Constipation and Dysfunctional Voiding

Caroyl Gilbert RN, CPNP-PC
Jessica Schuh PA-C
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Objectives:

- Understand clinical presentation and diagnostic evaluation of dysfunctional voiding and anorectal dyssynergia

- Recognize importance of urotherapy, biofeedback and pelvic floor PT in the treatment of dysfunctional voiding and anorectal dyssynergia
Function of Bladder

- Store urine
- Expel urine when socially convenient
- Urethral sphincters prevent leakage
Normal Bladder function

- Filling phase
  - Bladder/detrusor relaxation
  - Urethral sphincter muscle contraction

- Micturition/voiding
  - Urethral sphincter relaxation
  - Bladder/detrusor contraction
Structures that....... 

- Give urethral closure 
  - Internal urethral sphincter 
  - External urethral sphincter 
- Give support to bladder neck and urethra 
  - Pelvic floor muscles (PFM) 
  - Endopelvic fascia
Closure

Urinary trigone

Trigonal ring

Detrusor loop

Pubic symphysis

Sphincter urethrae

Urethrovaginal sphincter

Compressor urethrae

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Bladder/urethral support
Prevalence of day wetting

- Prevalence depends on several factors
  - Assessment of symptoms, methods of data collection, criteria for definition, population to be analyzed
- In children age and gender are factors
- Day incontinence varies between 30% at age 4 to 1.8% of 15 – 17 yr olds
- Enuresis diminishes from 40% of 5 yr olds to 3% of 15 – 17 yr olds

Yeung et al, J Urol 171: 2595, 2004
Hellstrom et al, Brit J Urol 76: 231, 1995
Classification of LUTD in the presentation

• Storage disorder
• Voiding/emptying disorder
• Confounders
  – Constipation
  – UTI
  – VUR
Summary of presentation

• Non-anatomic, non-neurogenic causes of urinary incontinence

• Storage disorders
  – Overactive bladder (OAB)
  – OAB and dysfunctional voiding (DV)
  – Sensory causes
  – Stress urinary incontinence (SUI)
  – Giggle incontinence

  – UTI and VUR

• Voiding disorders
  – Disorders of frequency – increased or decreased
  – Disorders of stream – mechanical or functional
  – Dysuria
  – Combined bowel and bladder dysfunction
Dysfunctional Voiding

• “The child with dysfunctional voiding (this phrasing is preferred instead of voiding dysfunction) habitually contracts the urethral sphincter during voiding. The term cannot be applied unless repeat uroflow measurements show curves with a staccato pattern, or unless verified by invasive urodynamic investigation”

   (Neveus et al 2006)

• Consequences
  ➤ Increase bladder pressure ⇒ reflux, renal damage
  ➤ Increase post void residual ⇒ recurrent UTI (Hansson 1990)

• Symptoms & Signs
  – Urgency, frequency, urge incontinence
  – Straining to void +/- overflow incontinence
  – Intermittent, staccato uroflow
  – Prolonged, unsustained detrusor contraction

Associated bowel dysfunction

• “There is a relationship between bladder and bowel dysfunction which affects both the assessment and management of dysfunctional voiding. The genitourinary and gastrointestinal tracts are interdependent sharing the same embryologic beginnings, pelvic location, aspects of innervation and passage through the Levator Ani”

• Lack of pelvic floor muscle relaxation (PFM) leads to bowel dysfunction and DV (Ab 2002)

• Parents tend not to recognise constipation (Loening-Baucke 1997, McGrath 2008)

• Treatment of constipation alone -> 66% improvement of PVR, 89% resolution day wetting and 63%NE and prevention UTI’s (Loening -Baucke1997)

Ab, E. BJU Int, 89: 48, 2002
Loening-Baucke, V. Pediatrics 100(2 (Pt. 1)): 228-232. 1997
Work-up: History

- Parent report and child report
- Medical history – obstetric, milestones, toilet training, previous surgery, UTI
- Voiding frequency, urine loss, urgency, reaction to urge, urinary stream
- Bowel history
- Menstrual and sexual history as applicable
- Review of previous investigations and interventions
- Voiding diary – bowel, urine, incontinence, volume
- Symptom score questionnaire
Work-up: Clinical examination

- General pediatric physical examination
- Abdominal examination – organomegaly, bladder distension, fecal impaction
- Perineal and perianal sensation (S1-5)
- Spine – bony misalignment, Cutaneous signs of occult Spina Bifida
- Neuro assessment of LE
- Genital examination
Work-up: Urinalysis

• Exclude UTI
• Screen for diabetes, renal damage/disease
• Asymptomatic bacteruria
• Specific gravity – fluid restriction, concentrating defect
• pH or calcium levels – extraordinary urinary frequency, irritative symptoms
Work-up: Uroflow

