Aims of course/workshop
Urinary retention in women is rare and diverse. Diagnostic criteria are not agreed and epidemiology is not well known. Forms of urinary retention in women include: complete retention, incomplete or insufficient emptying and elevated post-void residual. It may be acute or chronic, symptomatic or asymptomatic. Etiology is multifactorial including anatomic or functional bladder outlet obstruction and bladder dysfunction related to neurological diseases, diabetes mellitus, aging, pharmacotherapy, pain and infective/Inflammatory disease and idiopathic or unknown aetiology. This workshop will analyse and discuss physiopathology, evaluation and management of urinary retention in women from an integral, practical and evidence based approach.

Learning Objectives
After this workshop participants should be able to:
1. Identify possible aetiology, risk factors and pathophysiology of urinary retention in women
2. Properly evaluate urinary retention in women
3. Become familiar with the different options for the management of urinary retention in women including conservative, medical and surgical therapies

Learning Outcomes
After taking part in this workshop participants will be able to identify and properly manage urinary retention in women being able to identify possible aetiology, risk factors, evaluation and management including conservative, medical and surgical therapies. Typical clinical cases of typical clinical scenarios of urinary retention in women will be openly discussed with the attendants. Tree decision through Evidence Base Medicine tools will be used

Target Audience
Urologists, Gynaecologists, Physiotherapists, Nurses, Health care givers and all delegates with interest in the management of urinary retention in women.

Advanced/Basic
Advanced

Conditions for learning
This workshop will be interactive with no restrictions

Suggested Learning before workshop attendance
Urinary retention in women.

Suggested Reading


David Castro-Diaz (Spain)
Concepts & pathophysiology.
Urinary retention in women, in contrast to men, is rare and diverse; diagnostic criteria are not agreed and the epidemiology is not well known. The reported male to female ratio on urinary retention is 13–1, and the incidence is approximately 7 per 100,000 population per year (1). Forms of urinary retention and bladder emptying disorders in women include: complete retention, incomplete or insufficient emptying and elevated post-void residual. It may be acute or chronic, symptomatic or asymptomatic as explained above. There are many causes of urinary retention in women, but we will be more emphatic on the two most common causes in the neurologically healthy women: pelvic floor dysfunction, or dysfunctional voiding, and primary bladder neck obstruction (2).

Aetiology of urinary retention in women
There are anatomical and functional causes of urinary retention in women. Anatomic causes can be related to iatrogenic procedures (urinary retention surgery or colorectal and gynecological surgery) and to abnormalities due to obstruction by pelvic organ prolapse, gynecologic tumors, caruncle, urethral diverticulum, ectopic ureterocele, etc.). Urinary retention due to functional disorders is related to bladder dysfunction or bladder outlet dysfunction. Bladder dysfunction may be related to detrusor underactivity, acontractile bladder or failure of sphincteric relaxation. Female urinary retention due to bladder outlet dysfunction is usually due to two main entities: primary bladder neck obstruction and dysfunctional voiding. Besides these, it has to be taken into account that there are rare cases reported, such as cytomegalovirus cystitis (3), eosinophilic cystitis (4), inflammatory nervous disease (5), incarcerated gravid retroverted uterus (6), which offer variable characteristics to this entity. In order to properly empty the bladder during the voiding phase of the micturition cycle, a sufficient strength and duration of the detrusor activity is needed. Any kind of disorder affecting the strength or duration of the detrusor contraction, an increase in the outlet resistance or the poor coordination between the bladder (detrusor) and the bladder outlet (sphincter) may cause an insufficient emptying or a urinary retention in women (7, 8).

References

Montserrat Espuña-Pons (Spain)
Voiding dysfunction after delivery and radical pelvic surgery

Introduction
Urinary retention (UR) in women is a common clinical situation in postpartum and after radical pelvic surgery for a gynaecological cancer. UR in these patients can be only a transient problem or may be the aetiology of a persistent voiding dysfunction.

Postpartum urinary retention (PUR)
In the puerperium, PUR is a common finding which may increase the risk for persistent voiding dysfunction. Possible risk factors for PUR are: primiparity, cesarean section, birth weight, epidural analgesia, opioid analgesia, episiotomy and large perineal tears.

Two clinical situations may be observed:
A- Women who are unable to void spontaneously after a few hours of giving birth and (acute symptomatic urinary retention).
B- Women with abnormal postvoid residual volume (PVRV) detected by ultrasonography or by catheterization after spontaneous micturition, with a spontaneous recovery after several days.
The prevalence of acute symptomatic retention defined as inability to void after 6 hours of vaginal delivery or after removal of a catheter after caesarean section is low. Nearly half of the women may have a PVRV > 150 ml. after the first spontaneous void in immediate postpartum.

Women empty their bladders by relaxing the pelvic floor without a strong detrusor contraction. The pathophysiology of PUR is not well documented, but some suggestions may explain part of the problem. After a vaginal delivery important changes in the anatomy and functionality of the pelvic floor may and also some possible low urinary tract obstructive causes (vaginal periurethral edema) may occur. Epidural analgesia directly affects bladder sensitivity and contractility.

Voiding dysfunction after radical pelvic surgery
Radical Hysterectomy (RH) and bilateral pelvic lymphadenectomy is the most common and internationally accepted surgical treatment for cervical and has been considered as standard surgical treatment for stages IB1-IIA over the past 30 years, with a high five years survival (88-97%). Extensive pelvic surgery may result in damage of pelvic vascularization and autonomic innervation and consequently long term pelvic organ dysfunction side effects are common. Functional disorders of the lower urinary tract (LUT) are the most common long-term side effects, with a high postoperative incidence of bladder dysfunction. Nowadays there is a tendency to an individualization of the treatment in order to reduce the morbidity of surgery. There are two phases of the dysfunctions of the LUT in the postoperative period after RH related to the extent of damage of the autonomic innervation. In the immediate postoperative period, there is usually a transient spastic bladder with a decreased capacity but also with diminished sensation which causes voiding dysfunction and may require urethral catheterization for a few days or few weeks. After this period the patient may recover an efficient voiding function, with some changes in bladder sensation and in detrusor and urethral function, but without any symptoms. An over-distended bladder in the immediate postoperative period may generate a persistent hypo-contractile bladder and it’s the cause of persistent voiding dysfunction in some patients after radical pelvic surgery. This women have LUT symptoms and need abdominal straining for voiding.

References

Tufan Tarcan (Turkey)
Introduction:
There is no strong consensus on the evaluation of FUR since the pathophysiology is poorly understood. The etiology may include transient causes, detrusor underactivity, increased outlet resistance (mostly iatrogenic), psychogenic and mixed causes. Urinary retention remains to be a well-known complication of anti-incontinence surgery (1-2). The temporal relation between surgery and FUR is the most important diagnostic factor for the iatrogenic obstruction. In unexplained or chronic cases, a multidisciplinary teamwork is favored including a urologist, physiotherapist, neurologist, gynecologist, psychiatrist, gastroenterologist/general surgeon.

Basic evaluation:
The initial goal of evaluation is to ensure bladder emptying until evaluation is completed and management of retention is succeeded. Foley catheterization is usually the choice for acute retention (1, 2). Clean intermittent catheterization (CIC) should be preferred for periods longer than one week. Long-term indwelling catheterization is advised only for frail patients when CIC cannot be performed (1, 2).

The evaluation should then include assessment of the upper urinary tract (UUT) and take the necessary measures to prevent any further damage during evaluation process. Bladder emptying with CIC is the mainstay of UUT protection. Ultrasound is the basic imaging modality to assess the UUT (1, 2). Renal function tests are needed in long term retention.

The evaluation should continue to find out the etiology of FUR. FUR will resolve in a group of patients just with CIC after transient factors are eliminated.

