nocturnal enuresis;
- Irritative bladder symptoms: urgency, frequency (> seven times a day) and nocturia (more than once a night);
- Voiding difficulties: symptoms of hesitancy, poor stream, the sense of incomplete voiding, the need to immediately re-void, and the need to strain to void;
- Prolapse: symptoms such as pelvic pressure secondary to gravity, sacral backache due to the strain of prolapse on the uterosacral ligaments, a vaginal lump, dyspareunia or a loss of coital sensation because of vaginal laxity.

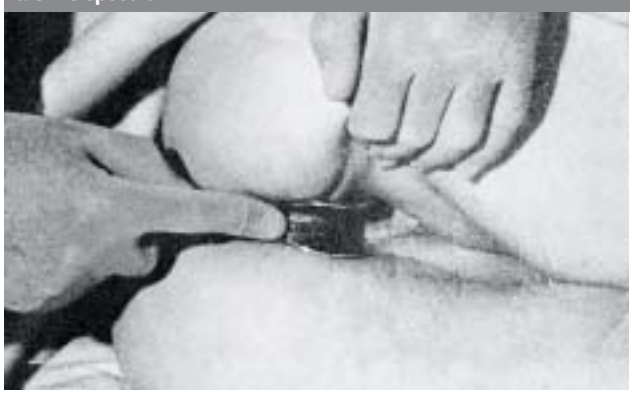
Other symptoms may include pelvic pain and menstrual disturbances. On occasions a history of multiple sclerosis, cerebrovascular accident or other neurological disorders may point to a neurological cause for women presenting with urinary symptoms. Diabetes can cause a lower motor neuron effect on the bladder

Main symptoms*

- Incontinence: stress, urge, coital, enuresis
- Irritative: frequency (> seven times a day), nocturia (more than once a night), urgency
- Voiding: hesitancy, poor stream, sense of incomplete emptying, straining to void
- Prolapse: pelvic pressure, vaginal 'lump', sacral backache (worst after day-long activity)
- Other: gynaecological, neurological

*Most women present with multiple symptoms, suggesting more than one diagnosis

Figure 3: Examining the anterior and posterior vaginal wall with a Sims speculum.



Signs

Clinical stress leakage

The most important sign in assessing women with urinary incontinence is clinical stress leakage directly after a stress such as coughing, straining or jumping. Almost invariably this indicates a degree of genuine stress incontinence.

Testing for this sign is best performed using a protective 'blue sheet', when the patient's bladder is comfortably full. The patient can be tested in the supine or left lateral position, although the standing position with legs astride is generally a more provocative stress. The patient's embarrassment can be reduced by reassuring her of the clinical importance of this sign in confirming the diagnosis of urinary incontinence.

The ease with which this sign is elicited gives an index of the severity of the incontinence. For example, involuntary loss of a couple of drops of urine after several coughs would generally indicate that the incontinence is of mild severity. Large volume loss with minimal straining points to a severe problem.

Prolapse

Each aspect of potential prolapse (uterine prolapse, cystocoele, rectocoele and enterocoele) should be looked for and classified independently as one of the following:

- Grade 0: not present;
- Grade 1: descent towards the vaginal introitus;
- Grade 2: descent to the vaginal introitus;
- Grade 3: descent through the vaginal introitus;
- Grade 4: prolapse totally outside the vagina (in the case of the uterus it is termed a procidentia).

The left lateral (Sims) position — the patient is semi-prone with knees and hips flexed and right (upper) leg elevated and slightly abducted — is the best way to assess prolapse. The patient's bladder should be empty, as a full bladder will limit the degree of any uterine prolapse, cystocoele or enterocoele.

Using a Sims speculum (figure 3) to hold back the posterior vaginal wall, the anterior vaginal wall and uterus can be inspected at rest and with the patient straining. By using the speculum to hold back the anterior vaginal wall, the patient can be examined for rectocoele and enterocoele, although in its milder forms the latter can be difficult to detect clinically.

Main signs

- Clinical stress leakage: urine loss with coughing or straining with patient's bladder full
- Prolapse: patient in the left lateral position with bladder empty. A Sims speculum allows identification and independent grading (0-4) of uterine prolapse, cystocoele, enterocoele or rectocoele
- Bimanual pelvic palpation: 8% incidence of uterine or adnexal pathology, especially fibroids

Bimanual pelvic examination

A bimanual pelvic examination will help detect the 8% incidence of significant pelvic pathology found in women presenting with symptoms of lower urinary tract and pelvic floor dysfunction. Most of the incidentally detected pathology is uterine fibroids, although adnexal pathology, such as ovarian cysts or tumours, is not uncommon.

Other clinical findings

Other findings may include fistulae, which usually occur postoperatively (vesico-vaginal, urethro-vaginal, uretero-vaginal), causing a semi-continuous urine loss, or recto-vaginal fistulae, which occur post-partum or postoperatively and cause an involuntary loss of flatus or faeces into the vagina.

Occasionally, a urethral diverticulum noted as a suburethral lump may result in urethral discharge on palpation. These may be a cause of recurrent urinary tract infections.

Initial management

THE following measures can be used by all practitioners in the initial management of women with symptoms and/or signs of lower urinary tract and pelvic floor dysfunction.

Midstream urine examination

One-third of patients with lower urinary tract and pelvic floor dysfunction will describe either frequency or dysuria, suggesting inflammation or infection of the urinary tract. These symptoms are often non-specific and may indicate other urinary tract problems.

