Dealing with the Wet Child:
Getting to Dry

Craig A. Peters, MD, FAAP
Pediatric Urology
Children’s National
Getting to Dry

- In the child with wetting after toilet training has been attempted, understanding the possible causes is critical to defining the best therapy.

- Most wetting is functional and behavioral, but structural causes should never be missed.

- Most diagnoses can be excluded with a careful history and exam.
Wetting

- Anatomic abnormalities
- Neurogenic incontinence
- Stress incontinence
- Enuresis
- Dysfunctional voiding
Incontinence

- **Total** - almost always anatomic or neurogenic
- **Stress** - only with activity
- **Overflow** - small amounts intermittently
- **Urge** - associated with urge to void, but cannot suppress void
- **Giggle** - only vigorous laughter
Incontinence: *Ectopic ureter*

- Constant wetting, small volume: “never dry” (*girls only*)
- Hydronephrosis or abdominal mass
- Purulent drainage from perineum

**Imaging:**
- US if mass or purulence
- IVP/CT/MRI if wetting alone and normal US
11 year-old with lifelong wetting despite bladder retraining; always “damp”

IVP shows duplicated right system and ureter passing by bladder neck, exiting onto perineum
Incontinence: Neurogenic

- Progressive
- Associated bowel incontinence
- Never really dry
- Associated physical anomalies:
  - foot
  - lower back
- Perinatal complications
Incontinence: *Stress incontinence*

- Apparently more common in athletes
- Structural basis unclear
- **Treatment:**
  - alpha-agonists for bladder neck tone
  - *pseudoephedrine*
  - bladder neck injections
  - bladder neck suspension or sling
Stress urinary incontinence in young female athletes

- Nygaard, et al., Obs Gyn, 84:183, 1994
  - 156 female college athletes (19.9yrs)
  - 28% reported sports-related SUI; 17% started in junior high, 40% in high school

- Bo, et al., Obs Gyn, 84:1068, 1994
  - 37 college age students
  - 38% reported sports-related SUI; 6/7 with symptoms had urodynamic evidence of sphincter incompetence

  - women with sports related SUI had less foot arch flexibility than those without

  - Urinary incontinence in very young and mostly nulliparous women with a history of regular organised high-impact trampoline training: occurrence and risk factors

- Carls, Urol Nurs. 27:21-4, 2007
Incontinence: **Nocturnal Enuresis**

- Nighttime wetting only
  - (mono-symptomatic enuresis - MSE or MNE)
- 50% more common in boys
- 15% of 5 years olds wet at night
- 5% of 10 year olds wet at night
- 1% of 15 year olds wet at night
- 15% of patients resolve per year
Enuresis - Laws of 15

- 15% of enuretics have encopresis
- 15% of enuretics become dry each year
- 15% of enuretics have daytime symptoms
- 15% of enuretics have an initial dry period
- 15% of non-enuretics have nocturnal polyuria
- 15% of non-enuretics have nocturnal awakenings
Enuresis - Etiology

- Inherited
- Sleep factors
- Bladder instability
- Nocturnal polyuria - vasopressin abnormality
- Developmental Delays
- ? Psychiatric factors
- ? Allergies
Enuresis - Management

- Reassurance
- Family-determined goals and timing
- Basic
  - Reduce evening fluids
  - Void before bed-time
  - Awaken after 2 to 3 hours of sleep
- Behavioral - alarms
- Pharmacological
  - DDAVP - continuous or episodic
  - Anticholinergics
- Treat any daytime voiding dysfunction
Incontinence: *Dysfunctional Voiding*

- Bladder and dowel dysfunction (BBD) due to behavioral or developmental factors
- No anatomic or neurological cause evident
- Usually after toilet training
- May be associated with UTI and reflux
- Management based on etiology
Dysfunctional Voiding: Significance

- 29% of Danish 6 and 7-year olds

- 8% of Belgian school age children

- 15% of teenage girls
Dysfunctional Voiding: Significance

- UTI affects 2.6 to 3.4% of children
- UTI is the cause of 1.1 million office visits in the USA per year in children under 18 years
  - *Freedman, J Urol, 2005*
- At least 50%, if not more, are associated with or due to dysfunctional voiding
Dysfunctional Voiding: Etiology

