Nocturnal Enuresis

Melissa Martin
Angela Steineck
February 18, 2014

Outline

- Case Study
- Normal Micturition
- Definitions
- Epidemiology
- Etiology
- General Assessment
- Management
- Impact

Case Study

11 y/o boy presenting with bedwetting >5 nights per week and episodes of daytime urgency.

Micturition

- Relaxation of the pelvic floor and external urethral sphincter
- Contraction of the detrusor muscle surrounding the bladder
- Result = Forceful and continuous urine flow with complete bladder emptying

Micturition

- Controlled by four specific parts of the nervous system:
  - ganglion cells in the bladder wall and sympathetic chain (autonomic) and dorsal root chain (sensory)
  - motor neurons and sensory interneurons in the caudal spinal cord
  - the caudal brainstem
  - the cortical and subcortical areas

Micturition

- Cortical arousal is present during sleep in response to bladder distension
- Ages 1-2: Develop conscious sensation of bladder filling
- Ages 2-3: Develop ability to void or inhibit voiding voluntarily
- Ages 3-4: Develop adult pattern of urinary control and are dry during day and night

Micturition

- Normal frequency of voiding in children= 4-7 times per day
- Normal residual urine volume in children <10% of maximal bladder capacity
- Reduced urine production at night in response to the circadian rhythm of the antidiuretic hormone (ADH)

Nocturnal Enuresis

- Involuntary passage of urine during sleep
- Beyond 5 y of age
- Twice per week for 3 consecutive months
- Primary: lifelong
- Secondary: acquired after being dry for at least 6 months
- Monosymptomatic: associated with normal daytime urination
- Polysymptomatic: associated with other urinary symptoms i.e. daytime symptoms, urgency, frequency

Epidemiology

- Age 5: at least 20% of children wet the bed at least monthly
- Age 6: 10% of children
- Age 7 and beyond: 15% become dry each year
- M > F

Etiology

- Physiologic
  - Maturational delay
  - Small badder
  - Deep sleepers
  - Genetic
- Psychologic
- Organic
- Association with sleep apnea

Nocturnal Enuresis and ADHD

- ADHD is the most specific comorbid disorder in children with nocturnal enuresis.
- Robson et al in 1997: 20.9% of studied individuals with ADHD demonstrated nocturnal enuresis.
- NE in setting of ADHD is more difficult to treat

Table 1.

Frequency of elimination disorders and attention deficit symptoms by gender

Disorder	No. Girls (%)	No. Boys (%)	Total No. (%)
Urinary incontinence:			
NE	41 (6.4)	95 (12.9)	136 (9.9)
DI	19 (3.0)	30 (4.1)	50 (3.6)
Overall	60 (9.3)	125 (17.0)	185 (13.4)
FI (any/encopresis):	9 (1.4)	10 (1.4)	19 (1.4)
Isolated	1 (0.2)	1 (0.1)	2 (0.15)
With UI	8 (1.2)	9 (1.2)	17 (1.2)
Constipation	4 (0.6)	9 (1.2)	13 (0.9)
Constipation + FI	1 (0.2)	2 (0.3)	3 (0.2)
ADHD symptoms (clinical/borderline range):			
Without UI	8 (1.2)	32 (4.4)	40 (2.9)
With NE	**6 (0.9)**	**7 (1.0)**	**13 (0.9)**
With DI	5 (0.8)	13 (1.8)	18 (1.3)
With UI + FI	4 (0.6)	5 (0.7)	9 (0.7)
Overall	19 (2.9)	52 (7.1)	71 (5.1)
Totals	1379 (100)	645 (100)	734 (100)

Table 4.

Risk factors for clinically relevant CBCL inattentive scale symptom scores

Independent Variable	Wald Chi-Square	p Value	OR (95% CI)
NE	**3.1**	**0.08**	**2.0 (0.9-4.4)**
DI	8.3	0.004	4.4 (1.6-12.0)
FI	0.2	0.688	1.3 (0.3-5.5)
Age	1.3	0.249	1.4 (0.8-2.6)
Gender	0	0.97	1.0 (0.5-2.0)
Developmental disorder	42.7	<0.0001	9.6 (4.9-18.9)
Migration	0	0.858	0.9 (0.4-2.1)
Separation	11.9	0.0006	3.3 (1.7-6.7)
Expected problems in schools	9.9	0.002	4.1 (1.7-10.0)