Urinary tract infection might be a causative or exacerbating factor for symptoms of lower urinary tract dysfunction. Therefore an MSU is an important test, as some of the presenting symptoms might be relieved or eliminated by treatment of any infection.

It is important to remember that recurrent urinary tract infections can be a reflection of a chronic high post-void residual urine volume (residual). A chronic residual of 30mL and above may cause recurrent urinary infections. Prolapse or ageing changes in the urethra are the two most common causes of such chronic high residuals.

Bladder or leakage diary (figure 4)

Frequency and nocturia are most accurately assessed by the patient recording the volume of urine each time she voids, over a period of time (eg, three days). The patient's recording of the volume voided, using a calibrated plastic jug for collection, may be a guide to her normal bladder capacity.

Women who void frequently and pass only small (100-200mL average) or very small (<100mL average) urine volumes should be encouraged to suppress the desire to void in an effort to build up their voided volumes. Formal bladder training under the care of a nurse continence advisor or continence physiotherapist, using bladder diaries, can prove valuable.

Recording fluid intake on a chart will identify women whose excess frequency or nocturia is due to above-average fluid intake (>2 L/day). No treatment is generally required for this group, although women with stress incontinence may notice less leakage with a more normal (1.5-2L) fluid intake. Similarly, women with poor average voided volumes due to low fluid intake (< 1L/day) may be encouraged to drink greater quantities of fluid.

Recording the incidence of involuntary urine loss or the need to change continence pads during the days of testing will be a further guide to the severity of any incontinence.

Figure 4: A bladder diary.

DAILY BLADDER CHART

This simple chart allows you to record the fluid you drink and the urine you pass over 3 days (not necessarily consecutive) in the week prior to your clinic appointment. This can provide valuable information.

Please fill in approximately when and how much fluid you drink, and type of liquid, according to the example. Please fill in the time and the amount (in mls. or ozs./pints) of urine passed, and mark with a star if you have leaked or your pad is damp

Date/ Time	Liquid-Intake	Volume of urine in mls. or ozs.	Date/ Time	Liquid-Intake	Volume of urine in mls. or ozs.
9.5.04					
2.15 am		150 mls			
7.15 am		250 mls*			
8.00 am	Mug coffee				
8.20 am		60 mls*			
9.30 am	Cup orange juice				
10.00 am		100 mls			
12 Noon	2 Mugs coffee				
2.00 pm		300 mls			
2.30 pm		20 mls*			
3.30 pm	Cup of tea				
4.00 pm		100 mls			
6.00 pm	Cup of tea				
7.00 pm		100 mls*			
8.30 pm	1 Glass Beer	200 mls			
10.00 pm	1 Glass Wine	150 mls			
11.30 pm		30 mls*			

General measures

Weight reduction will often reduce symptoms of stress incontinence. Obesity is also a disadvantage because it limits possible surgical options.

Caffeine-based beverages tend to increase bladder irritability and urinary frequency, so a reduction in their intake can give symptomatic relief.

Any factors exacerbating a chest condition should be addressed, as they may convert a minor incontinence symptom into a major lifestyle problem.

Although vaginal comfort and the condition of the vaginal mucosa may be improved by topical oestrogen, placebo-controlled trials have yet to prove a significant positive effect on urinary incontinence. However, there may be benefits for the symptoms of frequency, urgency and nocturia.

Many medications have an effect on the bladder. Symptoms may be helped by modifying the use of diuretics that cause frequency and a degree of urgency, and also some antihypertensives such as prazosin (Minipress), which have a strong urethral relaxant effect causing or exacerbating urinary incontinence. The effects of other antihypertensives on the bladder have been less well researched.

New Zealand and Swedish studies have confirmed the importance of pelvic floor exercises to reduce the incidence of postpartum incontinence, although only if the physiotherapy is properly supervised by trained physiotherapists or nurse continence advisors. At all ages physiotherapy is more successful if symptoms are mild to moderate in severity and stress urinary incontinence is the predominant symptom.

Initial management

- Midstream urine: eliminate infective causes
- Bladder diary: evaluate frequency, nocturia, average voided volumes, oral fluid intake, urine leaks or pad changes per day
- General: decrease caffeine intake, improve chest conditions, weight loss if obese, vaginal oestrogens if there are atrophic changes; change bladder-active medications (eg, Minipress)
- Physiotherapy: best if incontinence is mild to moderate and stress incontinence is the main symptom

While topical oestrogens have yet to demonstrate benefit in urinary incontinence, they may help with symptoms of frequency, urgency and nocturia.

Further management

Urodynamic assessment

WHEN conservative and general measures do not succeed, objective testing of bladder function by urodynamics allows for an accurate diagnosis and an overall assessment of severity, which can guide subsequent management. An accurate diagnosis is all important if more active interventions such as drugs or surgery are contemplated. Inappropriate medical or surgical treatment can carry significant morbidity.

Remember that most women present with multiple symptoms, suggestive of more than one urogynaecological diagnosis, and clinical judgment has been shown through years of research to be inadequate as the sole means of diagnosing women presenting with urinary incontinence and other symptoms of lower urinary tract dysfunction.