Transit causes of FUR are:
- Immobility (especially postoperative)
- Constipation or fecal impaction
- Medications
- Urinary tract infections
- Delirium
- Endocrine abnormalities
- Psychological problems
- Clot retention
Invasive tools such as invasive urodynamic studies (UDS) or cystoscopy should be delayed if transient causes are present (2). In fact, half of the women presenting with retention will void normally after transient factors are eliminated. In chronic cases, some pts may not be aware of retention whereas there is high level of anxiety in acute cases (2). There is a specific event that triggers FUR in about half of the patients. Besides a detailed history, the physical examination should include abdominal and sacral examination, pelvic examination, focused neurological examination. Cystoscopy is usually advocated to rule out any anatomic obstruction.

Urodynamic evaluation:
Non-invasive urodynamic studies such as uroflowmetry and PVR measurement can be utilized in pts who are not in complete retention. Cystometry and pressure flow studies (PFS) usually reveal detrusor underactivity (DUA) as the most common finding. Video-urodynamics should be preferred when available. According to ICI in 2013, “Since no test can accurately differentiate neurologic from non-neurologic female urinary retention, careful neuro-urologic evaluation will help guide to more appropriate management.”

PFS aim to diagnose infravesical obstruction which is however more difficult in women compared to men (1, 2). Women empty their bladders by relaxing the pelvic floor, sometimes with the additional help from the abdominal muscles without a strong detrusor contraction in contrary to men. Therefore, small changes in detrusor pressure may define BOO making it very difficult to develop reliable diagnostic nomograms. Additionally, many women cannot void in PFS due to obstructive effect of the catheter and unnatural environment. Relevant nomograms will be discussed during the workshop.

Neurological evaluation:
It starts with the focused neurological examination by the urologist. Neurology consultation is needed in persistent cases without an anatomic obstruction. MRI of the central and peripheral nervous system is the most commonly utilized radiological method to reveal certain neurological diseases such as MS, tumors, vertebral congenital and acquired pathologies.

Concentric needle EMG of the external urethral sphincter is the test that diagnoses Fowler’s syndrome described in 1985 (3). The EMG abnormality was called “decelerating bursts and complex repetitive discharges” where the exact pathophysiology remains unknown (3).

It has been suggested to be a muscle membrane disorder associated with a primary disorder of sphincter relaxation leading to increased urethral afferent activity that inhibits the passage of bladder afferent signals to the brain that results in poor sensation, large bladder capacity and DUA. The trigger is may be hormonal disturbance (progesterone deficiency in PCO), opiates, childbirth and other factors (3). Concentric needle EMG of the external urethral sphincter should be spared to unexplained persistent cases.

References:
3. Osman NI; Chapple CR: Fowler’s syndrome—a cause of unexplained urinary retention in young women? Nat Rev Urol, 2014; 11 (2): 87-

**Cristina Naranjo-Ortiz (Spain)**

Conservative Management

Urinary retention is a complaint of the inability to pass urine despite persistent effort.

Acute urinary retention is defined by the International Continence Society as a painful, palpable, or percussable bladder, with the patient unable to pass any urine when the bladder is full (1).

Chronic retention of urine is defined as a non-painful bladder, where there is a chronic high PVR. Patients with covert bladder retention may present with frequency, passing less than 150ml with feeling of incomplete emptying.

The incidence of acute urinary retention in women of all ages is in general uncommon. However, incomplete emptying with elevated post-void residual (PVR) is a frequent finding in geriatric women (up to one third), and the incidence is increased in fraile patients.

Whereas acute urinary retention is by definition always problematic, elevated post-void residual may be asymptomatic or associated with debilitating problems such as recurrent infection or urinary incontinence. Furthermore, urinary retention can be caused by a variety of disease processes, which in general are associated with either anatomic outlet obstruction or bladder dysfunction.
The most common aetiologies for retention depend largely on the population studied. Whereas in younger patients disorders causing failure of sphincter relaxation may play a primary role in the majority of cases, in an older population retention is more likely to be linked to conditions associated with aging.

Regarding surgery, the incidence of urinary retention depends on the type of procedure.

We should divide the management of these patients regarding the condition of the retention, if it is acute or chronic.

Acute (complete) urinary retention is ten times less common in women than men. In these cases, diagnosis is fairly straightforward, as patients will typically described either painful or painless inability to void for a prolonged period.

Onset of symptoms may be gradual and can go unnoticed by caregivers of patients or by patients with limited bladder sensation or who are severely cognitively impaired and cannot report symptoms. In general, the presence of a weak stream may predict for elevated post-void residual, however, other voiding lower urinary tract symptoms (LUTS) are unreliable predictor.

In a first visit we can make a patient’s medical history in depth and examination of PFM. We must know all the pathologies that we are going to keep using the tools we have in our hands because they are contraindicated. Also in these sessions we make a correct assessment of neurological L2 to S2 segments and musculature of the pelvic floor, so we have something to compare later.

The first stage of treatment will be very simple and we can teach our patient to do the job of education ADL and teach the exercises. These should be very simple and always avoiding muscle fatigue to avoid worsening (albeit temporary) because we do not want the patient to demoralize and abandon the treatment.

It could be last three months in order to return to normal bladder function.

The recommendations of expert committees and international organizations in matters related to continence, insist that the first approach in the conservative treatment for UI after prostate surgery remains the Physiotherapy with or without biofeedback, strengthening of PFM alone or with anal EES, etc. (2).

Other aids to these patients go through behavioural treatment, lifestyle changes and clean intermittent catheterization.


Christopher Chapple (United Kingdom)

Introduction:
 Urinary retention in women can either result from failure of normal detrusor contractile function or as a consequence of failure of coordinated relaxation of the bladder outlet during voiding.

Initial Management:
 The initial goal of evaluation is to ensure bladder emptying until evaluation is complete and an appropriate diagnosis has been made to allow a decision to be made over the appropriate management strategy. An indwelling catheter can be used, failing which intermittent self-catheterization should be instituted.

Medical options:
 There is no effective medical therapy for the underactive bladder. (1, 2)
Likewise no oral therapy has been reported as being useful for patients with failure of relaxation of the bladder outlet in case of either neurogenic detrusor sphincter dyssynergia (DSD) or Fowlers’ syndrome.

**Surgical Intervention:**
Surgical intervention in patients with detrusor underactivity has a limited role. Permanent catheterisation either urethral or preferably suprapubic has inevitable complications such as discomfort, infection and stone formation and is best avoided. If possible intermittent self catheterization is the mainstay of therapy in many patients. A number of other therapies have been evaluated in highly selected patients. (3)

Similar comments relating to catheterisation apply to the management of DSD but urethral catheterization particularly intermittent self catheterization is poorly tolerated in Fowler’s syndrome. Injection of botulinum toxin into the urethral sphincter has not been adequately validated for DSD. (4, 5); although there is an evidence base to support its use in patients with Fowler’s syndrome. (6, 7). Failing all other option either continent or incontinent urinary diversion may be necessary.