- Interaction between behavioral and biological processes
- Should not be considered as purely one or the other
- Once established, the patterns can be self-perpetuating
Dysfunctional Voiding: Etiology

- **Holder**
  - Too busy to go
  - Hurts to go

- **Unstable bladder ("Urge syndrome")**
  - Immature bladder; always creating an urge to void
  - Resisted with toilet training – trying to stay dry

- **"Lazy" bladder**
  - Inadequate emptying; over-flow wetting, infections
Dysfunctional Voiding: Etiology

- Vicious cycle
  - The holder has pain from her bladder contracting against a closed sphincter, the pain causes more tendency to hold and more pain
  - The holder gets a UTI due to inadequate emptying, it hurts to void, and she holds more
  - The unstable bladder is resisted, it contracts harder against the sphincter which acts to obstruct the bladder, which makes it more unstable
Incontinence and Dysfunctional Voiding

- Irritation - infection
- "Too busy to go"
- Bladder instability
- Voluntary Holding
  - Wetting due to incomplete emptying
  - Infection
- Wetting due to instability
Incontinence: Dysfunctional Voiding

- **Filling**
  - Low bladder pressure, sphincter active

- **Balanced Voiding**
  - Bladder contractions during play; voiding inhibited by voluntary, habitual sphincter contraction

- **High Pressure, unbalanced voiding**
  - Incomplete emptying due to habitual sphincter contraction during voiding
Dysfunctional Voiding

“Staccato” or intermittent voiding

“Spinning top” deformity during voiding indicating non-relaxation of external sphincter
Vincent’s curtsy
Dysfunctional Voiding: Evaluation

- Diagnosis is based on history
- The remainder of the evaluation is confirmatory and education to parent and child...
- And to rule out the dangerous causes of wetting and infection
Dysfunctional Voiding: Evaluation

- Diagnosis is based on history
- Questions must be directed to elicit what is often perceived to be a normal pattern of behavior to the child or parent
- When a parent asks the child “how many times do you go?” - *neither has a clue*
Dysfunctional Voiding: Evaluation

Ask about:
- Wetting pattern
- Toilet training
- Developmental history
- Constipation
- Family history of bladder dysfunction
KUB: stool burden
Constipation and Wetting

• Frequent association

• Probably due to pelvic floor tightness, lack of relaxation, and tendency to postpone voiding

• Likely contributes to bladder instability

• Reservoir for uropathogens

• Must ask specific questions to identify presence
Using Ultrasound to evaluate bladder function

- **Capacity**
- **Wall thickness**
  - Anatomic obstruction (rare in girls)
  - Neurogenic bladder
  - Dysfunctional voiding patterns
  - Acute inflammation (irregular wall)
- **Emptying efficiency - Post Void Residual (PVR)**
  - You have to ask for it - *after first void*
- **Anatomy**
  - Internal structures - all are abnormal
- **Ureters**
Bladder Ultrasound: Wall thickness

![Ultrasound Image](image-url)
Bladder Ultrasound

Bladder diverticulum

Dilated ureters
Indications for Urodynamic Evaluation

- What can be learned?
  - Pressure : volume relationships
  - Sensation at volume (patient has to be awake)
  - Voiding dynamics
    - Stability
    - Pressure
    - Sphincter relaxation
  - Emptying efficiency
  - Flow rate
  - Innervation - looking for denervation pattern
UDS: What are we looking for?

- Pattern of voiding to explain symptoms that is amenable to specific therapy
- Neurogenic bladder dysfunction vs. learned or maturational pattern
- Identify potentially progressive lesions (nearly all neurogenic)
UDS: What can we treat?