Urodynamic assessment aims to:

- Identify or eliminate detrusor instability as the cause of symptoms: detrusor instability can be treated non-surgically, initially with medication or behavioural techniques. Surgery may be an option in cases of mixed genuine stress incontinence and detrusor instability, although generally only after non-surgical therapies have been tried;
- Identify or eliminate voiding difficulties: drug treatment of detrusor instability and surgical treatment of genuine stress incontinence have the potential to cause voiding difficulties. Pre-existing voiding difficulties will prejudice against these treatments, which may lead to the possibility of acute or chronic urinary retention. Urodynamics will help identify women at risk of postoperative voiding difficulties;
- Confirm the presence of genuine stress incontinence: a positive diagnosis of genuine stress incontinence should be made before initiating any treatments appropriate to that diagnosis;
- Identify the severity of any bladder dysfunction: this is important in determining whether conservative therapies are likely to be successful;
- Confirm the nature and severity of any prolapse and its interaction with any bladder dysfunction: these interactions can be complex, providing a challenge to the skills of the specialised urodynamicist.

Urodynamic investigations

Consultation, with urodynamic testing, generally takes about one hour. It includes clinical re-assessment, some core urodynamic investigations and other testing as appropriate.

Core urodynamic investigations

Urine flow rate and residual urine volume measurement. Urine flow rate and the respective voided volume are measured on a specialised flow meter (figure 5), and the data compared to a nomogram chart (figure 6). A flow rate falling below the 10th centile is deemed to be abnormally slow.

Residual urine can be measured non-invasively by ultrasound or, otherwise, by urethral catheterisation. Eighty-five per cent of women have no measurable residual urine. A residual of 30mL or more is abnormal and is enough to cause recurrent UTIs.

Intrinsic bladder (detrusor) pressure measurement (filling and voiding cystometry). The intrinsic bladder or detrusor pressure is the pressure difference between bladder and abdominal pressure as measured using fine-gauge pressure lines inserted urethrally and rectally (figure 7). The bladder is usually filled with water, although contrast medium is used in radiology-based studies (videocystourethrometry).

During filling of the bladder to about 500mL (average bladder capacity), the detrusor pressure should rise less than 10cm H_2O. A low capacity is under 400mL. Pressure rises of more than 15cm H_2O associated with the symptom of urgency indicate the presence of abnormal bladder contractions (detrusor instability).

High detrusor pressures accompanied by poor urine flow during voiding indicate bladder outflow obstruction. Many women will void by urethral relaxation alone without the usual detrusor contraction that follows that relaxation. However, very low voiding detrusor pressures accompanied by poor urine flow indicate a hypotonic or poorly contractile bladder, perhaps due to a neurological cause.

Imaging. Ultrasound imaging allows effective and comfortable visualisation of bladder neck support, residual urine and other pelvic pathology. Radiology during voiding cystometry may provide some additional information, although there is a high rate of inability to void, as women are far less comfortable in such circumstances.

Other possible tests

Pad testing. For this test, the patient wears a pre-weighed perineal pad either during her everyday activities or during a series of actions provocative for urine loss, depending on the duration of the test. The pad is re-weighed at the end of the test. The increase in pad weight (allowing for normal secretions) confirms urinary incontinence and may act as a further guide to the severity of the patient's condition.

Tests of urethral function. These tests will confirm significantly

impaired urethral function in addition to the usual bladder neck incompetence in women with the main diagnosis of genuine stress incontinence. Confirmation of urethral incompetence has implications for the type of treatment modalities likely to be successful.

Cystoscopy. Visualisation of the bladder should not be a normal part of urodynamic testing. It may be indicated for cases of significant voiding difficulties or when clinical and urodynamic assessment suggests an inflammatory, infective or, rarely, a neoplastic process within the bladder.

Conservative treatment of genuine stress incontinence (table 2)

Physiotherapy

Physiotherapy is the mainstay of conservative treatment of genuine stress incontinence. Although cure rates are only 20-30%, improvement rates of around 50-60% are possible.

Only one-third of women will perform pelvic floor exercises correctly without instruction from a physiotherapist, so success depends on the motivation of the patient and the quality and the enthusiasm of the instructor. An ideal regimen for treatment has not been determined but in one postnatal group, a regimen of 40 contractions a day was associated with maximal compliance.

Physiotherapy can be enhanced by the use of:

- A perineometer: a manometer connected to a vaginal probe used to measure the strength of the pelvic floor contraction and any improvement (figure 8);
- Vaginal cones: a series of small cones of identical size and increasing weight (figure 9) that exercise the pelvic floor musculature if they are carried correctly. Studies have shown some additional benefit to that obtained with pelvic floor exercises alone;
- Electrical stimulation: these techniques are thought to increase blood supply to, and the resting tone of, the pelvic floor musculature. They have been shown to provide additional benefit to pelvic floor exercises alone, although the best treatment regimen has not been determined by existing studies.

Mechanical devices

These can be used to impede urine loss but they do not provide any cure for genuine stress incontinence. Mechanical devices include:

- Tampons: a cheap and effective mechanical device that may be especially useful in protecting women who experience urine loss at specific times;
- Ring pessaries: unlike their value in cases of prolapse, these generally provide little relief to the woman with incontinence;
- Urethral occlusive devices: these have had limited success because of discomfort, easy displacement and a higher-than-acceptable rate for urinary tract infections.

Surgical treatment of genuine stress incontinence

The trend over the last five years has been towards a minimally invasive approach to surgery for genuine stress incontinence, using suburethral prolene-mesh slings such as tension-free vaginal tape (TVT, figure 10).

The indications for surgery include failure of conservative therapy when genuine stress incontinence is of moderate to marked severity and/or when there are indications for other gynaecological surgery such as the repair of a prolapse.

During the last 25 years, surgeons have increasingly recognised that suprapubic bladder neck repairs for genuine stress incontinence have proved superior to equivalent vaginal repairs, although the latter might still used appropriately when minor genuine stress incontinence is associated with significant prolapse.

