Non-urological causes for urinary retention

Clare J Fowler
Suprapontine
- Stroke
- Parkinson’s Disease
- Tumours
- Trauma
- Dementias

Pontine
- Tumours
- Stroke

Spinal
- Multiple Sclerosis
- Trauma
- Tumour

Sacral / Infrasacral
- Disc prolapse
- Tumour
- Pelvic nerve injury
- Small fibre neuropathy

Intrinsic defects
- CIPO – myopathic, neurogenic

• High residual volume unusual

Rare but can cause retention with brain stem signs

Most commonly DO but may get high RV + paraparesis

Acontractile detrusor + sacral root or neuropathy features
Pelvic Ganglia
Pelvic nerves
S3 root in cauda equina
Pudendal nerves
The reader must imagine that he is looking into the body along a line from the left anterior costal margin, emerging through the posterior iliac spine on the other side. The left roots are seen.

A central disc at L4.5 is capable of damaging all roots below L5. In fact the most anterior roots (L5, S2) are the most vulnerable.

A lateral disc at L4 will predominantly affect L5 root. Note the displaced root pouch. But this disc may also affect the S1 root. This probably accounts for the ankle jerk often being abolished with disc lesions at L4.5.
Small fibre neuropathies

- Diabetes
- Amyloidosis — inherited (FAP)/2ndary
- Immune mediated neuropathy
- Distal autonomic neuropathy
- Inherited disorders (HSAN)
Length dependent neuropathies

- Diabetic
- Amyloid
- HSAN
Suprapontine
- Stroke
- Parkinson’s Disease
- Tumours
- Trauma
- Dementias

• High residual volume unusual

Pontine
- Tumours
- Stroke

• Rare but can cause retention with brain stem signs

Spinal
- Multiple Sclerosis
- Trauma
- Tumour

• Most commonly DO but may get high RV + paraparesis

Sacral / Infrasacral
- Disc prolapse
- Tumour
- Pelvic nerve injury
- Small fibre neuropathy

• Acontractile detrusor + sacral root or neuropathy features

Intrinsic defects
- Chronic Intestinal – myopathic, neurogenic
- Pseudo Obstruction CIPO

• Acontractile detrusor with or without bowel symptoms
Analysis of causes of isolated urinary retention in 61 women

Panicker et al. 2009
History of FS

- Urethral sphincter EMG abnormality observed in 1985 with Roger Kirby when investigating patients admitted for Mitrofanoff
- Many of women had clinical features of PCO
- This was at a time when the prevailing view was that urinary retention in young women was a psychogenic disorder
Typical patient’s history

- Woman, early 20s, notices she has not passed urine for 24-48 hours
- Sometimes previous infrequent voider and intermittent stream but sometimes not
- No sensation of urgency but increasing discomfort with distension
- Straining doesn't help
- Goes to A&E - >1.5 L drained from bladder
Typical patient’s history

- Retention may recur and persist with recurrent UTIS
- S/B urologist and then neurologist
- Investigations, including MRI – NAD
- No upper tract complications or pre-menarche history
- May have polycystic ovaries – may be over androgenised, hirsuite and acne
- Taught CISC – often hates it - pain on removing catheter “something gripping”
Abnormal electromyographic activity of the urethral sphincter, voiding dysfunction, and polycystic ovaries: A new syndrome?

Clare J Fowler, Timothy J Christmas, Christopher R Chapple, Helen Fitzmaurice Parkhouse, Roger S Kirby, Howard S Jacobs
Fowler’s syndrome—a cause of unexplained urinary retention in young women?

Nadir I. Osman and Christopher R. Chapple

Abstract | Urinary retention in women is an uncommon and poorly understood condition. In 1986, Fowler and colleagues described a syndrome in young women with unexplained urinary retention associated with polycystic ovary syndrome. The underlying abnormality was a poorly relaxing external urethral sphincter that when studied using concentric needle electromyography showed a distinct abnormal pattern suggesting direct spread of impulses between muscle fibres. These findings were subsequently reproduced by other researchers and in larger patient cohorts, but remain the subject of much debate. A poorly relaxing sphincter is thought to cause increased urethral afferent activity, which inhibits bladder afferent signalling leading to poor bladder sensation and detrusor underactivity. Most studies of Fowler’s syndrome are limited due to small cohorts with no control group and a lack of videourodynamic data. Whether Fowler’s syndrome represents a distinct cause of urinary retention or results from a maladaptive behaviour and is similar to dysfunctional voiding is unclear. Application of sacral neuromodulation in patients diagnosed with Fowler’s syndrome can restore normal voiding, in the absence of any effective pharmacotherapy or surgical treatment.