- Non-invasive
- To be done according to ICCS guidelines with adequate filling
- Describes voided volume, post void residual, flow rate and pattern
- Measures Qmax, Qave
- Helps identify voiding disorders, cannot diagnose on one flow study
- Simultaneous EMG of pelvic floor muscles
- Used as a measure of success of intervention
Work-up: Ultrasound in office coming soon

- Should be done on most children with LUTS
- Bladder US done pre- and post-void
- Bladder wall thickening/ irregularities, ureteral dilatation, bladder neck appearance
- Post void residual
- Constipation – displacement of bladder base or rectal crescent > 3 cm
Uroflowmetry

- Shape of the curve important
- Minimal age 4 years
- Q max less important
- More than 1 curve (at least 3)
- More than 50% of expected capacity for age
Dysfunctional voiding

• Assessment
  – Flow rate – staccato or intermittent or both
  – Flow rate – reduced max, prolonged flow time
  – Flow EMG – measures perineals, taken to represent PFM/EUS
  – Flow EMG – incomplete silencing during voiding
  – PVR – immediately after void

Figure 54.1 Normal voiding pattern. Electromyography (EMG) lag time of 4 seconds. Complete relaxation of pelvic floor muscles with voiding. Normal bell-shaped uroflow curve. Vura = volume of voided urine, Qura = urine flow, ST = start/stop, LT = lag time, VB = voiding begins, MF = maximum flow, VE = voiding ends.
Figure 51.9 Urodynamics tracing in incontinent child with vesicosphincter dyssynergia: (a) uroflow; (b) electromyogram.
**Figure 54.2** Type 1 dysfunctional voiding pattern. Persistent activity (non-relaxation) of pelvic floor muscles during voiding with a staccato uroflow curve.

**Figure 54.3** Type 2 dysfunctional voiding pattern (bladder instability). No lag time noted, which indicates initiation of flow prior to relaxation of pelvic floor muscle activity. For symbols, see caption to Figure 54.1.
Voiding cystourethrography

• Not a routine assessment

• BUT if recurrent UTI, abnormal US findings, obstructed uroflow studies, dilated ureters, high storage pressures, bladder neck dysfunction, failure of therapy, neurological history, anatomic abnormality, VCUG, UD or VUD should be done.
Treatment: Urotherapy

- Urotherapy means non-surgical, non-pharmacological treatment for LUT dysfunction
- Non-standardized term
- Described as ‘rehabilitation of LUT’
- Involves
  - Education
  - Intervention
  - Lifestyle advice
  - Documentation
  - Support and encouragement
Treatment: Goals

• No more symptoms
  – urgency, wetness
• No more signs
  – ↑PVR, active EMG during voiding
• Normalized flow curve
• PFM relaxation during void
• Normalized bladder capacity
• No further episodes of UTI
• Reduction in grade of VUR
• Normal bowel function
Working with children

- Education, education, education
- Understand the pace of assessment and treatment is slower
- Let the family know at the outset ‘this takes time’
- The child is your collaborator - in assessment and treatment
- Treatment is not ‘done’ to the child – he/she participates
- The child is the focus- not the problem
- Understand different behaviors eg a withdrawn child, de-motivated child,
- Offer structured choices, achievable goals. Set the child up for success not failure
- Remove blame and guilt for everyone
Treatment: Education

• What is not associated with disorder
  – laziness, naughtiness, dirtiness, low IQ
• Attribute dysfunction to external factors
• Establish prevalence in realistic context
• Explore motivation
• Establish child as co-investigator and collaborator
Treatment: “Standard Therapy”

- Routine hydration
- Regular, optimal voiding – every 2 hours
- Pelvic floor muscle awareness
- +/- pharmacotherapy
- +/- biofeedback training
- +/- neuromodulation
- +/- alternative / holistic intervention
“Standard Therapy”

• Routine hydration
  – Often voluntary dehydration
  – Re-set high set-point for thirst
  – Drinks of 200mls +/- age -dependent
  – 5-6 / day
  – Dilutes concentrated (? irritating) urine
  – Avoid sugar and caffeine
“Standard Therapy”

• Regular voiding:
  – Every 2-3 hours
    • May need vibrating alarm watch
  – Prevent over-distension (including overnight)
  – Re-establish sensory awareness
  – Minimized OAB activity -> leakage
  – Must be unopposed emptying
PFM Relaxation

• Optimal voiding mechanics
  – Supported seating / squatting
  – Neutral lumbar spine
  – Feet on stool; knees apart
  – Prevent urine entrapment
  – No pushing
  – Focused abdominal relaxation
  – Aim for a “waterfall” void
  – Double void
Biofeedback

• Refers to the biological signals that are fed back or returned to the patient to help them develop techniques in controlling them. This process can be used for various behaviors, including urinary control. The concept is to teach children to identify their muscle sphincter or perineal muscles and learn to control them.
  – Traditional Biofeedback uses auditory and visual without animation – treatment averages 6 weeks.
  – Animated Biofeedback uses software utilizing interactive games. With set of sensors placed on child’s abdomen and sphincter area, movements are translated onto a computer screen showing interactive games that the child controls. Children easily engage with the game and learn muscle isolation at the same time.
Animated Biofeedback
Biofeedback

• Program runs once a week for a total of 3-6 sessions.