Until 1999, colposuspension was deemed the gold standard for cure of genuine stress incontinence. It involves the elevation of the paravaginal tissues to the ipsilateral iliopectineal ligament on the pubis. It has satisfactory long-term subjective and objective outcomes in curing stress incontinence.

Colposuspension elevates the bladder neck and is slightly obstructive. Side effects include voiding difficulty, detrusor instability and vaginal prolapse, particularly vault prolapse and rectocoele.

During the last five years, synthetic suburethral slings have become increasingly popular because of their minimally invasive nature. The most widely used of these, (TVT) involves the insertion of open-weave prolene mesh from a small vaginal incision to two small suprapubic incisions. The open weave of the inert prolene mesh is important in preventing infection or rejection.

It is possible to perform the surgery under assisted local anaesthetic or regional block, allowing intraoperative adjustment of the tension in the tape (patient coughing with 300mL bladder volume). Hospitalisation can be day-only or overnight, compared with many days for open colposuspension.

The technique optimises the balance between successful cure of the incontinence and avoidance of voiding impairment and de novo urgency. Success rates for treatment of primary genuine stress incontinence with TVT are about 90%, with an 82% cure rate at seven years. In women who have undergone previous continence surgery, success rates at 84% are still good.

Complications are minor and may include voiding difficulty, bladder or vaginal perforation (should be recognised at the time of surgery), persistent or occasional de novo urgency or local bleeding or haematoma.

SPARC is a similar synthetic sling with a slightly different weave of prolene mesh to TVT and a different surgical approach to insertion of the tape. Both TVT and the SPARC now have respective 'obturator' versions (TVT-O, Monarch), which carry the sling superolaterally to exit through the obturator fossa rather than the suprapubic area. The perceived advantage is less pain, although data for success rates are not yet available.

The laparoscopic colposuspension-urethropexy has its supporters, and the success rates in the short and medium term are quite acceptable.

The traditional fascial sling has largely been outmoded because of the success of the synthetic slings and the additional morbidity of harvesting donor fascia from the abdominal wall or thigh.

Surgical options should also be considered when there is poor bladder neck support with good vaginal mucosal condition (a synthetic sling or colposuspension), or poor bladder neck support with poor vaginal mucosal condition, in which case a sling-type bladder neck repair is generally advisable.

When the bladder neck is fixed or elevated by previous continence surgery but it is open, substances called injectables can provide a minimally invasive day-only option as treatment in this difficult circumstance. Injectables are used to bulk the urethral submucosa at the level of the bladder neck to restore continence.

Long-acting collagen (Contigen) has been used in Australia for 14 years, while a silicone micro-particle alternative (Macroplastique) has been available for about six years. Improvement rates of around 80% with cure rates of 40% are possible.

Treatment of detrusor instability

Most treatments of detrusor instability have a response rate of only about 50%. This figure is not much higher than the 30% rates for placebo responses.

Behavioural techniques for mild to moderate cases include bladder training (drill) to suppress urgency, build up of voided volumes by additional oral fluid intake, decrease urinary frequency and decrease urgency of micturition.

Acupuncture has a success rate of about 50% in small studies, and hypnosis is successful in about 50% of cases in the short term.

Transcutaneous electrical nerve stimulation (TENS) using a number of external electrodes has been shown to significantly improve bladder capacity and reduce the number of unstable bladder contractions in patients with detrusor instability.

All medications for detrusor instability have anticholinergic side effects, the most distressing being a dry mouth. Its best to titrate medications up slowly from an initial small dosage. Many effective medications have been withdrawn over the years because of occasional cardiac side effects. The small number of medications currently available is listed in table 3 (see next page).

Treatment of voiding difficulties

The treatment should vary according to the cause (table 4, see next page). Prophylactic antibiotic regimens should be considered when recurrent UTI is a feature of voiding difficulties, especially with a very slow urine flow or a moderate (30-100mL) chronic residual. Regimens include:

- Standard: antibiotic, eg, trimethoprim, for 7-14 days followed by three months treatment with urinary antiseptic (hexamine hippurate [Hyprex]) 1g bd taken with vitamin C 500mg bd;
- More treatment-resistant cases: replace hexamine in the above regimen with low-dose antibiotic (eg, cephalexin 500mg, trimethoprim

cont'd next page

Figure 5: Measurement of urine flow rate. A: Slow to normal flow rate. B: Slow flow rate. C: Fast flow rate.

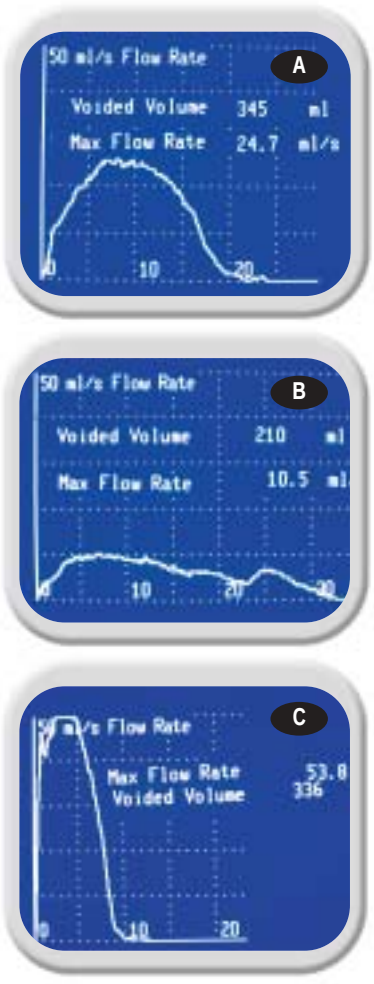


Figure 6: Liverpool Uroflow nomogram.