**References:**
Urinary retention in women: concepts and pathophysiology
D. Castro-Diaz
University of La Laguna / Hospital Universitario de Canarias
Spain

Acute urinary retention

- Men
  - BOO is common, diagnostic criteria are agreed, epidemiology of acute retention is known
- Women
  - BOO is rare and diverse, diagnostic criteria not agreed, epidemiology not well known
  - Varied voiding dynamics
  - Treatment outcome uncertain

Female Urinary Retention and Bladder Emptying Disorders

Complete retention
Incomplete or insufficient emptying
Elevated post-void residual (PVR)
Post-surgical - Incontinence surgery
  - Pelvic surgery
  - Other
Symptomatic or asymptomatic
Acute or chronic

Bladder dysfunction

- Detrusor underactivity
  - Neurogenic
    - Lower motor neurons
    - Decentralizations
  - Myogenic
    - Chronic obstruction or overdistention
  - Pharmacologic
    - Anticholinergics
    - α-agonists
    - Narcotics
  - Aging

- Acontractile bladder
  - Failure of sphincter relaxation
  - Fowler's syndrome
  - Learned
  - Pain

Bladder outlet dysfunction

- Anatomic
  - Iatrogenic
  - Stricture
  - Anti-incontinence surgery
  - Pelvic organ prolapse
  - Extrinsic compression
  - Gynaecologic tumours
  - Meatal stenosis
  - Caruncle
  - Skene's gland abscess
  - Urethral diverticulum
  - Urethral carcinoma
  - Ecstatic ureteroceles
  - Retroverted impacted uterus (first trimester)

- Functional
  - Primary bladder neck obstruction
  - Dysfunctional voiding
  - Detrusor external sphincter dyssynergia

Postoperative voiding dysfunction (PVD)

- Precise definition of short/long-term problems not defined
- Short-term retention = 0 % to 27 %, long-term = 0 % to 3.8 % (Petri 2005)
- Tape too tight or bad contractility
- Cochrane Data base TVT 5.9% TOT 2.8% (Ogah J 2009)
- Diagnosed by hypersuspension
- Swann sign at MCU; curve at bladder neck
- Prolonged voiding with low Qmax<15 cm H2O & Pdet (>25 cm H2O) & PVR
- OAB complaints
Urethral stricture in women

3-8% of women who present to urologist with voiding complaints have BOO (Carr1996)

The incidence of urethral stricture in women with BOO varies from 4% to 13% (Nitti 1999, Groutz 2000, Kuo 2005)

Female urethral stricture is typically iatrogenic

Aetiology of urethral stricture in women

Rare entity
Controversial aetiology
Likely that most cases are iatrogenic or traumatic in nature

- Prolonged catheterization
- Pelvic radiation
- Childbirth
- Pelvic fracture
- Surgery for diverticulum, fistula or incontinence
- Urethral dilatation (peri-urethral fibrosis)

Small series & case reports
- Tuberculosis, vulvar dystrophy, lichen sclerosis, primary carcinoma, fibro-epithelial polyps, urethral leiomyoma, bladder drained pancreatic transplants, post TURBT
- Resection sacrum/cecy & after female-to-male transsexual reconstruction

Background of Primary Bladder Neck Obstruction

First described by Marion in 1933
Turner-Warwick advocated Urodynamics and VCUG
Diokno described the entity in 1984
Precise cause remains obscure
- Failure of dissolution of mesenchymal tissue at BN
- Inclusion of abnormal connective tissue
- Smooth muscle hypertrophy & inflammatory changes (Leadbetter 1999)

Neurologic aetiology (Awad 1976)

Dysfunctional Voiding

- Intermittent and/or fluctuating flow rate due to involuntary intermittent contractions of the peri-urethral striated muscle during voiding, in neurologically normal individuals²
- Broad range of symptoms and signs for several diagnoses affecting sexual function, bowel function, urinary continence, and voiding
- Levator muscles as a potential source impairing urinary flow rate²
- Sphincter Vs levator muscles→ prognostic implications³
- Learned VD, Himman’s syndrome, non-neurogenic neurogenic bladder⁴

Fowler’s syndrome

- Young women
  - post menarche
  - Poly cystic ovary 40%
- High volume painless retention
- Apparently unconnected precipitating event
- All investigations normal, including MRI
- Not taking drugs, particularly opiate

Abnormal electromyographic activity of the urethral sphincter, voiding dysfunction, and polycystic ovaries: A new syndrome?

Chen J, Foxe, Timothy J, Christman, Christopher R, Chapple, Helen F, Tomassetti, Patrickrose, Roger H, Polly J, Jacobs, Howard J.

Fowler’s syndrome

Neurogenic injury/disease

<table>
<thead>
<tr>
<th>Vascular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strokes (ischaemic)</td>
</tr>
<tr>
<td>Degenerative</td>
</tr>
<tr>
<td>Parkinson’s Disease</td>
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<tr>
<td>Multi-system atrophy (MSA)</td>
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<tr>
<td>Demyelinating neuropathies</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
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<tr>
<td>Peripheral neuropathies</td>
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<tr>
<td>Guillain-Barré syndrome</td>
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<tr>
<td>Neurosyphilis (tabes dorsalis)</td>
</tr>
<tr>
<td>Herpes-Zoster/Herpes simplex</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>AIDS</td>
</tr>
</tbody>
</table>

Idiopathic Normal Ageing Unknown Factor in younger people

Aetiological factors In DUA/UAB

Iatrogenic
- Radical Pelvic surgery
- Radical prostatectomy
- Radical hysterectomy
- Anterior resection, abdominal-perineal resection
- Defunctioning colostomy
- Intravesical Phenol injections
- Radiation therapy

Functional Fowler’s syndrome Dysfunctional voiding

Myogenic Bladder outlet obstruction Diabetes

Pharmacotherapy Drugs with anticholinergic effects
- Anti-muscarinics
- Anti-histamines
- Anti-psychotics
- Anti-Parkinson’s medications
- Antidepressants
- Tricyclic antidepressants
- Opioids
VOIDING DYSFUNCTION AFTER DELIVERY AND RADICAL PELVIC SURGERY

Montse Espuña-Pons, MD, PhD
Senior Consultant Gynaecology, ICGON, Hospital Clinic, FCRB.
Associated Professor, University of Barcelona.
Barcelona, Spain

Introduction

• Urinary retention (UR) in postpartum or after gynaecological radical pelvic surgery can be only a transient problem or may be the aetiology of a persistent voiding dysfunction.

Two clinical situations may be observed:

A- Women who are unable to void spontaneously after a few hours of giving birth.

Acute postpartum urinary retention (APUR) can be a serious complication after childbirth, which can cause urogenital tract morbidity.

Postpartum urinary retention (PUR)

Two clinical situations may be observed:

B- Women with abnormal postvoid residual volume (PVRV) detected by ultrasonography or by catheterization after first spontaneous micturition*, with a spontaneous recovery after several days.

*Nearly half of the women may have a PVRV > 150 ml. after the first spontaneous void in immediate postpartum.

Postpartum urinary retention (PUR)

References:


Postpartum urinary retention (PUR)
Postpartum urinary retention: a systematic review of adverse effects and management


- No sufficiently powered and properly designed studies.
- Future research needs to include control groups and focus on long-term adverse effects.

Possible risk factors for PUR are:
- Episiotomy and large perineal tears, birth weight, primiparity, etc
- Epidural analgesia, opioid analgesia,

The pathophysiology of PUR is not well documented, but some suggestions may explain part of the problem.
Postpartum urinary retention (PUR)

- Women empty their bladders by relaxing the pelvic floor without a strong detrusor contraction.
- After a vaginal delivery, important changes in the anatomy and functionality of the pelvic floor may occur and as a consequence, urinary tract obstructive causes (periurethral edema).

Effects on pudendal nerve conduction

Epidural analgesia directly affects bladder sensitivity and contractility.

Diagnosis
Delivery-related risk factors for covert postpartum urinary retention after vaginal delivery

Fenke E. M. Mulder1, Katrin Oude Rengerink1, Jorria A. M. van der Puij1,2, Robert A. Bakker1,2, Jan-Paul W. R. Besselink3

Results Of 745 included women, 347 (47%) were diagnosed with covert PUR (PVRV <150 mL) of whom 197 (26%) had a PVRV ≥250 mL (75th percentile) and 50 (7%) a PVRV ≥500 mL (95th percentile). In multivariate regression analysis, episiotomy (OR 1.79, 95% CI 1.02 – 2.71), epidural analgesia (OR 2.08, 95% CI 1.36 – 3.19) and birth weight (OR 1.03, 95% CI 1.01 – 1.06) were independent risk factors for covert PUR. Opioid analgesia during labour (OR 3.19, 95% CI 1.46 – 6.98), epidural analgesia (OR 3.54, 95% CI 1.64 – 7.64) and episiotomy (OR 3.72, 95% CI 1.71 – 8.08) were risk factors for PVRV ≥500 mL.