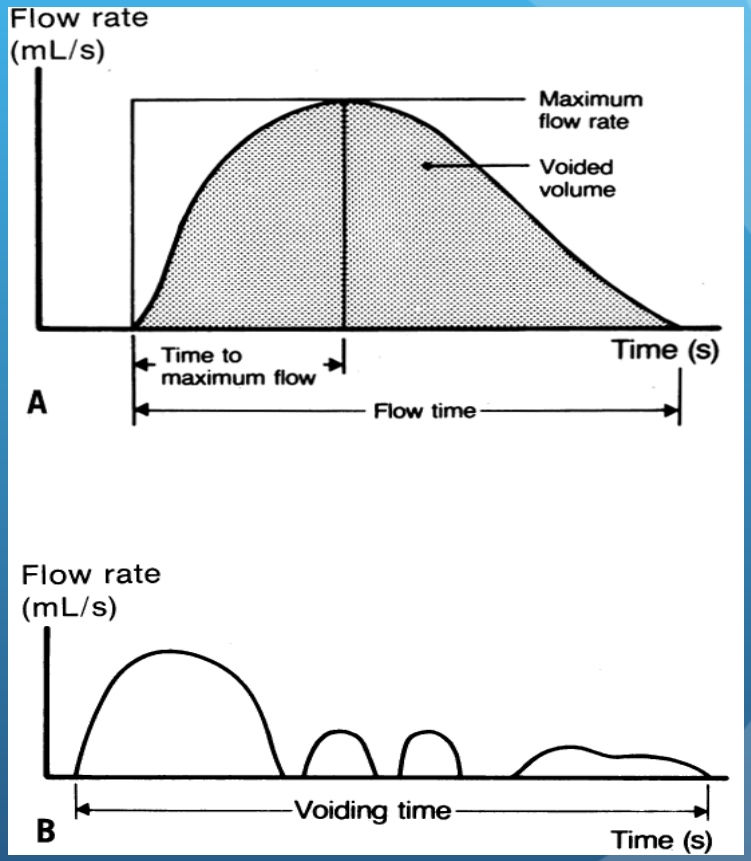
General Assessment

- History
  - Inquire whether child views wetting as a problem
  - Pattern of wetting
  - Associated symptoms
  - Fluid intake
  - Developmental Hx
  - History of UTIs, constipation, airway obstruction, abuse, stress
  - Previous interventions
  - Family history of wetting

General Assessment

- Physical Exam
  - Abdominal, spinal, neurologic, and genital exam
- Labs
  - U/A (everyone)
  - Ucx only if sxs concerning for infection
  - Further work-up directed by H&P: frequency/volume chart, uroflowmetry, urinary tract ultrasound, post-void ultrasound, spinal xray, abdominal xray
- Referral
  - Genitourinary pathology or treatment failure after 8-12 weeks→ refer to urology
  - Child's social functioning impaired or family punishing→ psychological counseling

Uroflowmetry



http://www.glowm.com/resources/glowm/cd/pages/v1/ch079/framesets/003f.html

Case Study

11 y/o boy presenting with bedwetting >5 nights per week and episodes of daytime urgency.

HPI: Mom has tried restricting fluids after 5pm and putting boy on toilet during the night. He has never been dry for 6 or more months. He is very embarrassed.

PMH: constipation, occasionally soils

FHX: Older sister had bedwetting

Case Study

- Physical Exam: vitals normal; neurological, spinal, abdominal and perineal examination normal
- Labs: Urinalysis normal

Case Study

- Plan: Ask mom to complete a 3 day frequency and volume chart

Case Study
Frequency and volume chart

03/04/04

Day 1

Time	Drink	Wee	Comments — urgency and leakage
eg, 8.00 am	eg, 200 mL	eg, 100 mL	+Needed to go, but could hold on for a while longer; ++Could only hold on for a few min more; +++Could not hold on 1 min more
08:00		100	Just out of bed. Bed dry
08:10	50		Milk
12:00	100		Cordial
16:00		100	+++Busting
16:30	200		Coke
17:00		100	+++Busting
18:00	200		Cordial
18:50		90	++Really needed to go
20:00	250		
21:00		80	Before bed wee

Amount of first wee in the morning: 100mL

04/04/04

Day 2

Time	Drink	Wee	Comments — urgency and leakage
eg, 8.00 am	eg, 200 mL	eg, 100 mL	+Needed to go, but could hold on for a while longer; ++Could only hold on for a few min more; +++Could not hold on 1 min more
09:00		80	Bed wet
09:20	100		Milk
15:00	250		Cordial
15:15		100	+++Busting
17:00	100	90	Water
18:00	100		Cordial
20:00	100	100	+++Busting
21:00			
23:00		90	Before bed wee

