CHEO
child & youth

Pediatric Telehealth Rounds

Today's topic:

Constipation in Kids!

Speaker:

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April 17, 2015

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Constipation in Kids!

Stephanie Davenport PGY3
Children's Hospital of Eastern Ontario
April 17th 2015

Please feel free to ask questions!

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Speaker has nothing to disclose with regard to commercial support.

Speaker does not plan to discuss unlabeled/ investigational uses of commercial product.

Objectives

Objectives

- ✓Definition of Constipation
- ✓Prevalence
- ✓Pathophysiology
- ✓Red Flags
- ✓Management

Definition

- ✓Involves: Infrequent, difficult, painful or incomplete evacuation of hard stools
- ✓"Functional" meaning without an organic etiology
- ✓Commonly due to children withholding to avoid painful defecation.

Prevalence

- ✓ Affects up to 30% of children
- ✓ Accounts for 3-5% pediatrician visits
- ✓ Peak prevalence in preschool
- ✓ No consistent effect of gender
- ✓ Presenting complaint not homogeneous: infrequent evacuation, hard small feces, difficult or painful evacuation of large diameter stools, fecal incontinence/encopresis, Abdominal pain.
- ✓ Functional constipation accounts for >95%
- ✓ Prompt treatment important: delayed or inadequate treatment may result in stool withholding/worsening sx/psychosocial consequences.

Some basics…

- ✓The frequency of stools in most children decreases from a mean of 4/day in the first week of life, to 1.7 per day by the age of 2.
- ✓Over this interval of stool volume increases more than 10x, while maintaining a consistent water content of approximately 75%
- ✓Intestinal transit time from mouth to rectum increases from 8 hours in the first month of life to 16 hours by 2 years of age to 26 by the age of 10.

Basic Physiology

- ✓ Normal continence is maintained by the resting tonicity of the internal anal sphincter and can be enhanced by contraction of the puborectalis muscle, which creates a 90 degree angle of rectum to the anal canal.
- ✓ When more than 15cc of stool enters the normal rectum, stretch receptors and nerves in the intramural plexus are activated.
- ✓ Inhibitory interneurons decrease the resting tone in the involuntary smooth muscle of the internal anal sphincter that is composed of voluntary skeletal muscle.

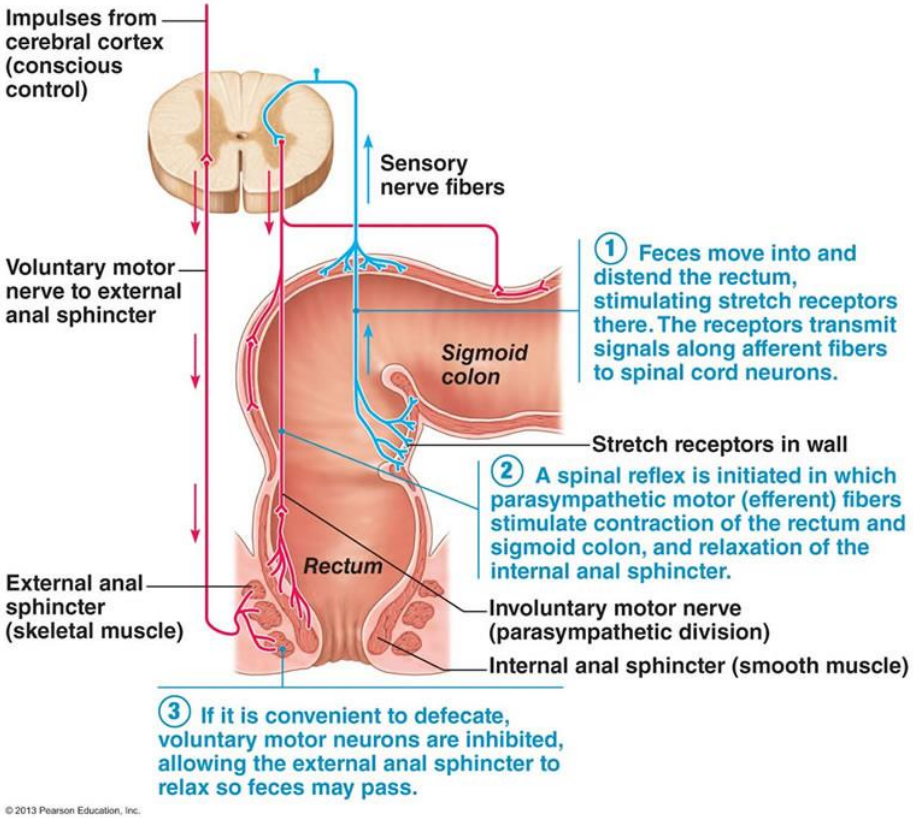
Basic Physiology

- ✓The urge to defecate is signaled.
- ✓If the child relaxes the external anal sphincter, squats to straighten the anorectal canal, and increases intra-abdominal pressure with the Valsalva maneuver, the rectum is evacuated of stool.
- ✓If however, the child tightens the external anal sphincter and the gluteal muscles, the fecal mass is pushed back into the rectal vault and the urge to defecate subsides.