PUR. Opioid analgesia during labour (OR 3.19, 95% CI 1.46 – 6.98), epidural analgesia (OR 3.54, 95% CI 1.64 – 7.64) and episiotomy (OR 3.72, 95% CI 1.71 – 8.08) were risk factors for PVRV ≥500 mL.

Definition?
Postpartum urinary retention (PUR)

**Treatment**

**Acute postpartum urinary retention (APUR).**

- The main treatment is clean intermittent self-catheterization (CISC) taught by the specialized nurse.
- Patients followed up by telephone and appointments with uroflowmetry.

**Women with abnormal postvoid residual volume (PVRV)**

- If retention persists, multichannel urodynamics is performed.
- Multichannel urodynamics confirmed in most patients an acontractile detrusor and in a few cases associated with stress urinary incontinence.

**CONCLUSIONS**

- Routine measurement of the PVRV is not established.
- Increased vigilance is required in the primigravid patient with an epidural.
- Early detection of voiding dysfunction prevents bladder atony.
- In most cases PUR resolves early, but PUR can persist.

**Conclusions**

Episiotomy, epidural analgesia and birth weight are risk factors for covert PUR. We suggest that the current cut-off values for covert PUR should be reevaluated when data on the clinical consequences of abnormal PVRV become available.
**CONCLUSIONS**

- It's important to increase the awareness amongst postnatal staff.
- CISC is well tolerated by most patients.
- Patients, who complain of subjective voiding difficulties at follow-up after PUR need an early referral to the specialized units.

**Postpartum urinary retention (PUR)**

**VOIDING DYSFUNCTION AFTER GYNAECOLOGICAL RADICAL PELVIC SURGERY**

**Impact of the radical surgery for cervical cancer on bladder function**

Extensive lymphadenectomy and **paracervical resection** are considered the main causes of postoperative LUT dysfunction.

**Impact of the radical surgery for cervical cancer on bladder function**

Women after RH had significantly more:
- voiding dysfunction
- urinary incontinence

**LOW URINARY TRACT SYMPTOMS AND URODYNAMIC OBSERVATIONS**

**VOIDING DYSFUNCTION**

- 15% of patients after RH require urethral catheterization for more than 30 days.
- Manchana et al (2009)
• A cohort of 333 women operated for cervical cancer, stage 1B and 2A, with radical hysterectomy from 1983 to 2000.
• Retrospective and lack of a control group.
• Follow-up 5 years after the operation.


SYMPTOMS OF DIFFICULT VOIDING AFTER SURGERY

• 123 / 333 (36%)


Early postoperative voiding dysfunction

Comparative Study of Laparoscopically Assisted Radical Vaginal Hysterectomy and Open Wertheim-Meigs in Patients With Early-Stage Cervical Cancer

Eleven Years of Experience

José Pabón, PhD, Sergio Martínez-Román, PhD, Aureli Tomé, PhD, Pete Fusi, MD, Inmaculada Alonso, PhD, Jose Antonio Lázaro-Cáceres, PhD, and Joan Balasch, PhD

(Int J Gynecol Cancer 2010;20: 173–178)

The two cohorts, CCS and reference group, both comprised 242 women each.

1. 146 CCS had been treated with radical hysterectomy and pelvic lymph node dissection (RH and LND).
2. 49 underwent surgery and adjuvant radiotherapy (SART).
3. 47 underwent primary radiotherapy (PRT).

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Prevalence of LUTS

Table 1: Prevalence of pelvic floor symptoms in CCS treatment group (in %) and odds ratios (95% confidence interval) compared to their matched references.

<table>
<thead>
<tr>
<th>Condition</th>
<th>RH and LND (n=194)</th>
<th>SART (n=49)</th>
<th>PRT (n=47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDI:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary frequency</td>
<td>30 (11-0.0)</td>
<td>42 (0.0-0.1)</td>
<td>71 (0.0-0.1)</td>
</tr>
<tr>
<td>Urinary urgency</td>
<td>18 (0.0-0.1)</td>
<td>48 (0.0-0.1)</td>
<td>78 (0.0-0.1)</td>
</tr>
<tr>
<td>Urinary incontinence</td>
<td>40 (0.0-0.1)</td>
<td>58 (0.0-0.1)</td>
<td>57 (0.0-0.1)</td>
</tr>
<tr>
<td>Stool frequency</td>
<td>60 (0.0-0.1)</td>
<td>76 (0.0-0.1)</td>
<td>53 (0.0-0.1)</td>
</tr>
<tr>
<td>Defecatory incontinence</td>
<td>45 (0.0-0.1)</td>
<td>45 (0.0-0.1)</td>
<td>25 (0.0-0.1)</td>
</tr>
<tr>
<td>Abnormal defecation pattern</td>
<td>51 (0.0-0.1)</td>
<td>25 (0.0-0.1)</td>
<td>43 (0.0-0.1)</td>
</tr>
<tr>
<td>Frequency</td>
<td>13 (0.0-0.1)</td>
<td>13 (0.0-0.1)</td>
<td>26 (0.0-0.1)</td>
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</table>

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**LUTS: PREVALENCE IN CCS COMPARED WITH MATCHED REFERENCES**

**DIFFICULTY EMPTYING BLADDER 30-45%**

- All patients treated had **significantly higher risk** than the reference group:

1. RH and LND: OR 6.2 (2.0-5.3)
2. RH and LND with adjuvant radiotherapy: OR 7.2 (2.4-21.2)
3. Primary radiotherapy: OR 4.7 (1.4-15.6).

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**Distressing LUTS**

**Table 1**

<table>
<thead>
<tr>
<th>Condition</th>
<th>CCS Prevalence (%)</th>
<th>CCS Matched Reference Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary incontinence</td>
<td>34 (16-71)</td>
<td>29 (14-60)</td>
</tr>
<tr>
<td>Overactive bladder</td>
<td>6 (3-14)</td>
<td>6 (3-14)</td>
</tr>
<tr>
<td>Distressor voiding</td>
<td>28 (13-50)</td>
<td>28 (13-50)</td>
</tr>
<tr>
<td>Unbladderated pns</td>
<td>18 (9-36)</td>
<td>18 (9-36)</td>
</tr>
</tbody>
</table>

Hazewinkel et al. / Gynecologic Oncology 117 (2010) 281–286

---

**Decreased detrusor muscle contraction** is common urodynamic observation after radical hysterectomy.

Most patients use abdominal straining or double voiding for emptying the bladder.

---

**LUTS: INCOMPLETE EMPTYING (45-51%)**

All patients treated had **significantly higher risk** than the reference group:

1. RH and LND: OR 3.2 (2.0-5.3)
2. RH and LND with adjuvant radiotherapy: OR 2.5 (1.1-5.9)
3. Primary radiotherapy: OR 4.3 (1.6-11.1).

Hazewinkel et al. / Gynecologic Oncology 117 (2010) 281–286

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**Long-term lower urinary tract dysfunction after radical hysterectomy in patients with early postoperative voiding dysfunction**

Thirty patients at least 2 years after radical hysterectomy were evaluated with multichannel urodynamic studies.

