Approaching Childhood Constipation
Anees Siddiqui, MD
Pediatric Gastroenterology
Specially for Children
Dell Children’s Medical Center of Central Texas

Disclosure
Anees Siddiqui, MD, has no relationships with commercial companies to disclose.

Learning Objectives
At the end of this presentation the participant will be able to:
1. Institute an appropriate workup to differentiate functional constipation and other organic etiologies of disease
2. Understand the appropriate management options for pediatric constipation
3. Have a sense as to when referral to subspecialty care is appropriate.

Epidemiology
- Prevalence estimated up to between 0.7 to 29.6%
- Independent of age, sex, race, geography, and socioeconomic status

Epidemiology
- 3% of all visits to pediatricians
- 25% of all visits to pediatric GI
- Estimated burden to health care system of $3.9 billion / year
Case I (M.L.)

- 2 yo with constipation since infancy
- Worsened when began walking
- Now requiring daily ex-lax to have a weekly bowel movement
- Demonstrates withholding behavior
- Social History: Mom recollects holding the child down to force her to have a BM

Case I (M.L.)

- Started on a laxative cleanout regimen followed by maintenance
- Enforced Non-Punative
- Seen in clinic for 1 month follow up
- Complete Resolution of Symptoms

Case 2 (L.R.)

- CC: constipation not responding to medical therapy
- HPI
  - 4 yo girl with constipation since infancy
  - Never toilet trained
  - BM every other week
  - Now with severe abdominal distension
  - ROS: FTT
Physical Examination

- General: thin NAD, distressed on examination
- Lungs: CTA B
- CV: RRR no murmer
- Abdomen: significant distension, tympanic, no masses, no HS megaly

Labs

- Normal CBC
- Normal LFTs
- Normal Chem 20
- Neg celiac, Neg thyroid, Neg Sweat

Meds

- Mirilax 17gm BID for several months
- Dulcolax 5mg BID for several weeks
- Senna 2 tsp BID for several months
- Mineral oil 1 tsp BID for several weeks

Work up

- Due to severity of symptoms child is admitted for further work up and management
  - Barium enema
  - Anorectal manometry
  - Colonic monometry
  - Rectal biopsy
  - Lumbar MRI

Barium Enema
Agenda

- Definitions
- Physiology / Pathogenesis
- Differential Diagnosis
- Workup
- Management

Definitions

- Constipation has multiple interpretations
- Variability of “Normal”

TABLE 1. Normal frequency of bowel movements

<table>
<thead>
<tr>
<th>Age</th>
<th>Bowel movements per week</th>
<th>Bowel movements per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 Months</td>
<td>2-10</td>
<td>2-3</td>
</tr>
<tr>
<td>Breast fed</td>
<td>5-14</td>
<td>1.5</td>
</tr>
<tr>
<td>6-12 months</td>
<td>2-14</td>
<td>1.4</td>
</tr>
<tr>
<td>1-3 years</td>
<td>4-21</td>
<td>1.4</td>
</tr>
<tr>
<td>More than 3 years</td>
<td>5-16</td>
<td>1.5</td>
</tr>
</tbody>
</table>


“Approximate mean ±1 SD”

Paris Concensus on Childhood Constipation Terminology (PACCT) Group

- 2 or more of the following for ≥8 weeks
- <3 bowel movement per week
- ≥1 fecal incontinence per week
- Large stool on rectal or abdominal exam
- Stool that clogs the toilet
- Retentive Posturing or Withholding
- Painful Defecation
Physiology

- Mechanisms of Continence
- Puborectalis
- Internal Anal Sphincter
- External Anal Sphincter
- Anorectal Angle

Physiology

- Stool Descends to Rectum
- Passive Relaxation of IAS
- Stool Contacts Anal Canal
- EAS Contracts

Physiology

- OK to Poop?
- Puborectalis Relaxes
- Pelvic Floor Descends
- Anorectal Angle Straightens
- Success!!

Physiology

- Shouldn’t Poop?
- EAS and Puborectalis Contract
- Anorectal Angle Lessens
- Maintain Continence!!

