APPROACH TO VOIDING DYSFUNCTION

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A VERY COMMON SYMPTOM

ASSOCIATED WITH DISTRESS & ANXIETY TO THE CHILD & PARENTS
Development of Urinary Continence
Voiding in Infants

- A coordinated spinal reflex
- Simultaneous contraction of bladder & relaxation of sphincter
- Reflex coordinated at the level of sacral segments S2-S3 of spinal cord
- No voluntary control
- Voiding reflex occurs 15-20 times a day
Transitional Phase of Voiding

- Period when children are acquiring bladder control, between 2-4 yrs of age
- To achieve bladder control, several steps must occur:
  - Awareness of bladder filling
  - Suprapontine modulation of reflex bladder contractions
  - Ability to consciously tighten the external sphincter to prevent incontinence
  - Normal bladder growth
  - Motivation by the child to stay dry
  - A burst of ADH daily at night reducing urine output at night

- By 5 yrs:
  - 90% children continent during day
  - 85% continent during night
Voiding Dysfunction

Enuresis

Involuntary voiding of urine in a child over 5 years of age without structural or neurological disease of bladder or urinary tract

Incontinence

Leakage of urine in a child with structural or neurological disease of the bladder or urinary tract
Enuresis

- Nocturnal Enuresis
  - Primary
  - Secondary

- Diurnal Enuresis
  - Pediatric Unstable Bladder
  - Detrusor-Sphincter Dyssynergia
  - Infrequent Voiding
  - Vaginal Voiding
  - Giggle Incontinence
Nocturnal Enuresis

The occurrence of involuntary voiding at night at 5 years, the age when voluntary control of micturition is expected.
Nocturnal Enuresis may be:

- **Primary**
  - 75% cases
  - Nocturnal urinary control never achieved

- **Secondary**
  - 25% cases
  - Child dry at night for >6 months before enuresis occurs
  - Often suggest underlying disease
Epidemiology

- Males > Females
- +ve family history in 50% cases
- Polygenetic inheritance; gene localized on chromosome 12 & 13
Pathogenesis

A diagnosis of exclusion; etiology multifactorial

- Delayed maturation of cortical mechanisms for voluntary control of micturition
- Sleep disorder – enuretic children
- Reduced ADH production at night
- Genetic factors
- Psychological factors
- Sleep apnea
Treatment

Non Pharmacological Therapy

- Motivational Therapy
- Conditional Therapy
  - Awakening Programs
  - Enuresis Alarms
- Bladder Training Exercises
- Fluid Restriction & Dietary Therapy
Pharmacological Therapy

- Tricyclic anti depressant; Imipramine
  - Dose: 25mg at 6-8 yrs of age
  - 50mg at 9-12 yrs
  - 75mg at >12yrs

- Desmopressin acetate
  - Tablet 0.2-0.6mg at bedtime
  - Nasal Spray 10-40 microgram at bedtime
  - Duration of therapy 3-6 months

- Anti cholinergic; Oxybutynin chloride
  - Dose 4-6mg at bedtime
Follow up & Response

- **Consistent follow up** essential to assess the results

- **Improvement** defined as 50% reduction in no of nights that bedwetting occurs

- **Resolution** is defined as only one or two wet nights over a three-month period, and documentation that the child wakes up spontaneously to void.
DIURNAL ENURESIS
Pediatric Unstable (Overactive) Bladder

**SIGNS & SYMPTOMS**
- Bladder size smaller than normal
- Strong uninhibited bladder contractions
- Symptoms of urinary frequency, urgency & urge incontinence
- History of recurrent UTI’s & constipation in children

**VCUG**
- Dilated urethra
- Narrowed bladder neck
- Bladder wall hypertrophy
- Spinning top deformity

**TREATMENT**
- Timed voiding
- **Anticholinergic**
  - Oxybutynin
  - Hyoscyamine
  - Tolterodine
- **Alpha Blockers**
  - Terazocin
  - Doxazocin
- **Pelvic floor exercises**
Voiding cystourethrogram (VCUG) showing the dilated posterior urethra with a constriction ring in the distal urethra (spinning top shape).
Non Neurogenic Neurogenic Bladder (Hinman Syndrome)