**Before:** 3/25 (12%)

**After:** 14/30 (47%)

---

**Long-term lower urinary tract dysfunction after radical hysterectomy in patients with early postoperative voiding dysfunction**

**Urethral catheterization > 30 days**

To compare long-term lower urinary tract dysfunction after radical hysterectomy in patients:

(A) with early postoperative voiding dysfunction.

(B) without early postoperative voiding dysfunction.
URODYNAMIC OBSERVATIONS

DECREASED DETRUSOR PRESSURE

• Detrusor pressure at maximum flow significantly decreased in patients after surgery, but without a difference between groups A and B.

CONCLUSIONS:

• LUTS and urodynamic dysfunctions are common after radical surgery for cervical cancer.
• There is a need for improving the information to the patient before and after radical hysterectomy.
• Special attention for patients who are at high risk of later urogynaecological problems.

Impact of the radical surgery for cervical cancer on bladder function

CONCLUSIONS:

• Assessment in the pre and posttreatment is important for detect distressing symptoms, which will likely enhance patients’ quality of life
• Pre- and post-operatively, patients must get information about how reducing risks of LUTS (loosing weight, emptying the bladder appropriately, and exercising the pelvic floor muscles).
There is no strong consensus on the evaluation of FUR since the pathophysiology is poorly understood.

- On average women with FUR are seen by three hospital consultants before a diagnosis is made.
  - Kavia, RBC et al, BJU INT, 2006
- Etiology may be multifactorial:
  - Transient causes or,
  - Detrusor underactivity or,
  - Increased outlet resistance
  - Mixed
  - Unexplained (idiopathic)

Goals of evaluation (1)

To ensure bladder emptying until evaluation is completed and management of retention is succeeded.

- Foley catheterization is usually the choice for acute retention
- CIC should be preferred for periods longer than one week
- Long-term indwelling catheterization is advised only for frail pts when CIC cannot be performed

Goals of evaluation (2)

To assess the upper urinary tract (UUT) and take the necessary measures to prevent any further damage during evaluation process.

- Bladder emptying with CIC is the mainstay of UUT protection
- Ultrasound: Basic imaging modality to assess the UUT
- Renal function tests are needed in long term retention

Goals of evaluation (3)

To find out the etiology in order to treat FUR.

- Transient causes
- Persistent FUR
  - Will need more invasive neuro-urological evaluation such as UDS, cystoscopy and sphincter EMG
- Evaluation goes together with treatment since treatment also starts with CIC
  - Enables to monitor PVR
- FUR will resolve in a group of patients just with CIC after transient factors are eliminated
Transient causes of FUR

Invasive tools such as invasive UDS or cystoscopy should be delayed if transient causes are present

- Immobility (especially postoperative)
- Constipation or fecal impaction
- Medications
- Urinary tract infections
- Delirium
- Endocrine abnormalities
- Psychological problems
- Clot retention
- Post-partum urinary retention

In fact, half of the women presenting with retention will void normally after transient factors are eliminated

Conclusions: The number of female retentions encountered in our practice is fairly high, with very few of these fitting the criteria for sacral nerve stimulation. In a third no aetiology was found. Approximately half of those who successfully voided did so with no treatment.

Basic steps of evaluation (1)

Detailed history

- Symptoms
  - Abdominal discomfort,
  - Emptying phase symptoms,
  - Recurrent urinary tract infections,
  - Incontinence

- Onset: acute or chronic
  - In chronic cases, some pts may not be aware of retention
  - High level of anxiety is seen in acute cases

Basic steps of evaluation (2)

Detailed history

- Childhood voiding history
- Previous surgery
  - Anti-incontinence or other pelvic surgeries
- Co-morbidities
  - Hormonal status, DM
- Medications that cause retention
  - SSRI, alpha agonists, anticholinergics, calcium channel blockers, opioid analgesics, psychotropic drugs
- Constipation
- Gynecological history
  - PCO, endometriosis

So, transient factors should be carefully assessed and more invasive evaluation should be spared for persistent cases.

Conclusions: In our experience, AUR in the female is mainly related to underlying neurologic/urogynecologic disease, even though the etiology could not be known in a significant percentage of patients. Half of the patients recovered completely and did not require any treatment.

The type of onset and age

There is a specific event that triggers FUR in about half of the pts
Basic steps of evaluation (3)

Physical examination
- Abdominal and sacral examination
- Pelvic examination
- Urethra, prolapse
- Focused neurological examination

In prolonged cases:
- Renal function tests and urine analysis
- Cystoscopy
- Invasive urodynamics and sphincter EMG
- Advanced neurological tests

Urodynamic studies

Uroflowmetry and PVR measurement
- In pts who are not in complete retention
Cystometry and PPS with anal sphincter EMG
- Detrusor underactivity is the most common finding
- PFS are not always helpful
Urethral Pressure Profile
- Fowler’s syndrome is associated with high urethral closing pressure in UPP and sphincter volume on US
Video-urodynamics: should be preferred when available

"Since no test can accurately differentiate neurologic from non-neurologic female urinary retention, careful neuro-urologic evaluation will help guide to more appropriate management.”

Problems with PFS

Women empty their bladders by relaxing the pelvic floor,
- sometimes with the additional help from the abdominal muscles
- without a strong detrusor contraction compared to men.
Small changes in Pdet may define BOO
- Difficult to develop reliable diagnostic nomograms
Many women cannot void in PFS
- Obstructive effect of the cath.
- Unnatural environment

Neurological evaluation

Starts with the focused neurological examination by the urologist
Neurology consultation is needed in persistent cases without an anatomic obstruction
MRI of the central and peripheral nervous system is the most commonly utilized radiological method to reveal certain neurological diseases
- MS, tumors, vertebral congenital and acquired pathologies

Special Tests for the Dx of NBD

Bladder-cooling reflex; the ice water test
- show value in the diagnosis of NLUTD and in the differentiation between reflexic and areflexic neurologic bladder (LOE 2, ICI 2013).
Bethanechol supersensitivity test
- may contribute to overall evaluation of neurologic LUT dysfunction. (LOE 2, ICI 2013)
Sphincter EMG
- can be valuable in the diagnosis of patients with neurologic bladder dysfunction (LOE 2, ICI 2013).
Others: Nerve conduction studies, SSEP
- Recommendation of grade C, ICI 2013

Concentric needle EMG of the external urethral sphincter

The test that diagnoses Fowler’s syndrome (1985)

The EMG abnormality was called “decelerating bursts and complex repetitive discharges”
- a muscle membrane disorder,
- primary disorder of sphincter relaxation
Increased urethral afferent activity that inhibits the passage of bladder afferent signals to the brain
- poor sensation, large bladder capacity and DUA
Concentric needle EMG of the external urethral sphincter

Normal resting interference pattern with 3 or 4 motor units firing tonically

Increasingly expanding time base from 30 to 3 milliseconds per division, so that waveform of complexes firing repetitively becomes apparent and forms burst discharge (top)

UPP and TV-US may predict EMG abnormality in idiopathic FUR

Concentric needle EMG is not commonly performed
• requires special equipment
• technical expertise
• experienced investigator

MUCP and urethral sphincter complex volume on TV-US are higher in women in urinary retention who have the characteristic EMG abnormality
• hypothesis is that overactivity leads to enlargement of the striated element of the sphincter complex

High-level of comorbidities in Fowler’s syndrome is intriguing

Of 62 patients with Fowler’s syndrome, 50% had unexplained chronic pain syndromes,
• 19% of these were taking opiates.
Abdominopelvic surgery with general anesthesia was the leading trigger (35%).
24% had “functional” neurological symptoms such as non-epileptic attacks or leg weakness.
30% had psychological symptoms

An algorithm for the evaluation of FUR

Initial evaluation
Detailed history, physical examination, laboratory and PVR measurement, uroflowmetry, and renal ultrasound; mental health screening; neurology, gynecology, and psychiatry consultations, if necessary at any point

Transient FUR
Treat the transient causes

Persistent FUR
Start CIC
Consider indwelling cath in the frail
A good quality (video)urodynamic study and cystoscopy

Obvious anatomic causes
Consider surgical correction

Neurogenic bladder/sphincter dysfunction
Manage the NBD

Idiopathic retention
Further evaluation for Fowler’s Syndrome or psychogenic urinary retention

Conclusions
The multi-factorial etiology of FUR is complicated and poorly understood.
A considerable amount of pts with FUR have transient causes that can be diagnosed or treated by or during a structured clinical evaluation.
CIC with elimination of transient causes will be enough to cure half of the patients.
Conclusions

A good quality (video) UDS and cystoscopy should be considered in persistent FUR

A multidisciplinary teamwork is favored:

- Urologist
- Physiotherapist
- Neurologist
- Gynecologist
- Psychiatrist
- Gastroenterologist/general surgeon

Do not......