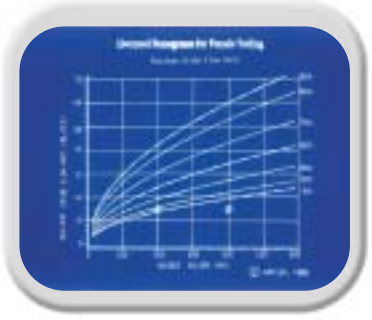


Figure 7: Normal cystometry.

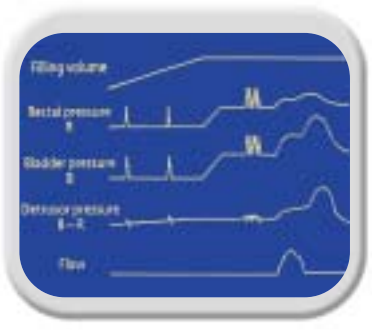


Figure 8: A perineometer.

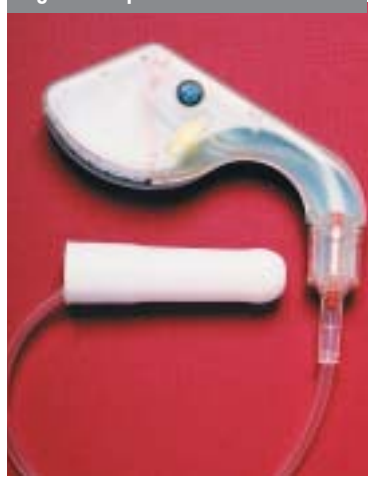


Figure 9: Vaginal cones.

Figure 10: Suburethral tension-free vaginal tape (TVT) sling for genuine stress incontinence. (Image courtesy of Johnson & Johnson Medical.)

Table 2: Conservative treatment of genuine stress incontinence

Possible modalities	Patient category
Physiotherapy	Mild or moderate cases
Mechanical	Future pregnancy planned
Patient choice	No surgery wanted

Urodynamics

If more active interventions such as drugs or surgery are contemplated, an accurate diagnosis by urodynamics is important to:

- Identify/eliminate detrusor instability (cystometry)
- Identify/eliminate voiding difficulties (urine flow rate, residual urine volume)
- Confirm the presence of genuine stress incontinence (clinical assessment and imaging)
- Assess for prolapse and interaction with bladder dysfunction
- Assess severity of all diagnoses present

from previous page

300mg or nitrofurantoin 100mg) nocte ± one cranberry tablet mane;

- Most treatment-resistant cases: norfloxacin in reducing doses eg, 400mg bd for 10-14 days, then 400mg nocte for 14 days, then 200mg nocte for 14-28 days.

Treatment of vaginal and uterine prolapse

Conservative treatment includes physiotherapy, which is appropriate for milder degrees of prolapse. However, it is unlikely to provide any relief of uterine and/or vaginal prolapse of grade 2 or above. A ring pessary can provide very effective relief for higher degrees of prolapse. The appropriate size needs to be identified with fitting rings.

Treatment of uterine and/or vaginal prolapse has traditionally been performed via a vaginal approach, in contrast to the more successful suprapubic approach for urinary incontinence. It can be challenging to achieve an optimal result for the simultaneous surgical treatment of both urinary incontinence and prolapse, although the synthetic slings do combine well with the following procedures.

- Uterine prolapse:
  - — When the family is complete: vaginal hysterectomy;
  - — When future childbearing is anticipated: Manchester repair (amputation of the prolapsed cervix with preservation of the rest of the uterus);
- Cystocoele:
  - — Primary repair: anterior vaginal repair;
  - — Recurrent repair: anterior vaginal repair or paravaginal repair (reattachment of lateral vagina to pelvic sidewall muscles);
- Rectocoele: posterior vaginal repair;
- Enterocoele:
  - — Small: posterior vaginal repair;
  - — Medium to large: sacrospinous colpopexy (figure 11): this highly successful procedure (>90% cure) fixes the apex of even the largest vaginal vault prolapse to the strong sacrospinous ligament on the sidewall of the pelvis.

Laparoscopic approaches to all the different prolapse categories are becoming more popular, although data regarding success rates are limited. During the last five years there has been increased use of the following suprapubic laparoscopic options:

- Uterine prolapse:
  - — When the family is complete: abdominal or laparoscopic assisted vaginal hysterectomy;
  - — When future childbearing is anticipated: laparoscopic uteropexy;
- Cystocoele:
  - — Primary repair: open or laparoscopic paravaginal repair;
  - — Recurrent repair, as above;
- Enterocoele (medium to large): open or laparoscopic sacrocolpopexy (± mesh).

Figure 11: Sacrospinous colpopexy.