CNE recording from US of woman with FS
Direct muscle to muscle - “ephaptic” transmission
Primary disorder of sphincter relaxation
Urethral pressure profile
Modification of original theory

• Cause of EMG abnormality remains unknown – hormonal milieu?
• Clinical picture is one of low pressure – never upper tract dilatation
• Discussions with Prof Chet de Groat - it is the effect of the sphincter’s contraction – mediated through afferents which inhibits detrusor contraction
“Pro-continence reflex”
Sacral neuromodulation
Mean maximum urethral closure pressure (MUCP) for 21 patients (1-14 IPG, 15-21 PNE), showing expected value (92-age) before and after neuromodulation (with pelvic muscles relaxed).
An fMRI study of the effect of sacral neuromodulation on brain responses in women with Fowler’s Syndrome.

- Restored activation of PAG
  - gateway to brain
  - restored bladder signals
- and right insula
  - seat of bladder sensation
- Patients report restored sensation
  - (and ability to void)

Older PET and newer fMRI study showed similar PAG behavior with SNM

Kavia et al. BJU Int 2010;105:366-72
Fowler’s syndrome

higher brain centres

PAG

Sacral cord

SNM

urethral afferents

bladder efferents

bladder afferents
Success of SNM over time

From Spinelli

Neurogenic LMNI

“fowler”

“non fowler” ?
Hypothesis

Fowler’s syndrome is due to sacral cord encephalin intoxication
“Pro-continence reflex”

Fowler’s syndrome
Opiates and the bladder

• Retention is particularly common following epidural analgesia.

• After epidural administration of morphine urinary retention was more common than following the administration of equivalent doses given intramuscularly or intravenously.

• Opioids interact with receptors in the sacral cord resulting in the inhibition of sacral parasympathetic outflow, impairing detrusor contraction and so causing urinary retention.
Bladder symptoms of FS are similar to those of retention following administration of opiates i.e. insensate, acontractile bladder
Patient

- Pelvic/musculoskeletal pain
- Investigated over many months by gynaecologists/orthopaedic surgeons – all NAD
- Referred to pain clinic – started on symptomatic analgesics
- Onset of retention - no explanation
- Referral letter mentions “complex” case
- Long list of medication including opiates
Urinary retention in 55 patients
Dec 2009-June 2010

Taking opiates

Number

FS
female
male

Age (years)

From 1997 to 2007, the milligram per person use of prescription opioids in the U.S. increased from 74 milligrams to 369 milligrams, an increase of 402 percent.

In addition, in 2000, retail pharmacies dispensed 174 million prescriptions for opioids; by 2009, 257 million prescriptions were dispensed, an increase of 48 percent.

The Possible Role of Opiates in Women with Chronic Urinary Retention: Observations from a Prospective Clinical Study

Jalesh N. Panicker,* † Xavier Game, Shahid Khan, Thomas M. Kessler, Gwen Gonzales, Sohier Elneil and Clare J. Fowler‡

Journal of Urology 2012, 188, 480-484,
Fowler’s syndrome

- Urethral afferents
- Sacral cord
- Encephalins
- Higher brain centres
- Opiates
Response to sacral neuromodulation

- Retrospective analysis of the outcome of “2-stage” SNM in 100 women with chronic urinary retention.
- 25 were on opiate medications
- 8 of 25 had been diagnosed as FS on the basis of history, a raised UPP and abnormal sphincter EMG
  8 more had a suitable history and raised UPP but sphincter EMG not done.
- the use of opiates was shown to have no effect on the outcome of stage 1 or stage 2
Concluding Hypothesis

• Fowler’s syndrome is probably due to sacral cord encephalin intoxication and exogenous opiates compound the underlying abnormality.
• The mechanism of action of SNM is to provide antagonism at synapses in the cord or PAG to the effect of abnormal neurotransmitters common to both FS and opiate takers (presumed encephalins).
Current situation

• “Psychogenic or hysterical retention” not listed in textbooks, but research is in progress to see if there is an association with other non-organic symptoms.

• Urinary retention in women ≈ FS. Wrong – there should be positive features

• Demonstrated responsiveness to SNS means this has become optimal treatment and alternative to intermittent catheterisation and recurrent UTIs
Thank-you for your attention