Do not perform excessive urethral dilatation

- Most common cause of female urethral stenosis is iatrogenic
  - The most common urodynamic finding in FUR is detrusor under-activity

Do not label idiopathic cases as psychogenic without completing the psychiatric and neurological work up

Thank you
Urinary retention in women
Conservative management

C. Naranjo-Ortiz, PT, PhD

Affiliations to disclose†:
ICS TRUSTEE

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☐ Self-funded
☒ Institution (non-industry) funded
☐ Sponsored by:

† All financial ties (over the last year) that you may have with any business organisation with respect to the subjects mentioned during your presentation.

Urinary Retention (UR) in women
Prevalence and etiology

UR
• Acute ➔ Postsurgical or anaesthesia
• Chronic ➔ Neurologic, anatomic, inflammatory, functional and idiopathic

PREVALENCE
• Unknown in general (both types)
• Urodynamic reported ➔ 12% - 17%

Wennbec, AI et al., 2009

UR in women

Why UR occurs?

Urethra fails to relax
Additional infravesical resistance is present
Failure in the synchronization of detrusor contraction and urethral relaxation

Detrusor unable to contract

Soumendra, N et al, 2007

Acute UR in women

Painful or painless ➔ Depends on neurological status
Sudden onset
Requires catheterization

Rena, D et al., 2014

Chronic UR in women

Urinary tract infection
Reduced sensation
Urgency, incontinence
Frequency, nocturia
Straining to void

Chapple, CR et al., 2008
Clinical evaluation of the Pelvic Floor Muscles (PFM)

- Palpation
- PFM strength
- PFM coordination

Ultrasound (US) imaging

- Perineal US
- Static
- Dynamic

Electrophysiology

- Superficial electromyography PFM
- With or without flowmetry

PFM assessment

In order to return to normal bladder function

Chronic UR in women
Conservative management

Recommended about three months of conservative management

Hsieh, J. et al., 2014

PHYSIOTHERAPY

PFMT → Relaxation techniques

OTHER AIDS

- Behavioural treatment: Life-style changes
- Clean intermittent self-catheterization

PFM work synergistically with deep abdominal muscles, multifidi muscles and respiratory diaphragm

Coactivation between PFM and transverse abdominis (TA)

Adherence is very important

Feedback and biofeedback

Feedback is essential in motor learning

Biofeedback techniques: verbal, visual, manometric, EMG, US, etc.

Biofeedback can be used for autonomic functions

Electrical Stimulation

Improve micturition coordination

Relax PFM overactivity

Stimulate afferent fibers to convey bladder filling sensation

Stimulate efferent fibers to induce bladder contraction

Stimulate afferent fibers to induce bladder contraction

Re-educate and condition PFM
**Behavioural treatment:**
Life-style changes

- Active use of PFM is a key voiding skill
- Altering voiding habits, fluid intake and other aspects of life-style
- Behavioural treatment are usually comprised of several components and tailored to the needs of the individual women

Vahr, S et al., 2013

**ADHERENCE**

- Continued adherence is key to maintaining PFMT effectiveness
- Poor adherence results in a longer term decline in effect

Dumoulin, C et al., 2015

**TAKE HOME MESSAGES**

- PFMT adherence should be monitored for attendance, home-exercises adherence and proper clinical intervention, and follow-up.

- Patient-focused strategies targeting different PFMT strategies:
  - influencing the intention to adhere,
  - selfefficacy,
  - positive attitude towards exercises,
  - perceived benefits,
  - integration of PFMT into daily activities.

DOMO ARIGATO GOZAIMASU

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Management of Female Urinary Retention - Medical and Surgical

Christopher Chapple
Consultant Urological Surgeon
Sheffield Teaching Hospitals
NHS Foundation Trust
UK

Causes of female Retention

- ANATOMICAL
  - Gynae; POP, fibroids
  - Post surgical
  - Urethral stenosis/diverticulum
  - Ureterocoele
  - Foreign body

- FUNCTIONAL
  - Underactive Bladder
  - Bladder neck obstruction
  - Pseudodyssynergia
  - Neurological
  - Fowler’s syndrome

Disturbances or defects could occur at multiple sites: CNS control, normal sensation and smooth muscle activity even involving the extracellular matrix can lead to DUA

Aetio-pathogenesis of Detrusor Underactivity

Neurogenic injury/deficit
- Vascular
- Trauma (nerve, vessel)
- Degenerative
  - Parkinson's Disease
  - Multi system atrophy (MSA)
- Enzymatic abnormalities: Neuronal disorders
  - Genetic disorders
  - Drugs
  - Alcohol
  - Certain drugs for cardiovascular, mental illness, pain, cancer

Mechanic
- Bladder outlet obstruction due to BPH
- BPH
- Detrusor Myocyte Extracellular matrix

Diabetes mellitus
- Normative Aging

Neurological disease or injury

Neuropathic injury
- Peripheral nerve injury
- Multiple sclerosis
- Guillane-Barr syndrome
- Diabetes mellitus
- Neurosyphilis
- Herpes zoster
- Neurologic disease or injury
- Sacral cord and cauda equina lesions
- Spinal cord and cauda equina injuries
- Traumatic
- Intra vertebral disc prolapse
- Spinal canal stenosis
- Spinal cord injury
- Sacral fracture
- Pelvic fracture

Idiopathic
- Normal ageing
- Bladder cancer

Functional
- Fowler's syndrome
- Dysfunctional voiding
- Idiopathic
- Normal Ageing
- Unknown factor in younger people

Aetiological factors
In DUA/UAB

Diabetic Neuronal injury
Neuromuscular junction dysfunction
Neuropathy
- Motor neuropathy
- Sensory neuropathy
- Autonomic neuropathy
- Diabetic polyneuropathy
- Diabetes melitus
- Vascular

BPH
- Bladder outlet obstruction due to BPH
- Prostatic hyperplasia
- Lower urinary tract symptoms

Diabetes mellitus
- Normative Aging

Failure of Integrations of processing
- Impaired activation of detrusor myocytes
- Impaired efferent pathways
- Detrusor overactivity

Detrusor Underactivity
Method

Intermittent self-catheterisation

1) Real time indication of Detrusor shortening

Specifically when frequent and/or serious possible side effects are taken into account

Combination therapy with a cholinergic drug and an α1-Adrenoceptor antagonist

Voluntary stop test

Median residual volume decreased

Straining?