Failure of external sphincter to relax during voiding in children without neurological abnormalities

**Signs & Symptoms**
- Staccato Stream
- Day & Night Wetting
- Recurrent UTI’s
- Constipation & Encoporesis

**Investigations**
- VUR
- Trabeculated Bladder
- Decreased urinary flow rate
- Hydronephrosis & Renal insufficiency

**Treatment**
- Anticholinergic & alpha blockers
- Timed voiding & behavioral therapy
- Intermittent catheterization & external urinary diversion
INFREQUENT VOIDING
- More common in girls
- Void only 1-2 times a day
- Associated with UTI
- T/M; To encourage frequent & complete voiding

VAGINAL VOIDING
- Incontinence after urination
- Caused by labial adhesion
- Common in overweight girls

GIGGLE INCONTINENCE
- Common in girls 7-15yrs of age
- Incontinence occurs suddenly during giggling
- T/M; Methylphenidate
INCONTINENCE

- Leakage of urine in a child with structural or neurological disease of the bladder or urinary tract
ETIOLOGY

- Cystitis
- Bladder outlet obstruction
- Ectopic ureter & fistula
- Sphincter abnormality
  - Epispadias
  - Extrophy
  - Urogenital sinus abnormality
- Neuropathic bladder & Overflow incontinence
- Traumatic
- Behavioral
- Organic Diseases; CRF, DM
NEUROPATHIC BLADDER

CONGENITAL
- Myelodysplasia
- Occult Spinal Dysraphism
- Sacral Agenesis
- Imperforate Anus

ACQUIRED DISEASES
- Traumatic lesions of spinal cord
- CNS Tumors
- Sacrococcygeal Teratoma
- Cerebral Palsy
Consequences of Neuropathic Bladder

- Urinary incontinence
- UTI’S
- Hydronephrosis
- Pyelonephritis
- Renal Insufficiency
Management

- Clean Intermittent catheterization
- **Anticholinergic Drugs**
  - Oxybutynin chloride
  - Hyoscymine
  - Tolterodine
- Alpha adrenergic medication
- **Antibiotic Prophylaxis**
- **Reconstructive Urinary Tract Surgery**
Ureteral Ectopia

- Usually associated with duplicate collecting system in girls
- Constant dribbling of urine during day & night

Investigations
- Ultrasonography
- IVU
- CT Scan

Treatment; Partial nephrectomy & ureteroureterostomy
Ectopic upper pole kidney (straight arrow) and termination of the Ectopic ureter (curve arrow) were shown by IVU.
## Approach to Voiding Dysfunction

### History
- Pattern of incontinence
- Dysuria
- Polyuria & polydipsia
- CNS Trauma
- Constipation & Encoporesis
- Poor urinary stream
- Snoring at night
- Psychosocial & family history

### Physical Examination
- Bladder palpation
- Exam. of genitalia
- Fecal masses
- Neurological exam.
- Spine exam.
- ENT exam. For adenoids

### Investigations
- Urinalysis
  - Glucose
  - Osmolality
  - Specific Gravity
- Urine Culture
- Radiological studies
  - USG
  - MCUG
H/O Voiding Dysfunction

Primary

Nocturnal

Idiopathic Primary Nocturnal Enuresis

Secondary

Diurnal

Structural / Neurological Anomalies of Urinary System

No

Systemic Illness

Yes

Ectopic Ureter

Epispadias

Neuropathic Bladder

PUV

No

Frequency & Urgency

Yes

Pediatric Unstable Bladder

Staccato stream

Hinman Syndrome

Infrequent/vaginal/Giggle incontinence

No

CRF

DM

UTI

Spinal trauma

Spinal/CNS tumor

Emotional upset
THANK YOU