Features of synthetic suburethral slings (eg, TVT, SPARC)

- Minimally invasive
- Short hospitalisation
- Prolene mesh (no infection, erosion rare)
- High success rates
- Combine well with prolapse surgery
- Safe
- Low complication rates

Table 3: Medications for treating detrusor instability

Frequency, urgency and urge incontinence

Anticholinergic

- Propantheline (Probanthine) 15-30mg tds. Best usage: frequency

Musculotrophic

- Oxybutynin (Ditropan) 2.5-5mg tds. Best use: urgency, urge incontinence
- Tolterodine: limited availability in Australia but can be imported from New Zealand (CTC Pharmaceuticals; Tel: (+64) 9303 4253 at around $1.50 per 2mg tablet. It has similar efficacy to oxybutynin with less dry mouth

Nocturia and nocturnal enuresis

Antidepressants

- Amitriptyline (Endep, Tryptanol) 10-25mg nocte. Best usage: nocturia, enuresis
- Imipramine (Melipramine, Tofranil) 25-75mg nocte. Best usage: nocturia, enuresis

Antidiuretics

- Desmopressin (Minirin) 1-2 nasal sprays nocte. Best usage: nocturnal diuresis, enuresis

Botulinum toxin for detrusor instability

- Botulinum toxin type A (Botox) injections to the detrusor muscle (under cystoscopic control) have been introduced for cases of refractory detrusor hyperreflexia in patients with a neurogenic cause. Doses of 300-500 units have been quoted, with maximum limits of 1000 units. A significant increase in bladder capacity and decrease in urinary frequency has been described, with an average of seven months before re-treatment was necessary. Most importantly, in this very difficult group, there was significant improvement in continence and quality of life. Data for other categories of lower urinary tract dysfunction are sparse.

Table 4: Treatment of voiding difficulties

Cause	Treatment
Uterine or vaginal prolapse	Repair prolapse
Idiopathic high residual urine	Long-term UTI prophylaxis
Recurrent urinary infections	Hexamine (Hiprex), nitrofurantoin (Macrodantin, Ralodantin)
Postoperative, post-partum	Prolonged catheterisation (suprapubic, self-catheterisation)
Distal urethral stenosis (atrophic changes)	Urethral dilatation, vaginal oestrogens

Prognosis

There has been increasing public awareness in Australia of lower urinary tract and pelvic floor dysfunction, especially urinary incontinence, as a major women's health issue. There are now greater possibilities for successful conservative treatment of early symptoms and there may be opportunities for prevention, particularly in relation to childbirth initiatives, including postpartum physiotherapy.

Effective surgical techniques are available for genuine stress incontinence and moderate to marked prolapse, and the surgical trend is towards more minimally-invasive approaches, provided success rates can be objectively proved to be comparable to those of the traditional approaches.

There has been increasing use of laparoscopic approaches to prolapse surgery. Unfortunately, progress in the treatment of detrusor instability and voiding difficulties has been slow.

Author's case studies

Mixed genuine stress incontinence and detrusor instability

A 50-YEAR-old mother of three presented with a 10-year history of stress and urge urinary incontinence (dating from the birth of her last child), worse over the last two years and requiring four pads a day. She admitted to frequency, nocturia, symptoms of incomplete emptying and the need to re-void. Menopause was at 47. She was taking Minipress for hypertension.

There were mild atrophic vaginal changes. Clinical stress leakage was readily elicited in the left lateral and standing positions with coughing. There was no significant abnormality detected on bimanual pelvic examination.

Initial measures

An MSU was negative. Bladder diary confirmed frequency (10-12/day), nocturia (2-3/night), six episodes of leakage and the use of four pads a day. Vaginal oestrogens were employed for the atrophic vaginal changes, with slight improvement in the nocturia but no improvement in the incontinence symptoms.

Slight improvement in overall incontinence was achieved by changing Minipress to an alternate antihypertensive agent. Supervised physiotherapy over two months resulted in some improvement although the patient was still using three pads a day.

Urodynamic investigations

Clinical stress urine leakage was again very easily elicited by the specialist clinician performing the urodynamics. A moderate degree of bladder neck mobility was seen on transvaginal ultrasound, which, together with the clinical stress leakage, confirmed the diagnosis of genuine stress incontinence of moderate severity.

Figure 12: Grade 3 vaginal vault prolapse.

The presence of voiding difficulties was eliminated by observation of a normal urine flow rate (60th centile of nomogram) and no residual urine.

Filling cystometry showed the presence of abnormal detrusor contractions to 25cm H_2O at a volume of 250mL, with further contractions to 30cm H_2O, causing involuntary voiding. Voiding cystometry was satisfactory.

Treatment

A trial of anticholinergic medication (Ditropan) resulted in relief of the urge incontinence, but the stress incontinence remained. A tension-free vaginal tape (TVT) was inserted, with complete cure of the stress incontinence and decreased urgency and urge incontinence. Anticholinergic medication was gradually discontinued as the bladder became more competent with post-surgical bladder training.

Mixed bladder dysfunction

A 63-year-old mother of two presented with eight months of symptoms of vaginal prolapse (bulge, pressure) associated with the symptoms of frequency, nocturia, urgency and occasional urge, but no stress incontinence.

She had undergone a vaginal hysterectomy and repair procedure for prolapse eight years previously. The prolapse caused voiding difficulties when it dropped through the vaginal entrance (generally in the afternoon or after lifting). She had also experienced two recent UTIs.

A large vaginal vault prolapse (figure 12) was seen protruding though the vaginal entrance. Some stress urine leakage could be elicited when the prolapse was pushed back. There were some atrophic vaginal changes.

Initial measures

A ring pessary that needed to be changed each 3-4 months was chosen as the initial treatment option. Vaginal oestrogens were also employed. Two sizes of pessary both fell out.

An MSU confirmed that the UTI had been effectively treated. A prophylactic course of the urinary antiseptic Hiprex taken twice a day was prescribed, with 500mg vitamin C with each Hiprex tablet. The patient was referred for urogynaecological assessment with urodynamics.

