Urinary incontinence

Common

May be:

- Nocturnal or diurnal
- Intermittent or continuous
- Primary or secondary
- Organic or functional

Typically presents in one of three ways:

1. Purely night-time wetting
   - Primary monosymptomatic enuresis **always functional**. Secondary nocturnal enuresis usually functional; occasionally organic 2' to BOO or neuropathic bladder
2. Intermittent daytime wetting
   - **Typically functional**. Occasionally organic 2' BOO/neuropathy
3. Continuous daytime wetting
   - **Always organic**. Neurological or structural. Structural causes include epispadias, ectopic ureter, short urethra, urovaginal confluence.

NB. Any duration of dryness excludes ectopic ureter, female epispadias, urovaginal confluence, short urethra. Dribbling *between* voids may be associated with ectopic urethra or more commonly labial adhesions.

Always ask about bowel function in addition to above features

Physical examination

Abdominal	palpable bladder/kidneys
Male genital	epispadias, phimosis, meatal stricture
Female genital	epispadias, urovaginal confluence, imperforate hymen, labial adhesions
Spine	hairy patch, swelling, haemangiomata, sacral agenesis. UMN lesion (brisk reflex or clonus), calf wasting, lower limb neurology

Other examination

- USS and urine dipstick in all patients
- Occasionally MRI and UDS for neuropaths

<u>Organic daytime urinary incontinence</u>

UTI	intermittent	
Bladder outflow obstruction*	intermittent	
Neuropathic bladder	intermittent	continuous
Hinman syndrome	intermittent	continuous
Exstrophy-epispadias		continuous
Ectopic ureter		continuous
Congenital short urethra**		continuous
Urovaginal confluence		continuous

* Bladder outflow obstruction

- Uncommon
- Boys > girls
- Boys
  - Posterior valves

- Urethral stricture
- Meatal stenosis
- Pathological phimosis (rare)
- Constipation/tumour

Girls

- Haematocolpos
- Hydrocolpos
- Constipation/tumour

Incontinence typically 2' to obstructive detrusor overactivity rather than decompensation with overflow (except constipation/tumour)

Investigation

- PMR
- Flow rate
- EUA and cystoscopy in selected cases

** Congenital short urethra

Continuous urethral leakage

Diagnosis confirmed by cystourrethroscopy

<u>Functional daytime urinary incontinence</u>

Relatively common

3% girls and 2% boys of 7 years wet at least one day per week.

Of these 30% girls and 50% boys also wet at night

May be divided into dysfunctional storage or dysfunctional voiding

Dysfunctional storage (characterised by detrusor instability)

- Urge syndrome
- Diurnal frequency syndrome/sensory urgency
- Giggle incontinence

Dysfunctional voiding (often characterised by detrusor sphincter dyssynergia)

- Staccato voiding
- Deferred voiding/lazy bladder syndrome
- Occult neuropathic bladder (Hinman syndrome)

1. Urge syndrome

? persistence of transition phase to maturity voiding such that detrusor inhibition is volume related

End-filling detrusor instability typical; short duration from first sensation to incontinence. Absence of bladder overactivity = sensory urgency

Re-inforcement manoeuvres common (Vincent's curtsey sign)

Urinary stream typically smooth (vs. staccato)

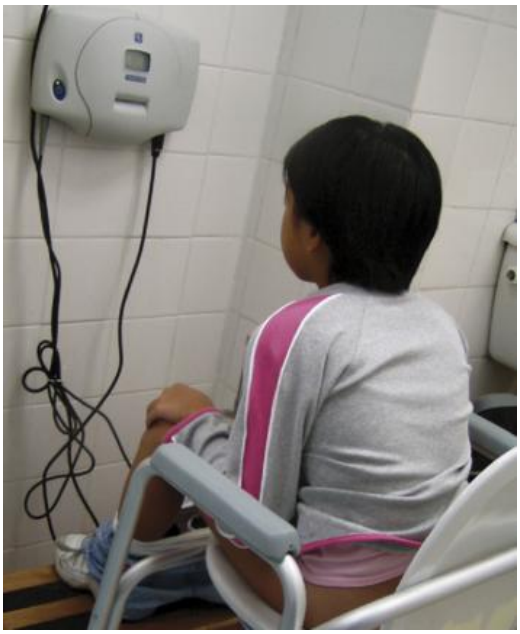
Natural history to resolution (2-3% persist into adulthood)

USS/MSU (occasionally UDS)