UTI, urethral trauma, urethritis, epididymo-orchitis

Relaxation time of striated sphincter is shorter than the contraction

Achieved long-term urinary control

Benzodiazipines

Conservative management

1) Behavioral interventions

- Scheduled voiding
- Double voiding
- Straining

2) Pelvic floor physiotherapy and Biofeedback

3) Catheterisation

- Intermittent self-catheterisation
- Indwelling (suprapubic) catheter

Physiological Measures

<table>
<thead>
<tr>
<th>Type of Measurement</th>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous occlusion</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mechanical stop test</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Detrusor pressures</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Calculations

\[
v_{\text{det}} = \frac{Q}{2 \left[ \frac{3}{V + V_{t}} \right]}^{4 \pi}
\]

Substantiated parameters: bladder growth and DU

Both groups significant differences in DU

\[
WF = \left[ (pdet + a) (vdet + b) \right]^{P_{\text{det}}@Q_{\text{max}} + 5Q_{\text{max}}}
\]

○ BCI (strong>150, normal 30-150)

Pharmacological agents to facilitate bladder emptying

No effective pharmacotherapy for UAB exists

- Anticholinergic agents (duloxetine, darifenacin)
- Prilocagluride
- 5 α-Reductase Inhibitors
- α-1 blockage

Decreasing outlet resistance:

- α1-adrenergic receptors antagonists (phenoxybenzamine, prazosin, terazosin / doxazosin, alfuzosin / tamsulosin, silodosin)
- B-blockers
- Betablockers
- Betamimetic agonists
- -2 agonist (for reducing prostatic size, e.g. flutamide)

- Available studies do not support the use of parasympathomimetics
- Specifically when frequent and/or serious possible side effects are taken into account
- Combination therapy with a cholinergic drug and an α1-blocker appears to be more useful than monotherapy

Catheterisation

Clean intermittent self-catheterisation:

- Most prevalent method of bladder management in patients with UAB

- Complications are compared with indwelling/suprapubic catheters
  - UTI, urethral trauma, urethritis, epididymo-orchitis and urethral bleeding

- However, many patients find the technique difficult

Electrical stimulation

**Brindley** device

- Transcutaneous stimulation + dorsal root section / sacral deafferentation
- Requires inner neural pathways and a bladder capsula of continence (generally used for SCI patients)

- Increasing strength

○ Relaxation time of denervated sphincter is shorter than the relaxation time of the distal smooth muscle

- Luminosity: voiding may occur in spaces at above normal bladder pressure

Sacral nerve stimulation

- In patients with micturition p<0.01, achieved continence in
  - Post-void residual volume <20 mL in 22/22 cases
  - Mean number of catheterisations: 4.2 ± 3.9 in 22 patients

Effective, but invasive

Intravesical Electrical Stimulation (IVES)

- Establishes conscious control of the initiation and completion of a micturition reflex
- Activates specific mechanoreceptors in the bladder wall
- Lowers the micturition threshold and reflex amplitude
- Randomized placebo-controlled trial lasting

- Achieved long-term normalisation of voiding in 20/24 (83%) children with idiopathic, and in 8/20 (40%) with neurorontic, antirretical, or idiopathic

- 10 daily 80 mL rinses (5 at 20 mL in 22 patients) followed by home treatment (2-3 times weekly) until bladder function normalised (further improvement

- To spontaneous children (at 1 month):
  - median residual volume decreased
  - median voided volume increased

- Effects stable for 2 years
- Catheterisation discontinued in 11/15 cases
**Surgical options**

- Trans urethral resection of prostate
- Intraspincteric Botulinum Toxin
- Reduction cystoplasty
- Detrusor Myoplasty

**Future directions**

1. Underactive bladder
   - prospective study correlating symptoms and signs with DUA
   - Development of patient-reported outcome measure

2. Detrusor underactivity
   - Consensus and validation of urodynamic diagnostic criteria
   - Development of non-invasive methods of new pharmacological therapy?

**Causes of female Retention**

- **ANATOMICAL**
  - Gynae; POP, fibroids
  - Post surgical
  - Urethral stenosis/diverticulum
  - Ureterocoele
  - Foreign body

- **FUNCTIONAL**
  - Underactive Bladder
  - Bladder neck obstruction
  - Pseudodyssynergia
  - Neurological
  - Fowler’s syndrome

**Conservative Treatment Options**

- Watchful waiting
- Intermittent catheterization
- Indwelling catheter
- Pharmacotherapy to control associated overactivity
- Dilation (??) – I do not recommend

**Definitive Treatment Options**

- **Midurethral Synthetic Sling**
  - Sling incision
  - Sling loosening (early)
  - Urethrolysis

- **Traditional Slings**
  - Sling Incision (PV sling)
  - Urethrolysis
    - Transvaginal
    - Retropubic
    - Suprameatal (infra pubic)
  - Cut suspension/sling sutures
    - No published peer-reviewed series

**Technique of Mid Urethral Sling Loosening 1-2 weeks**

- Infiltrate anterior vaginal wall with 1% lidocaine
- Open vaginal suture line
- The sling is identified and hooked with a right angle clamp
- Spreading of the right angle clamp or downward traction on the tape will usually loosen it (1-2 cm)
- If the tape is fixed, it can be cut
- Reapproximate vaginal wall

Vic Ntini personal communication
If the sling is difficult to identify, can go lateral to the midline especially for TO slings.

It is critical to identify the sling with certainty (consider pathologic confirmation).

Illustrations from Vaginal Surgery for The Urologist

Midurethral Synthetic Sling Incision

Obstructing Midurethral Sling at 11 months

Obstructing Midurethral Sling Complete Retention at 3 months

TVT Take Down Results

<table>
<thead>
<tr>
<th>N</th>
<th>Type</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Midline Incision</td>
<td>100% normal emptying</td>
</tr>
<tr>
<td>23</td>
<td>Midline Incision</td>
<td>100% normal emptying 50% complete, 70% partial resolution of storage sx</td>
</tr>
</tbody>
</table>

* Recurrent SUI in 6%
** Significant recurrent SUI 13%

TVT Take Down Results

<table>
<thead>
<tr>
<th>N</th>
<th>Type</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Midline Incision</td>
<td>84% 17%</td>
</tr>
<tr>
<td>32</td>
<td>Various</td>
<td>94% retention 9% 67% UUI</td>
</tr>
<tr>
<td>14</td>
<td>Midline Incision</td>
<td>93% 21%</td>
</tr>
</tbody>
</table>


Outcomes of Midurethral Sling Revision for Voiding Dysfunction: Multicenter Retrospective Study

- 175 patients (70% RP and 30% TO)
  - 54% cut (mean 71 days)
  - 29% excised (mean 102 days)
  - 18% pulled down (mean 9 days)

- Outcomes
  - Voiding symptoms resolved in 81%
  - Storage symptoms resolved in 75%
  - De novo SUI in 21%
  - De novo OAB in 12%

- Resolution of VD independent of method and timing of revision

- SUI less likely with early revision

Traditional Sling Incision Results

<table>
<thead>
<tr>
<th>N</th>
<th>Type</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
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<td>14</td>
<td>Midline Incision</td>
<td>93% 21%</td>
</tr>
</tbody>
</table>

Formal Urethrolysis: Indications after Sling Surgery
- Failed sling incision (any material)
- Inability to identify autologous or biological sling
- In certain cases where there is consideration to another sling in the same setting

Urethrolysis - Anatomy
- Urethra may be fixed to the pubic bone with dense scar tissue
- Goal of urethrolysis is to completely free & mobilize urethra

Transvaginal Urethrolysis
- Inverted U incision
- Lateral dissection above periurethral fascia
- Endopelvic fascia sharply perforated and retropubic space entered

Illustrations from Vaginal Surgery for The Urologist
Nitti VW, Rosenblum NB, Brucker BM Elsevier, 2012

Place penrose drain around the urethra

Transvaginal Urethrolysis
- Sharp and blunt dissection freeing the urethra from the undersurface of the pubic bone
- Index finger placed between pubic bone and urethra

Illustrations from Vaginal Surgery for The Urologist
Nitti VW, Rosenblum NB, Brucker BM Elsevier, 2012