Urodynamic assessment

A grade 3 vaginal vault prolapse was confirmed. Clinical stress leakage was confirmed when the prolapse was reduced.

Voiding difficulties were confirmed by the presence of slow (5th centile of the nomogram) and interrupted urine flow and a residual urine volume of 90mL, probably accounting for her recent UTIs.

Detrusor instability of mild to moderate severity was noted on cystometry, with a number of abnormal bladder contractions to 20cm H_2O and a low bladder capacity of 350mL. Voiding cystometry showed a high-pressure contraction, with very slow urine flow due to bladder outflow obstruction by the prolapse

.

Treatment

A sacrospinous colpopexy ('hitch') procedure effectively cured the vaginal vault prolapse and the symptoms of voiding difficulties, decreased frequency and urgency. Objectively, urine flow was better, with the residual urine now zero. There were no further UTIs.

Subsequent anticholinergic therapy replaced over time by bladder training saw further decreases in the frequency and urgency.

With the surgical reduction of the prolapse, the stress incontinence became more a symptom. As voiding was satisfactory, a TVT could be employed as a second-line procedure.

GP's contribution

DR RENATA CHAPMAN
Chatswood, NSW

IMELDA, 75, presented with a UTI, which I treated with antibiotics. At 26 she had one healthy daughter, born after a prolonged and difficult labour.

At 55 she had an abdominal hysterectomy and oophorectomy for large fibroids. She started Premarin, which she had continued without any side effects. She subsequently had an anterior repair for vaginal prolapse at 60. She was otherwise healthy and was not on any other medication.

When Imelda returned with another episode of UTI, she complained of urge incontinence. Examination showed grade 2 vault prolapse and a large enterocoele. Pelvic and renal ultrasound were normal. Physiotherapy at a local incontinence clinic had minimal effect and Imelda refused any more surgical procedures. Pro-Banthine and Ditropan were not helpful.

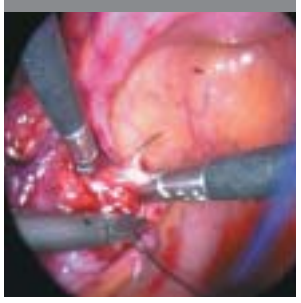
Finally I persuaded her to see a gynaecologist, who unsuccessfully tried two different types of pessaries to hold the prolapse in place.

A few years passed with Imelda having recurrent UTIs, worsening prolapse, urge and stress incontinence and nocturia. Following the Women's Health Initiative, I slowly weaned her off Premarin. Imelda was now almost 80.

When reviewed by a urogynaecologist, she was found to have grade 3 rectoenterocoele. There were signs of previous colposuspension and, on reducing the prolapse and asking her to cough, there was clinical stress leakage.

On vaginal ultrasound, the bladder neck was supported by the colposuspension, although there was some opening on straining. Urine flow was slow and interrupted and there was a small residual of around 15mL, accounted for by the prolapse. On filling cystometry the bladder was stable,

Figure 13: Laparoscopic pelvic floor repair.



although there was a late pressure rise to around 11cm of H_20. When testing Imelda for stress leakage at bladder capacity, which was reduced at 400mL, there was ready clinical stress leakage. She voided with a satisfactory contraction, improved urine flow and a moderate residual of 43mL.

Imelda was advised to have surgery using a sacrospinatus hitch procedure combined with a posterior repair and tension-free vaginal tape (TVT) insertion. The procedure went well technically; however, four weeks post surgery Imelda is not happy. She is wearing pads and her incontinence seems to be worse.

Questions for the author

Why is Imelda still incontinent and what is the prognosis? What further can be done for her?

In this complex case it is possible the TVT may be either too tight (causing urge incontinence) or too loose (causing stress incontinence). The other cause may be some bladder instability.

Adjustments to the tape are occasionally necessary but need to be performed in the first two weeks after surgery. Symptoms reported later may require a fuller urodynamic assessment to determine the cause and treatment of the persistent incontinence.

What is the mechanism of bladder dysfunction post hysterectomy and is there a difference in the incidence and type of bladder dysfunction depending on the type of hysterectomy (abdominal vs vaginal vs laparoscopic)?

Most bladder dysfunction predates hysterectomy, although the mechanism of new bladder dysfunction post hysterectomy involves an element of denervation (as with childbirth). There may be some postsurgical structural changes.

There is a higher relative increase in the incidence of voiding difficulty compared with genuine stress incontinence or detrusor instability post hysterectomy, with no known difference according to the type of hysterectomy.

Contrary to our earlier beliefs, the results of the Women's Health Initiative and Heart and Estrogen/Progestin Replacement (HERS) studies demonstrated increased incidence of incontinence in women taking HRT. How can these results be explained?

Cyclical variations (worst premenstrually) in genuine stress incontinence and voiding difficulty can occur in some premenopausal women with a retroverted or fibroid uterus. This observation in postmenopausal women is not easily explained.

Could you elaborate on the protective role of caesarean section in the prevention of urinary and faecal incontinence? Why is the effect short term?

The high level of protection provided by caesarean section against faecal incontinence is clearly the avoidance of anal sphincter trauma during vaginal delivery. There is no evidence that this is short term.

There is a much higher incidence of urinary incontinence (particularly stress) and pelvic floor mobility in women after vaginal delivery compared with women undergoing caesarean section. Wilson et al[1] report that seven years after first confinement the relative incidence of urinary incontinence is 46% (all vaginal deliveries) compared with 32% (all caesarean sections).