Basic Physiology

- ✓Repetitive denial of evacuation leads to stretching of the rectum and eventually of the lower colon producing a reduction in muscle tone and retention of stool.
- ✓The longer that stool remains in the rectum, the more water is removed and the harder the stool becomes to the point of impaction.
- ✓Encopresis, or fecal soiling usually is the result of looser stool leaking or overflowing from a rectum that has been distended by retained stool.

Basic Physiology



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Hx and Px

- ✓ Careful hx to look at any red flags (discussed later) including birth hx, birth weight, timing of passage of meconium, tolerance of early feedings.
- ✓ Constipation arising at intervals:
  - ✓ BM to Formula
  - ✓ Strained to table foods
  - ✓ Cow's milk
  - ✓ Home to daycare
  - ✓ Diaper to toilet training
- ✓ Allow the child/parent to feel comfortable!
- ✓ Character of the stool ***
- ✓ FHx: CF, hypothyroidism, neurofibromatosis or myopathies

Hx and Px

- ✓Encopresis: age and circumstances at onset
- ✓The response of the parent to the soiling should also be documented
- ✓Hx of possible sexual or rectal abuse should be elicited and suspected if the age of onset is older than usual or the condition is more resistant to treatment.

Hx and Px

- ✓ Documentation of growth and weight gain
- ✓ The remainder should focus on features of systemic diseases and include a thorough neurologic evaluation.
- ✓ Abdominal girth (can be repeated at home, monitored for response)
- ✓ Bowel sounds, hemorrhoids are very rare in childhood, even with longstanding constipation.
- ✓ Perianal manifestations of Crohn's disease include fistula, abscess or ulceration.

Rectal Exam

- ✓ NOT routinely necessary
- ✓ Suggested for the following groups:
  - ✓ Infants
  - ✓ Children with sx since early infancy
  - ✓ Any red flags
  - ✓ Children in whom the presence or degree of constipation is unclear

Bristol Stool Chart

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on the surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. Entirely Liquid

ROME III Criteria

- ✓ Developed originally in 1999, updated 2006, used as a diagnostic aid and to provide categorization for research purposes.
- ✓ Criteria fulfilled at least once per week for at least 2 months prior to diagnosis
- ✓ Child must be a developmental age of at least 4 years old
- ✓ Must not meet criteria for IBS

Rome III Criteria

- ✓2 or fewer defecations in the toilet per week
- ✓At least one episode of fecal incontinence per week
- ✓History of retentive posturing or excessive volitional stool retention
- ✓History of painful or hard bowel movements
- ✓Presence of a large fecal mass in the rectum
- ✓History of large diameter stools that may obstruct the toilet.