Mx

- Reassurance
- Pads
- Oxybutynin (60-70% effective: fewer side effects cf. adults)
- Bladder retraining
  - Simple
    - Timed fluid intake
    - Timed voiding

Biofeedback
Pelvic floor relaxation etc
Children over 8 yrs



2. Giggle incontinence
   Inherited
   Typically girls 9-12 yrs
   Leakage may be significant
   Often persists into adulthood
   Modest improvement with anticholinergics: Ritalin (methylphenidate) most effective treatment but controlled drug

3. Dysfunctional voiding
   Believed by some to represent an abnormal learned response to urge syndrome: sustained attempts to prevent leakage in response to OAB leads to failed sphincter relaxation or DSD
   Bladder emptying incomplete
   High intravesical pressures predispose to VUR +/- scarring
   Mx as for urge syndrome with ISC for high residuals

4. Lazy bladder syndrome
   Long-standing dysfunctional voiding results in decompensation
   Increased compliance and decreased contractile efficiency leads to floppy bladder, chronic retention and UTI
   Rx with cognitive bladder retraining +/- ISC

5. Hinman syndrome
   aka occult neuropathic bladder
   Children typically present with dysfunctional voiding leading to eventual decompression, poor compliance, overflow incontinence and upper tract changes.
   Majority have bowel dysfunction (constipation, impaction)

Bladder displays all features of neuropathic bladder without an obvious cause
detrusor-sphincter dyssynergia
'fir-tree' bladder on cystography (sacculation)
upper tract dilatation (> 60%; VUR in 50%)

occasionally obstructive uropathy
Traditionally believed to be functional disorder 2' severe emotional upset (Hinman 1973): however similar features in Ochoa urofacial syndrome (Ochoa 1992) suggest subtle defect at brainstem level (facial LMN located close to pontine micturition centre)
bladder – Mx as for neuropaths (see notes)

<u>Primary monosymptomatic nocturnal enuresis</u>
Definition: wet at night over the age of five. Secondary enuresis = wet at night after 6 month symptom-free interval
Natural history
85% of 5 year-olds are dry at night
Approximately 10% 7 year olds wet bed > 3 x per week
10-15% per year resolve
7% of those who wet after 5 years old continue into adulthood
Two thirds boys
Positive FHx in 75%
Features
Impaired functional bladder capacity
Impaired noctural secretion of vasopressin
Impaired sleep arousal
Management
Supportive measures first
Counselling
Fluid restriction before bed
Double voiding before bed
Lifting may help
Behavioural modification
Star chart for young children
Enuretic alarms
Age 7 or above
70% success rate
Low relapse rate
Usually available from school nurse
Requires no pants/nappy in bed
Can malfunction/alarm if lead detached
Medication
Desmopressin
desmospray 10-40ug, desmotabs 200-400 ug, desmomelt 125-250ug
70% success rate
30-50% relapse rate
good for FHx and primary cases; poor when late onset or diurnal symptoms

useful for special occasions

Anticholinergics

may be useful in patients with a low bladder capacity.

oxybutynin first line

imipramine a/w cardiotoxicity and death in OD - avoid

Appendix

Voiding co-ordinated at pontine micturition centre in brainstem – not simple spinal reflex as previously believed

3 sets of peripheral nerves involved

1. thoracolumbar sympathetic (T10 – L2)
   via sympathetic chain and hypogastric nerves
2. sacral parasympathetic nerves (S2,3,4)
   via pelvic nerves
3. sacral somatic outflow (S2,3,4)
   via pudendal nerve

Evidence of innate influence of higher centres even in infants – infants only void during wakefulness (Ohel 1995): never when fully asleep.

Voiding frequency vs. age

Foetal (third trimester)	30 per 24 hours
First year	20 per 24 hours
2 – 3 years	10 per 24 hours
7 years	5 per 24 hours (adult)

Reduction in voiding frequency due to growth-related increase in bladder capacity

Establishment of normal voluntary voiding dependent on 3 factors:

- Age-related increase in bladder capacity
- Development of voluntary control of striated urethral sphincter
- Direct control over bladder sphincteric unit

Attainment of complete control thought to pass through transitional phase where ability to inhibit voiding reflex is related to bladder volume.

Determination of expected bladder capacity in kids:

- Infants (Holmdahl et al, 1996)
  Bladder capacity (mL)= 38 + (2.5 × age (mo))
- Children > 1 yr = Koff's formula (Koff, 1983)
  Bladder capacity (mL)=[Age (yr)+ 2] × 30

Post-micturition volume exceeding 10% of expected bladder capacity abnormal