

# UG CONNECT

A CME NEWSLETTER OF KK UROGYNAECOLOGY CENTRE  
THE CENTRE FOR ADVANCED PELVIC FLOOR RECONSTRUCTION AND BLADDER DYSFUNCTION

## FEMALE VOIDING DISORDERS

### INTRODUCTION

Normal voiding requires the coordination of bladder contraction together with simultaneous relaxation of the bladder neck and urethra. The organs involved include the bladder, urethra, voluntary sphincters and involuntary sphincters. The neural pathways include the pathway responsible for micturition (parasympathetic), continence (sympathetic), and their control and coordination. Dysfunction or disruption in any of the organs or neural pathways involved can lead to a voiding disorder.

### AETIOLOGY

The causes of voiding disorder can be broadly divided into anatomical and functional causes.

#### Anatomical Causes

1. Pelvic organ prolapse
2. Prior surgery: anti incontinence surgery, extensive pelvic surgery, excessive periurethral bulking agent injection
3. Urethral stricture or fibrosis, meatal stenosis, urethral diverticulum, Skene's gland cyst or abscess, urethral cancer, urethral calculus or foreign body
4. Gynecological causes: uterine or cervical tumours, vaginal cancer, large ovarian cyst, retroverted gravid uterus
5. Acute inflammation: genital or urinary tract
6. Faecal impaction

#### Functional Causes

1. Primary bladder neck obstruction (lack of relaxation of smooth muscles of bladder during voiding)
2. Dysfunctional voiding (associated with learned voiding disorder or pelvic floor dysfunction)
3. External sphincter pseudodyssynergia (external urethral sphincter that does not relax during voiding in an otherwise neurologically intact woman)
4. Drugs: anticholinergics, tricyclic antidepressants, epidural anaesthesia
5. Neurological causes
  - Detrusor sphincter dyssynergia (when external urethral sphincter contracts during a detrusor contraction in a neurologically impaired individual eg. spinal cord injury (suprasacral), multiple sclerosis)
  - Parkinson's disease
6. Psychological influences: anxiety, hysteria or depression

### CLINICAL FEATURES

Patients with voiding difficulties can present with the following symptoms:

- Hesitancy (difficulty initiating a stream)
- Incomplete emptying
- Poor flow
- Intermittent stream
- Post micturition dribbling
- Straining to void
- Frequency and urgency of urination
- Overflow incontinence (no warning incontinence)
- Signs of urinary tract decompensation like recurrent urinary tract infections (due to residual urine) and renal insufficiency (due to reflux nephropathy)

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Produced with an educational grant from



**Pfizer Pte Ltd**

1 Science Park Road, #04-01 The Capricorn  
Singapore Science Park, II Singapore 117528



GlaxoSmithKline

**GlaxoSmithKline Pte Ltd**

150 Beach Road #22-00 Gateway West  
Singapore 189720



Novo Nordisk

**Novo Nordisk Pharma (S) Pte Ltd**

238A Thomson Road Novena Square, Tower A #16-06/08  
Singapore 307684



SCA

**SCA Hygiene Singapore Pte Ltd**

10 Jalan Kilang #02-01 Sime Darby Enterprise Centre  
Singapore 159410

## EVALUATION

Evaluation and treatment are often driven by the type of disorder and degree of bother to the patient, presence of urinary tract decompensation and co-existing medical conditions that might affect the urinary tract.

Specific points in history include:

- Onset of symptoms after any specific event like surgery, child birth, menopause or start of a new drug
- Recurrent urinary tract infections
- Childhood or adolescent voiding problem
- Associated sexual or bowel dysfunction
- Neurological symptoms like extremity weakness, tingling and numbness

Specific signs to look for during examination include:

- Presence of abdominal/pelvic mass or fullness
- Presence of pelvic organ prolapse
- Appearance of urethral meatus and palpation of the urethra for any abnormalities
- Neurological examination: gait, deep tendon reflexes, perianal reflex, anal sphincter tone, lower limb tone

## INVESTIGATIONS

Investigations done to evaluate the symptoms of voiding disorders include:

### Mid stream specimen of urine (MSU) – urine microscopy and culture and sensitivity

This should always be taken to exclude infection or proteinuria. Further tests are warranted if the results are abnormal.

### Post void residual urine volume

An ultrasound, bladder scan or in-out catheterisation should be performed to measure post void residual volume. A residual urine volume of >50ml is significant. However, a volume of up to 150ml in immediate post operative patients is permissible. Increased residual volume can be attributed to bladder outlet obstruction or detrusor hypocontractility.