• Initial visit – 1 ½ hour
  – Assessment, goals and treatment plans are developed.
  – Patient and parent education are initiated and child participates in an animated biofeedback exercise.

• Subsequent visit – 1 hour
  – Review of voiding
  – Animated Biofeedback exercises.

• Graduation
  – Patient returns in 6-8 weeks for re-assessment with uroflow/emg/pvr and continuing care with provider
Biofeedback

• In choosing candidates for Biofeedback, age and maturity are important. Success depends on the child’s listening skills because cooperation is the key to continue with treatment.

• Nurses are vital to the success of Biofeedback program. Children who participate in Biofeedback program are usually shy and embarrassed. Compassion, honesty and commitment from the nurse are important to ensure that patients and families receive excellent care and education.
Resources

• ICCS Documents:
  – Anatomy and Physiology of the Bladder: an Overview
  – Dysfunctional Voiding in Children: an Overview
  – Diagnostic Evaluation of Children with Daytime Incontinence
  – Urotherapy
  – The Management of Dysfunctional Voiding in Children

• Clinical Pediatric Urology Textbook, Steve Docimo

• Incontinence: Biofeedback Therapy presentation, Imelda Salcedo, RN
Fecal Incontinence

• Pelvic floor anatomy
Anorectal Dyssynergia

- https://www.youtube.com/watch?v=FUoW4W4kla8

- Michigan Bowel Control Program
Prevalence of chronic constipation and dyssynergic defecation

11-18% estimated global prevalence of chronic constipation in adults

Most likely underestimated because most patients do not seek health care

Dyssynergic defecation is detected in 27-59% of adults with chronic constipation
Etiology/Pathophysiology of dyssynergic defecation

31%  Began in childhood
29%  Associated with a particular event (childbirth, trauma, back injury)
40%  No identified etiology
Clinical Presentation

Chronic constipation
Excessive straining
Incomplete evacuation
Stool frequency of <3 BM’s/week

“Symptoms alone cannot differentiate between slow transit constipation and dyssynergic defecation”
Work-up: History

Medical History (Spina Bifida, tethered cord)
Previous testing (imaging, manometry)
Stooling frequency
Straining to stool
Feeling evacuated after stooling, yes or no
Stool consistency (Bristol Stool Scale)
Encopresis
<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Separate hard lumps, like nuts (hard to pass)</td>
</tr>
<tr>
<td>Type 2</td>
<td>Sausage-shaped but lumpy</td>
</tr>
<tr>
<td>Type 3</td>
<td>Like a sausage but with cracks on its surface</td>
</tr>
<tr>
<td>Type 4</td>
<td>Like a sausage or snake, smooth and soft</td>
</tr>
<tr>
<td>Type 5</td>
<td>Soft blobs with clear-cut edges (passed easily)</td>
</tr>
<tr>
<td>Type 6</td>
<td>Fluffy pieces with ragged edges, a mushy stool</td>
</tr>
<tr>
<td>Type 7</td>
<td>Watery, no solid pieces. Entirely Liquid</td>
</tr>
</tbody>
</table>
Work-up: Clinical Exam

General physical exam
Abdominal palpation, fecal matter palpable
Rectal exam: squeeze/push at rectum
Work-up: Anorectal manometry
Types of dyssynergic defecation

• Type 1: Adequate pushing force along with a paradoxical increase in anal sphincter pressure
• Type 2: inadequate pushing force, paradoxical anal sphincter contraction
• Type 3: adequate pushing force but either absent or incomplete anal sphincter relaxation
• Type 4: inadequate pushing force, absent or incomplete anal sphincter relaxation
Treatment: Pelvic floor physical therapy

- Physical therapy, with or without biofeedback
- Biofeedback: electrodes to perianal area, hand held device with screen
Treat Constipation

Laxative regimen
Oral hydration
Dietary fiber
Scheduled toilet sitting
Resources


• The Poo in You, www.gikids.org
Thank you for your attention

Caroyl Gilbert RN, CPNP-PC
(cmgilber@bcm.edu)

Jessica Shuh PA-C
(jbschuh@texaschildrens.org)