Pathophysicsiology

- Summary of Components of Defecation
- Bolus Delivery
- Bolus Sensation
- Pelvic Floor Reaction
- Intra Abdominal Forces
- Disruption in the above causes constipation
Differential Diagnosis

**Anatomic**
- Imperforate Anus
- Anteriorly Displaced Anus
- Anal Stenosis

**Metabolic**
- Hypothyroidism
- Hypocalcemia
- Hypokalemia
- Cystic Fibrosis
- Diabetes Mellitus
- Celiac Disease

**Neuropathic**
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other

**Other**
- Spina Bifida
- Spinal Cord Trauma
- Tethered Cord
- Encephalopathy

**Anatomic**
- Imperforate Anus
- Anteriorly Displaced Anus
- Anal Stenosis

**Metabolic**
- Hypothyroidism
- Hypocalcemia
- Hypokalemia
- Cystic Fibrosis
- Diabetes Mellitus
- Celiac Disease

**Neuropathic**
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other

**Other**
- Spina Bifida
- Spinal Cord Trauma
- Tethered Cord
- Encephalopathy

**Anatomic**
- Imperforate Anus
- Anteriorly Displaced Anus
- Anal Stenosis

**Metabolic**
- Hypothyroidism
- Hypocalcemia
- Hypokalemia
- Cystic Fibrosis
- Diabetes Mellitus
- Celiac Disease

**Neuropathic**
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other

**Other**
- Spina Bifida
- Spinal Cord Trauma
- Tethered Cord
- Encephalopathy

**Anatomic**
- Imperforate Anus
- Anteriorly Displaced Anus
- Anal Stenosis

**Metabolic**
- Hypothyroidism
- Hypocalcemia
- Hypokalemia
- Cystic Fibrosis
- Diabetes Mellitus
- Celiac Disease

**Neuropathic**
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other

**Other**
- Spina Bifida
- Spinal Cord Trauma
- Tethered Cord
- Encephalopathy

**Anatomic**
- Imperforate Anus
- Anteriorly Displaced Anus
- Anal Stenosis

**Metabolic**
- Hypothyroidism
- Hypocalcemia
- Hypokalemia
- Cystic Fibrosis
- Diabetes Mellitus
- Celiac Disease

**Neuropathic**
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other

**Other**
- Spina Bifida
- Spinal Cord Trauma
- Tethered Cord
- Encephalopathy

**Anatomic**
- Imperforate Anus
- Anteriorly Displaced Anus
- Anal Stenosis

**Metabolic**
- Hypothyroidism
- Hypocalcemia
- Hypokalemia
- Cystic Fibrosis
- Diabetes Mellitus
- Celiac Disease

**Neuropathic**
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other

**Other**
- Spina Bifida
- Spinal Cord Trauma
- Tethered Cord
- Encephalopathy
Differential Diagnosis

- Anatomic
- Metabolic
- Neuropathic
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other
- Prune Belly Syndrome
- Gastroschisis

Differential Diagnosis

- Anatomic
- Metabolic
- Neuropathic
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other
- Scleroderma
- SLE
- Ehlers-Danlos Syndrome

Differential Diagnosis

- Anatomic
- Metabolic
- Neuropathic
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other
- Opiates
- Anticholinergics
- Sympathomimetics
- Anti-Depressants (TCAs)

Differential Diagnosis

- Anatomic
- Metabolic
- Neuropathic
- Enteric Neuropathy / Myopathy
- Abdominal Musculature
- Connective Tissue Disorder
- Drugs
- Other
- Lead Intoxication
- Vitamin D Intoxication
- Cow’s Milk Protein Intolerance
- Botulism

Differential Diagnosis

- Functional
- Celiac
- Hypothyroidism
- Calcium Derangement
- Milk Protein Intolerance
- Hirschsprung’s

Differential Diagnosis (Non Organic)

- Developmental
- Situational
- Depression
- Reduced Stool Volume
Pathogenesis

- Some stimulus causes withholding
- Stool becomes increasingly harder
- Child is more reluctant to defecate
- Colonic distension weakens peristalsis
- Constipation cycle
- Often overflow incontinence results

Workup

- History
  - Age of Onset
  - Passage of Meconium
  - Nausea / Vomiting
  - Toilet Training
  - Abdominal Distension
  - Abdominal Pain
  - DooDle Dance
  - Fecal Incontinence
  - Course Hair
  - Fatigue

- Physical Exam
  - General Appearance / Vitals
  - Abdomen
  - Anus
  - Rectum
  - Back
  - Neurologic Examination