Amount of first wee in the morning: 100mL

Case study

Findings:

- Fluid intake is 650-800 ml/day (greater in the evening than during the day)
- Functional bladder capacity is 100mL (lower than expected for age)
- He withholds voids for hours then experiences urgency

Additional Studies

- Uroflowmetry: normal urine flow curve
- Bladder U/S: no residual urine after voiding

Case Study

Diagnosis: Primary non-monosymptomatic nocturnal enuresis

Management

- Child needs to be motivated for any intervention to be successful
- Goal #1: Resolve/alleviate problem and limit impact on child's self esteem and relationships
- Goal #2 (equally important):
  - Allow family to understand enuresis is common and is usually a developmental problem, child has little to no control.
  - Punishments only LOWER self-esteem and does improve sxs
  - Effective treatments available, but will require their cooperation

Nocturnal Enuresis Management

- Alarms
  - Preferred method: high efficacy, low cost, low regression rate
  - Children >7 years old
  - Avg use at least 2-3 months, up to 6 months
  - Requires significant cooperation from parent, especially during 1st week when child may not awaken to alarm
  - 50% of children who achieved dryness with alarm, remain accident free after therapy discontinued
  - Video: http://www.youtube.com/watch?v=S-hGcEjpcJ8

Nocturnal Enuresis Management

- Medications
  - DDAVP
    - Effective in 60% of children with monosymptomatic nocturnal enuresis
    - Average of 1.3 dryer nights per week
    - High relapse rate after medication discontinued
    - Concerns for hyponatremia from excess water intake
  - Oxybutynin
    - Increase bladder capacity and decrease overactivity
    - Uncontrolled studies show improvement in sxs
    - Side effects: constipation, flushing, dizziness, increased temp, urinary retention after voiding
  - Combination therapy: DDAVP and anticholinergic agent requires very close monitoring

Nocturnal Enuresis Management

- Behavior therapy: studies are **inconclusive**
  - Bladder relaxation exercises
  - Rewards
  - Fluid restriction before bedtime
  - Scheduled waking

Daytime Incontinence

- If child presents with daytime and nighttime incontinence→ treat daytime incontinence first
- Treat any underlying pathology, if no organic cause identified then:
  - Timed voiding: voiding q2hr, easy access to restrooms
  - Medications for diurnal enuresis rarely used: anticholinergics and alpha blockers

Impact

- Self-esteem
- Interpersonal relationships
- Risk of physical abuse
- Impact on schooling

Education

- Discourage punishment
- Not a sign of emotional, psychological or medical dysfunction
- Encourage child to take responsibility for dryness
  - “double bubble technique”: plastic sheet over mattress followed by sheets/blankets, repeat X 2
  - Dry set of pajamas at bedside
  - Practice what to do after accident
    - Helps decrease family tension

Case Study

Diagnosis: Primary non-monosymptomatic nocturnal enuresis

Management

1. Remove blame/shame from child/family
2. Recommend collaborative approach between child, parents, teachers, doctor
3. Encourage voiding prior to bed
4. To reduce daytime urgency: aim for a daily fluid intake of 1.5 L (caffeine-free), drink at regular intervals throughout the whole day (slowing down in the evening), void at least 5–6 times per day instead of holding on.
5. Address constipation/soiling
6. Return in 3-4 weeks for f/u

Case Study

- 6 weeks later:
  - Patient had increased functional bladder capacity, resolved constipation, resolved urinary urgency, but continues to wet the bed on most nights
  - Diagnosis: Monosymptomatic nocturnal enuresis
  - Plan: Recommended alarm. Return in 8 weeks.

References

- Caldwell PH, Edgar D, Hodson E, Craig JC. Bedwetting and toileting problems in children. MJA Practice Essentials- Pediatrics, 2005; 182: 190-195.
- Schmitt, B. D. "Nocturnal Enuresis." *Pediatrics in Review* 18.6 (1997): 183-91.
- Zuckerman, Barry S., Marilyn Augustyn, and Elizabeth B. Caronna. *The Zuckerman Parker Handbook of Developmental and Behavioral Pediatrics for Primary Care*. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins Health, 2011. Print.

Thank you!