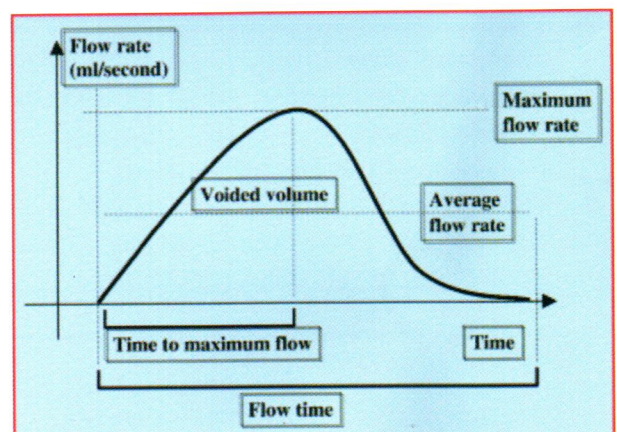
### Urodynamic studies

Urodynamic evaluation is the gold standard for quantifying the degree of obstruction or detrusor contractile dysfunction and simultaneous pressure/flow analysis.

The following are normal cystometric parameters:

- Filling cystometry
  - o Residual volume <50ml
  - o Maximum bladder capacity >400ml
  - o Absence of detrusor contractions during filling
  - o Negligible rise in detrusor pressure on filling (compliance)
- Voiding cystometry
  - o No leakage on coughing or performing exercise
  - o No provoked detrusor contractions as a result of precipitating factors, such as postural changes or coughing
  - o A maximum voiding detrusor pressure of <50cmH<sub>2</sub>O, with a maximum flow rate of >15ml/s for a voided volume of >150ml.

The maximum flow ( $Q_{max}$ ) varies in different individuals and is a function of age, sex, anxiety and voided volume. For a hypocontractile bladder, urodynamics will reveal a large bladder capacity, low bladder pressure during filling, and little or no detrusor contractions during voiding. For bladder outlet obstruction, a high voiding detrusor pressure and low flow rates will be observed. Bladder Outlet Obstruction Index ( $BOOI = P_{det}@Q_{max} - [2Q_{max}]$ ) and Bladder Contractility Index ( $BCI = P_{det} Q_{max} + [5Q_{max}]$ ) are indices which have been proposed for bladder function assessment associated with bladder outlet obstruction. They allow the categorisation of patients with bladder outlet obstruction into subsidiary groups depending upon outlet obstruction and bladder contractility.



The normal uroflowmetry curve is a continuous, smooth, almost bell-shaped curve. Interruptions or spikes and valleys in the flow and decreased bladder compliance may be indicative of a voiding dysfunction. Patients should be asked if the void was representative of their typical pattern with respect to force and volume.

**Videourodynamics** simultaneously measures and displays urodynamic parameters with radiographic visualization of the lower urinary tract. The interrelationships between radiographic appearance of the lower urinary tract and urodynamic parameters can be better appreciated and artifacts recognized. It is the most precise way to evaluate lower urinary tract function and disturbances in micturition.

### **Electromyography**

It is predominantly used to study striated muscles, in particular the urethral sphincter and pelvic floor muscles. The sphincter activity is measured during urodynamic testing either by surface electrodes (similar to that used in ECG) or by inserting needle electrodes directly into the sphincter muscles. The main clinical indication is to distinguish between striated muscle and smooth muscle dysfunction in neuropathic urethral obstruction. It is used to identify the failure of the external urethral sphincter to relax during voiding, leading to detrusor sphincter dyssynergia. Increased pelvic floor EMG activity during voiding is one of the hallmarks of pseudodyssynergia and it is probably an acquired (learned) disorder.

### **Radiology**

This includes an X-ray or ultrasound of the kidneys and bladder, or a CT urogram or MRI to look for kidney or bladder pathology (tumour, diverticulum, foreign body) that can cause voiding disorders, or hydronephrosis caused by voiding disorders. Pelvic ultrasound scan is also useful for fibroids/cysts. Neurological signs and symptoms may prompt radiographic investigations of the nervous system or spine. A voiding cystourethrography (VCU) is helpful in cases of urethral diverticulum, stricture or vesicoureteral reflux.

### **Cystourethroscopy**

To exclude foreign bodies, bladder diverticulum or bladder tumours and for locating obstructive foci.

