Paediatrics – Urinary incontinence

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

Organic daytime urinary incontinence
- 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
Paediatrics – Urinary incontinence

Urethral stricture
Meatal stenosis
Pathologic 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 cystourethroscopy

**Functional daytime urinary incontinence
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
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)

Primary monosymptomatic nocturnal enuresis
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 nocturnal 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