Additional Work-up

- Imaging
  - KUB ??
  - Transit Study
  - MRI of LS Spine
  - Barium Enema
  - Anorectal Manometry
  - Colonic Motility Study
  - Lab Tests
Management

- Disimpaction
- Maintenance Therapy
- Behavioral Therapy
- Treat the Underlying Condition

Medications

- Mushers (Osmotic Laxatives)
- Pushers (Stimulant Laxatives)
- Lubricants
- Rectal
- Other

- Mushers
  - Senna (Ex-Lax)<sup>®</sup>
    - 6-11yo: 1 square QD - BID
    - >12yo: 2 square QD - BID
  - Bisacodyl
    - 1-3 tablets/Day (5mg)
    - ½-1 suppository/Day (10mg)

- Pushers
  - Milk of Magnesia (MgOH)
    - 1.5gm/kg/day (disempact)
    - 1.0gm/kg/day (maintain)
  - Lactulose
  - 1 - 3 cc/kg/day
  - MgCitrate
    - 1 - 3 cc/kg/day (<6yo)
    - 100 - 150 cc/day (6-12yo)
    - 150 - 300 cc/day (>12yo)

- Lubricants
  - Mineral Oil
    - 15 - 30cc/yr (max 240cc) daily for disimpaction
    - 1 - 3 cc/kg/day maintenance
Medications

- Mushers
- Pushers
- Lubricants
- Rectal
- 
- Fleets (Phosphate) Enema
  - 6cc/kg up to 135cc
  - no kids < 2 years
  - no more than 1/ day
- Mineral Oil Enema
- Glycerin Suppository

Disimpaction

- Goal is aggressive clean out
- Dealers Choice ... but
- Miralax 17gm BID x 3 days
- Ex-Lax 1 square qDay x 3 days
- Then on maintenance

Maintenance Therapy

- Goal: 1 - 2 soft stool / day
- Expect 6 - 24 month of therapy
- Focus of Therapy
  - Dietary Education
  - Behavioral Modification
  - Laxatives

Maintenance: Diet

- Fiber Supplementation
- Adequate Hydration
- Balanced Nutritious Diet
- ? Milk Elimination ?

Maintenance: Behavior

- Age Appropriate Toilet Training
- Sitting Schedule
- Incremental Rewards
- Stooling Chart
- Avoid Punitive Measures

Weaning

- Gradual tapering of medications tried every 6 months
- Stopping meds too soon is the most common cause of relapse
Outcomes

- Rates of Successful Management Vary
  - 50% - 90% success over 1 year
- Close follow up and continuation of meds is crucial

Outcomes by Age

- 75%

Outcome Categories

- (Category 1) Good Outcome without Laxatives
- (Category 2) Good Outcome with Laxatives
- (Category 3) Poor Outcome without Laxatives
- (Category 4) Poor Outcome with Laxatives

Contributors to Poor Outcome

- Delay in Referral
- Advanced Age at Onset
- Defecation Frequency
Take Home Points

- Definitions
- Physiology / Pathogenesis
- Significant Variability in Presentation
- Cycle of Constipation
- Main Dx: Functional, Milk Intolerance, Celiac, Hypothyroid, Ca
- History, Physical
- Management
- Minimum 6 months of Laxatives

Agenda

- Differential Diagnosis
- Workup
- Management
- Main Dx: Functional, Milk Intolerance, Celiac, Hypothyroid, Ca
- History, Physical
- Minimum 6 months of Laxatives

Barium Enema

- Due to severity of symptoms child is admitted for further work up and management
  - Barium enema
  - Anorectal manometry
  - Colonic monometry
  - Rectal biopsy
  - Lumbar MRI

Work up

- Balloon Simulates Fecal Bolus
- Attempting to elicit the RAIR (recto-anal inhibitory reflex)

Anorectal Manometry
Indications

- Rule out Hirschsprung's
- Evaluation of Intractable Constipation
- Evaluation of Fecal Incontinence
- Establish candidacy for anorectal biofeedback
- Establish candidacy for anal botox injection

Hirschsprung's Disease

- Normal HD
- Contrast Enema
- Anorectal Manometry
- Rectal Suction Biopsy
• 27 children who had >3 biofeedback sessions
• 88.9% success in treating functional constipation due to pelvic floor dysfunction
References