Other factors such as age or pelvic floor surgery (figure 13) may contribute to the lessening of the protective effect of caesarean section over time. It has been reported that the prevalence of urinary incontinence in postmenopausal nuns is similar to that in parous postmenopausal women.

1. Wilson PD. Obstetric practice and urinary incontinence 5-7 years after delivery. *Neurourology and Urodynamics* 2002; 21(4):289-91.

Australian Doctor

How To Treat CPD

Australian Doctor Education

Instructions
Earn 2 CPD points by completing this quiz online or on the attached card. Mark your answers on the card and drop in the post (no stamp required) or fax to (02) 9422 2844. For immediate feedback click the 'Earn CPD pts' link at www.australiandoctor.com.au Note that some questions have more than one correct answer. The mark required for CPD points is 80%. Your CPD activity will be updated on your RACGP records every January, April, July and October.

1. Gabriella, 42, presents with increasing urinary incontinence. She has had four children by vaginal delivery. Which THREE factors in her obstetric history may support a diagnosis of genuine stress incontinence?
a) The number of children she has had ❑
b) The weight of her babies ❑
c) The length of time she spent in stage 2 of delivery ❑
d) Whether she had an episiotomy during her deliveries ❑

2. Gabriella is overweight and takes a diuretic for hypertension. To assess the cause of Gabriella's symptoms you are least likely to do which ONE of the following?
a) Ask about the circumstances in which the incontinence occurs ❑
b) Test for genuine stress incontinence by observing any urinary leakage after coughing, when she has a full bladder ❑
c) Explain that an MSU to check for urinary infection is not justified because her only symptom is incontinence ❑
d) Perform a pelvic examination to check for other pathology that may affect management ❑

3. Her examination shows mild to moderate stress urine leakage but no other pathology. She says her symptoms are much worse when she plays sport. You are most likely to do which TWO of the following?
a) Explain that using a tampon during sport may improve her symptoms at that time ❑
b) Develop a weight-loss plan ❑
c) Prescribe a vaginal oestrogen ❑
d) Advise her to be fitted with a ring pessary ❑

4. Gabriella has little improvement with the changes you have made. She returns with worsening incontinence and a prolonged chest infection. You are most likely to take which THREE actions?
a) Reassess her after treating her chest infection, to establish how much it is affecting her genuine stress incontinence ❑
b) Refer her for surgery with no further investigations ❑
c) Refer her for physiotherapy ❑
d) Ask her to keep a bladder/leakage diary ❑

5. Gabriella asks about bladder tests that a friend with similar symptoms has had. Which advice are you most likely to give her (choose TWO)?
a) She should be referred for a cystoscopy ❑
b) Urodynamics would confirm which factors were contributing to her symptoms ❑
c) Ultrasound would diagnose any bladder-neck support abnormalities ❑
d) If detrusor instability is contributing to her symptoms, the detrusor pressure should rise over 15cm during bladder filling ❑

6. May, 67, complains of frequency, dysuria, back ache, slow urination and occasional incontinence. She has hypertension, which is well managed on prazosin. May has had diabetes for 30 years and also has osteoarthritis. She has had four children by vaginal delivery. Which THREE factors in her history are most likely to influence your management?
a) The use of prazosin to treat her hypertension ❑
b) Her history of diabetes ❑
c) Her history of osteoarthritis ❑
d) Her age ❑

7. Before examining May, you correctly explain to her which TWO of the following?
a) If she has genuine stress incontinence, physiotherapy may improve her symptoms, but is unlikely to cure them ❑
b) A vaginal pessary might be effective treatment if prolapse is present ❑
c) Investigations are likely to show only one cause for her symptoms ❑
d) To examine her for prolapse, she will need to have a full bladder ❑

8. May's examination shows a grade 1 rectocoele and uterine prolapse. Her MSU shows a UTI, which you treat. When considering her management, which ONE statement is incorrect?
a) The UTI would not have worsened her symptoms by causing detrusor stability ❑
b) Her UTI may be a sign of a chronic high volume of residual urine ❑
c) Cranberries as juice or a tablet daily may lower her risk of UTIs ❑
d) If tests show she has a very slow urine flow, prophylactic antibiotics should be considered ❑

9. May has minimal improvement with treatment of her UTI. She is keen to avoid surgery. When considering medications you are most likely to take which TWO courses of action?
a) Prescribe an anticholinergic because of its low risk of side effects ❑
b) Prescribe topical vaginal oestrogens if she is shown to have chronic high levels of residual urine ❑
c) Prescribe antidepressants ❑
d) Prescribe oxybutynin, with a warning about the need to stay cool in hot weather ❑

10. May's symptoms worsen and she is having side effects with medication. She asks you about surgery. When considering her surgical options you are most likely to decide which TWO of the following?
a) A colposuspension would not aggravate her voiding difficulties ❑
b) If tests show she has poor vaginal mucosa and bladder-neck support, a sling-type bladder-neck support would be advisable ❑
c) Surgery using tension-free vaginal tape may allow a shorter period of hospitalisation ❑
d) Surgery for her incontinence would need to be performed separately to the repair of her prolapse ❑

HOW TO TREAT
Editor: **Dr Lynn Buglar**
Co-ordinator: **Julian McAllan**

NEXT WEEK
The next How to Treat investigates the problem of child abuse and neglect. The author, **Dr Louise Newman**, is a child and adolescent psychiatrist and director of the NSW Institute of Psychiatry. She is chairwoman of the NSW branch of the RANZCP and chairwoman of the faculty of child and adolescent psychiatry.