## **MANAGEMENT**

### **Immediate management**

Early discovery and vigilance, especially after surgery or delivery with the use of epidural analgesia, is necessary to prevent bladder damage. Patients with high residual urinary volume can be taught Clean Intermittent Self-Catheterization (CISC). This is to empty the bladder at frequent intervals to prevent proximal damage to the kidneys. For patients who are unable or unwilling to perform CISC, indwelling catheters have to be used. Weekly or two weekly removal of the indwelling catheter and retraining of the bladder may be required, allowing time for it to rest and possibly recover. The key word is 'PATIENCE'. Subsequent management depends on the cause of the voiding disorder. If the patient is able to pass urine, though not completely, the prognosis is much better than if she is unable to pass urine at all, which may indicate damaged nerves.

### **Anatomical causes**

**Previous anti incontinence procedure:** In cases of voiding disorder after a TVT, 70-90% of patients have a dramatic improvement after a sling excision. Twenty percent of them have recurrent SUI. In patients with no improvement after this procedure, full transvaginal urethrolisis with bilateral perforation of the endopelvic fascia and complete mobilisation of the urethra may be necessary. In patients presenting with such complications after a Burch colposuspension, a retropubic suture release, either transvaginally or abdominally, leads to disintegration of the scar between the urethra and pubis.

In cases of **uterovaginal prolapse**, relief of symptoms after reducing the prolapse with a ring pessary indicates urethral compression as the cause of voiding disorder and predicts success of a prolapse surgery in the resolution of symptoms.

Other management measures include removal of obstruction caused by tumours, treatment of inflammation,

management of constipation, including referral to a colorectal surgeon for further evaluation in cases of recurrent constipation.

In cases of **urethral stricture**, cystoscopy and judicious dilatation of the urethral lumen or a transurethral resection of the bladder neck can lead to relief of symptoms. A **urethral diverticulum** can compress the urethral lumen and lead to bladder outlet obstruction. In such cases, a diverticulectomy with maintenance of appropriate calibre of the urethral lumen should be done.

In cases with voiding difficulties due to atrophic vaginitis, vaginal estrogen pessaries or creams may be used.

## Functional causes

In cases of **primary bladder neck obstruction**, CISC should be done if there is long standing retention. Alpha one receptor antagonists like tamsulosin relax the bladder neck. Bethanechol chloride and distigmine bromide have been used to improve detrusor contractility. Transurethral incision of the bladder neck using a pediatric resectoscope and neuromodulation (Interstim™) have also been used. There is paucity of outcome data on injection of botulinum toxin into the bladder neck and neuromodulation. Pelvic floor relaxation, sacral neuromodulation and skeletal muscle blockers like diazepam have been used for the treatment of **pseudodyssynergia**. Botulinum toxin injection into the external sphincter has been tried for the treatment of **detrusor external sphincter dyssynergia**. In patients with **anxiety**, anxiolytics like diazepam or antidepressants may help in reducing the symptoms. Voiding disorders need to be excluded in patients presenting with symptoms of urinary frequency and urgency before prescribing anticholinergic drugs (for the treatment of overactive bladder), as they may worsen the condition. Patients also need emotional and psychological support, especially while waiting for recovery, as many are frustrated and depressed.

## Prevention

Adequate laxity of the urethral lumen should be ensured at the end of any anti incontinence procedure. Iatrogenic urethral stricture or fibrosis should be avoided when operating on the urethra. Care should be taken that the calibre of the lumen is large enough to accept a 14F catheter with no difficulty. Measures to prevent recurrent urinary tract infections include basic personal hygiene, early post-coital voiding and increased fluid intake. Continuous antibiotics for 6 months also reduces the risk of recurrent UTI.

## CONCLUSION

Voiding disorders can be caused by a myriad of aetiologies. Early diagnosis is important and treatment should be instituted appropriately to prevent renal compromise.

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Article by: Dr Priyanka Singh/Dr Kadam Pratima/Dr Freda Khoo  
 Editorial: A/P Han How Chuan, Dr Christopher Chong/Dr Wong Heng Fok

Correspondence to A/Prof Han How Chuan

Printed by Advance Printing

### Urogynaecology Centre

*The Centre for Advanced Pelvic Floor Reconstruction and Bladder Dysfunction*

KK Women's and Children's Hospital 100 Bukit Timah Road Singapore 229899. Telephone +65- 6394 2291/3096 Facsimile + 65-62918135 Email: Han.How.Chuan@kkh.com.sg



KK Women's and  
 Children's Hospital  
 SingHealth