Optional - Interposition of Martius Flap
**Retropubic Urethrolysis**
- Mobilization of urethra by sharp dissection
- Restore complete mobility to anterior vaginal wall
- Paravaginal repair
- Interposition of omentum between urethra and pubic bone

**Supravaginal Urethrolysis**
- Curved incision above the urethra

**Supravaginal Urethrolysis**
- Sharp dissection of urethra and bladder neck off pubic bone
  - Pubourethral, pubovesical “ligaments” incised
  - Retropubic space entered
  - Lateral attachments left
  - Care to avoid injury to autonomic nerves
- Martius flap

**Urethrolysis Results**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Type</th>
<th>Success</th>
<th>SUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foster &amp; McGuire</td>
<td>48</td>
<td>Transvaginal</td>
<td>65%</td>
<td>0</td>
</tr>
<tr>
<td>Nitti &amp; Raz</td>
<td>42</td>
<td>Transvaginal</td>
<td>71%</td>
<td>0</td>
</tr>
<tr>
<td>Cross, et al</td>
<td>39</td>
<td>Transvaginal</td>
<td>72%</td>
<td>3%</td>
</tr>
<tr>
<td>Goldman, et al</td>
<td>32</td>
<td>Transvaginal</td>
<td>84%</td>
<td>19%</td>
</tr>
<tr>
<td>Petrou, et al</td>
<td>32</td>
<td>Supravaginal</td>
<td>67%</td>
<td>3%</td>
</tr>
<tr>
<td>Webster &amp; Kreder</td>
<td>15</td>
<td>Retropubic</td>
<td>93%</td>
<td>13%</td>
</tr>
<tr>
<td>Petrou &amp; Young</td>
<td>12</td>
<td>Retropubic</td>
<td>83%</td>
<td>18%</td>
</tr>
<tr>
<td>Carr &amp; Webster</td>
<td>54</td>
<td>Mixed</td>
<td>78%</td>
<td>14%</td>
</tr>
</tbody>
</table>

**Repeat Urethrolysis**

**Urgency Incontinence**
- 2/16 (12%) resolved
- 11/16 (69%) improved - required anticholinergics
- 3/16 (19%) no improvement

**Stress Incontinence**
- 4/22 (18%) de novo SUI
- 2 had persistent SUI
- 5 women had bulking and 4 were improved

**Obstructing Sling Algorithm**
- Early Intervention (Mid urethral synthetic sling)
- Transvaginal Sling insertion: OK
- Transvaginal Urethrolysis
- Repeat Urethrolysis (possibly retropubic)
Summary

- Clinically significant obstruction after sling surgery incontinence surgery may not be “common” but occurs even in the most experienced hands.
- Sling incision and urethrolysis, by a variety of techniques, are successful in restoring emptying and relieving LUTS in a majority of cases.
- Some studies “suggest early rather than late is better.”
- The diagnosis is most often made based on clinical grounds rather than testing.

Causes of female Retention

- ANATOMICAL
  - Gynae; POP, fibroids
  - Post surgical
  - Urethral stenosis/diverticulum
  - Ureterocoele
  - Foreign body
- FUNCTIONAL
  - Underactive Bladder
  - Bladder neck obstruction
  - Pseudodyssynergia
  - Neurological
    - Fowler’s syndrome

Abnormal electromyographic activity of the urethral sphincter, voiding dysfunction, and polycystic ovaries: A new syndrome

Treatment of Fowler’s syndrome

- Stop all opioid analgesic drugs
- No established drug treatment
  - Alpha-1 antagonists and viagra poor outcome
  - PDE4 inhibitor theoretical potential
- Self catheterisation very poorly tolerated;
- Mitrofanoff procedure
- Sacral nerve stimulation

SNS in Fowler’s syndrome

- FDA/ NICE supported
- Some patients show marked improvement
- Physiological mechanisms unclear
- Cost
- Patient selection

Long term outcome of SNS

- 5 year data from 17 centres; 31 patients
- ISC fell from 5.3 (+/- 2.8) to 1.9 (+/- 2.8)
- Reduced mean catheterised volume
- At 5 years clinical success rate 58% (at least 50% reduction in symptoms)
- 78% of people responding at 1 year were still responding at 5 years.

Van Kerrebroeck et al. J Urol 2007; 178: 2029
EMG-negative Fowler's syndrome

- “Non-Fowler Fowler’s syndrome”
- Baclofen
- Supportive measures and follow up
- Mitrofanoff procedure

Causes of female Retention

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Pre-operative assessment
- How large is it?
- Is it asymptomatic?
- Only treat if symptomatic
- Physical examination
  - ? Cystocele
  - ? Stress incontinence
- ? Need for urodynamics
- Is there infection present?
  - MSU

Female urethral diverticula Treatment
- Palliative
  - Endoscopic incision
- Curative
  - Marsupialisation
  - Excision
  - Excision & Young – Dees reconstruction

Excisional Surgery - tips
- Sim’s Position rather than standard lithotomy
- Self retaining retractor – eg Parkes
- Good light
- Suction
- Infiltrate with fluid (adrenaline)

Urodynamic films and subsequent MRI
- note extension behind bladder
**Technique**

- ‘U’ Flap of vaginal mucosa
- Dissection of the diverticulum
- Closure in layers – careful repair of the urethra
- Martius flap
  - Overclosure of repair
  - Mitigate against stress incontinence
  - Facilitate subsequent sling procedure
Post-operative Management

- Remove vaginal pack & Martius donor site drain at 24 hours
- Suprapubic catheter
- Leave urethral catheter for 2-3 weeks
- Oral antibiotics until catheter removed

Results

69 patients underwent UD repair, the majority were mid urethral (46%) or distal (31%), often multilobulated. Median age was 40 years. Average size was 12mm (range 8-42mm). 26 patients had pre-existing SUI. 3 of these had fistulae after failed urethral surgery, 6 were recurrent UD, and 2 had received Tension-free Vaginal Tapes prior to referral.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysuria</td>
<td>75%</td>
</tr>
<tr>
<td>Pelvic pain</td>
<td>72%</td>
</tr>
<tr>
<td>Dyspareunia</td>
<td>50%</td>
</tr>
<tr>
<td>Frequency</td>
<td>46%</td>
</tr>
<tr>
<td>Pus PU</td>
<td>44%</td>
</tr>
<tr>
<td>SUI</td>
<td>38%</td>
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<tr>
<td>Urgency</td>
<td>34%</td>
</tr>
<tr>
<td>Infection</td>
<td>34%</td>
</tr>
</tbody>
</table>
Summary

- If symptomatic excise
- Prone position
- Martius Flap
- Subsequent autologous sling

Female strictures

- Rare
- Dilation
- Failing conservative management then urethrolasty
  - Vaginal flap
  - Oral mucosa

Surgical Options – Vaginal Flap

- Vaginal Flap urethroplasty first described in 1935
  - Harris Surg Gynec Obstet 1935 61: 366
  - Modified Ellis and Hodges J Urol 1969 102:214
- Urethral catheterisation
  - “U” flap in anterior vaginal wall
  - Stricture incised
  - Flap advanced avoids tunneling

Surgical Approach to the Urethra

- No guidelines or recommendations on this at present.
  - Evidence would suggest either a dorsal or ventral approach.
  - Consider Martius if intend inserting a sling
  - Consider sling at first operation if severely incontinent otherwise I favour a two stage approach.
  - Long term follow-up is important

Conclusions

- Female outlet obstruction is a varied group
- Anatomical and functional causes
- Post surgical retention; examination findings can guide suitable intervention
- Urethral stenosis manage as conservatively as possible
- Urethral diverticulum – manage with due attention to sphincter
- Fowler’s syndrome;
  - young women with painless retention
  - High MUCP and typical EMG