- Neurogenic - complex
- Sphincteric weakness - rare except neurogenic
- Poor emptying – *Rx: CIC*
- Over-activity - *Rx: anticholinergics*
- Normal with voluntary incoordination - *Rx: behavioral*

*These three are usually evident by history and US*
**Voiding dysfunction: Treatment**

- **Voiding pattern:** timed, double voiding
- **Correct constipation** – diet, Miralax
- **Acidophilus**
- **Behavioral modification; biofeedback for external sphincter relaxation**
- **Antibiotic prophylaxis:** if recurrent symptomatic UTIs would impair voiding retraining

Bladder Retraining: 3-R’s

- **Regular**
  - timed schedule of voiding, every 2.5 to 3 hours
  - alarm wristwatch useful in older children

- **Relax**
  - double void with distraction between voids for 2 minutes

- **Record**
  - calendar to remind child (parent) and record progress; reinforcement
Dysfunctional Voiding: Management

- Identify the likely pattern
- Educate the parent and child to the degree possible
- Behavioral aspects
- Pharmacologic assistance
- Follow-up and follow-through
Dysfunctional Voiding: Management

- Two basic patterns:
  - Holder
    - Voiding postponement, infrequent
    - Often with constipation and abdominal pain
    - Post-void residual on US
    - **Behavioral retraining**
  - Unstable bladder
    - Urgency and frequency
    - Small volume dampness
    - Suggestions of neuromuscular immaturity
    - Small bladder with no PVR
    - **Behavioral therapy and anticholinergics**
Incontinence and Dysfunctional Voiding

- Irritation - infection
- Voluntary Holding
- “Too busy to go”
- Bladder instability
- Wetting due to incomplete emptying
- Wetting due to instability
Incontinence and Dysfunctional Voiding

- Voluntary Holding
  - “Too busy to go”
  - Bladder instability
  - Wetting due to instability
  - Ditropan

- Wetting due to incomplete emptying

- Infection
  - Irritation - infection

- Infection
Incontinence and Dysfunctional Voiding

- Irritation - infection
- Infection
- Voluntary Holding
- "Too busy to go"
- Bladder instability
- Wetting due to incomplete emptying
- Wetting due to instability
- Antibiotics
Incontinence and Dysfunctional Voiding

Irritation - infection

Voluntary Holding

“Too busy to go”

Bladder training

Wetting due to incomplete emptying

Infection

Wetting due to instability

Bladder instability
Antibiotic prophylaxis in Dysfunctional Voiding

- If child is having recurrent infections associated with dysfunctional voiding, prevention of UTI during bladder retraining is essential
- Each infection creates pain, aggravates ongoing voiding dysfunction
- Prevent infection until better voiding has been established
Dysfunctional Voiding: Management

Follow-up

- Phone check on progress
- Written record helpful
- Emphasis on patient/parent education
- US for re-check of PVR
- Determine potential need for anticholinergics; many parents prefer no meds and will work on a behavioral program first
- If started on meds, adjust dosage by response
- Determine when further investigation may be warranted: UDS
Dysfunctional Voiding: Management

- Pitfalls
  - “It’s not working” - compliance, understanding, child resistance
  - “We don’t have time”
  - “She won’t do the program”
  - “It worked great for a year, but she’s doing the same thing; what should we do now?”

- Use UDS to confirm impression of voiding program (rarely adds anything new, but can be convincing to parent)

- Moving to alternative therapy: add in anticholinergics, biofeedback, acupuncture
Biofeedback

- Use of formal biofeedback of pelvic musculature activity during voiding to train children about control of relaxation
- Complex, multi-session programs
- Can be effective in some cases; uncertain relative to simple behavioral training
- Limited access in eastern Massachusetts
- Insurance coverage limited
Wetting: Getting to Dry

- Common problem with significant health and quality of life impact
- Essential to recognize the patterns as largely behavioral
- Rule out structural or neurogenic problems
- Management based upon understanding the pattern of dysfunctional voiding and an integrated behavioral/functional approach to treatment
- Follow-up must allow for variable responses and will take significant time: 6 to 24 months
- Invasive testing is rarely useful
How you can be **BOSS OF THE BLADDER**
When you “gotta go”, you gotta go.