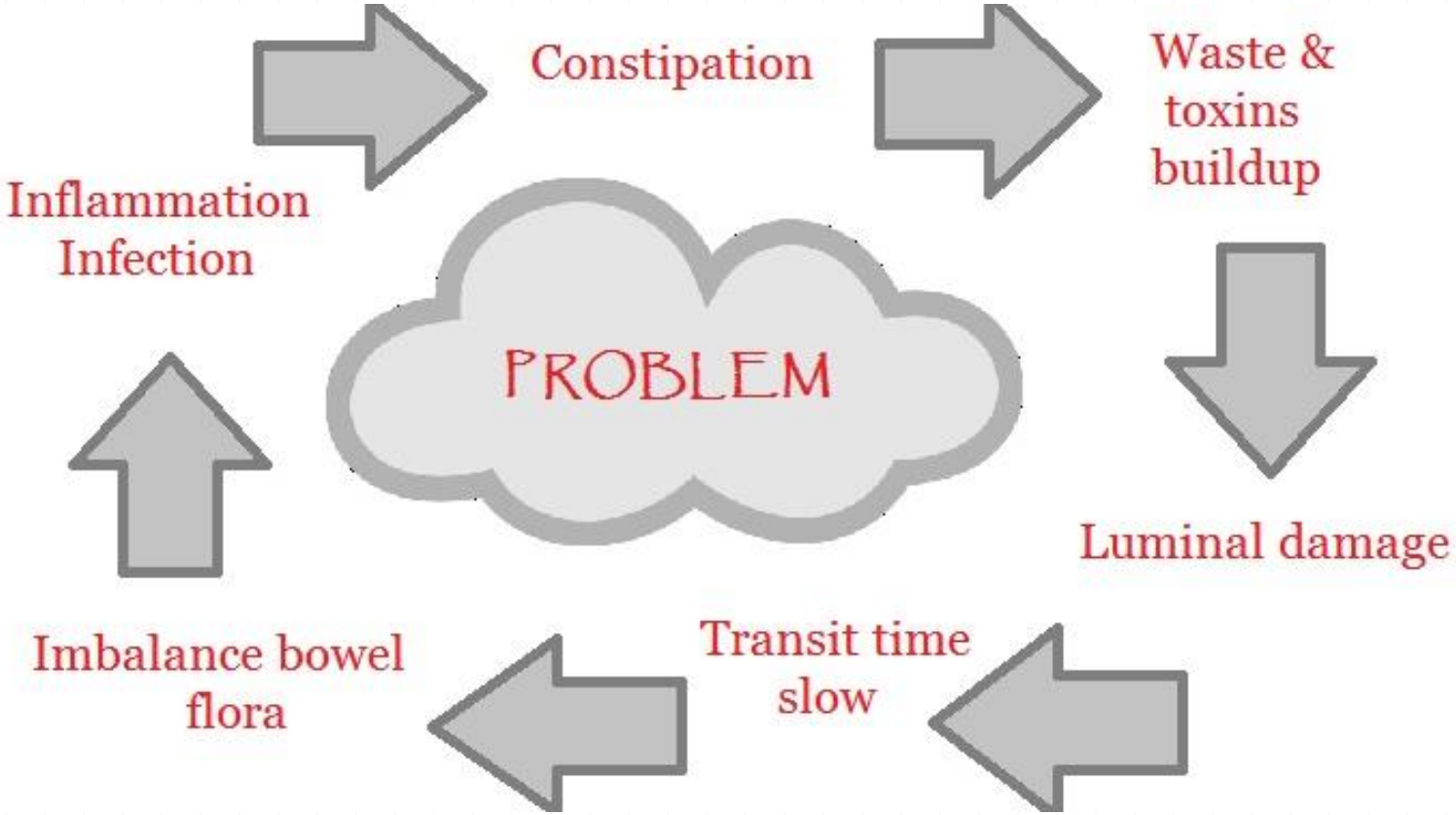
Etiology

When does it arise?

- ✓ 3 times when most prone to develop constipation:
  - ✓ Introduction of cereals and solid foods
  - ✓ Toilet training
  - ✓ Starting School

  - ✓ These can be positive experiences, but if negative, can promote the child wanting to avoid that experience again and thus start the cycle of withholding.

Constipation



Red Flags

Red Flags

- ✓ Delayed passage of meconium: more than 90% of normal newborns but only 10% of infants with Hirschprung disease pass meconium within the first 24 hours of life.
- ✓ Fever, vomiting or diarrhea
- ✓ Rectal bleeding (consider anal fissure)
- ✓ Severe abdominal distention

Red Flags

- ✓Constipation presenting from birth or early infancy
- ✓Stools that are very narrow in diameter
- ✓Urinary incontinence or bladder disease
- ✓Weight loss or poor weight gain (FTT)
- ✓Delayed growth
- ✓Extra-intestinal symptoms (especially neurologic)
- ✓Congenital anomalies or syndromes associated with Hirschprung disease (Down Syndrome)

Management

Goals of Management

- ✓To produce soft, painless stools
- ✓To prevent re-accumulation of feces
- ✓Attained through a combination of education, behavioural modification, daily maintenance stool softeners and dietary modifications.

- ✧Initial laboratory and radiographical investigations are not necessary unless history and exam suggest organic disease.

Initial Management

- ✓ Education:
  - ✓ Loss of control over defecation confuses the child and angers the parents who may believe it is willful defiance. Important to remove these negative attributions and have the parents understand that soiling is not willful or defiant.
  - ✓ During Toilet training, should not be a struggle, clinicians may need to guide the parent in assessing the child's readiness.
  - ✓ May be longstanding (when eventually referred for help), instilling hope and positivity is important. Crucial to acknowledge that proper management is a long-term partnership, necessitating patience and realistic goals for improvement.

Education continued…

- ✓ Parents often worry that medications may make the bowel “lazy’ or “addicted” to laxatives. Education about stool softeners is important to dispel misconceptions.

Fecal Disimpaction

- ✓ Fecal impaction is identified by the presence of a large and hard mass in the abdomen or dilated vault filled with stool on rectal exam, and often substantiated by a history of overflow incontinence.
- ✓ AXR not necessary to diagnose FI. However, if abdominal examination is difficult/compliance is not complete, may be necessary.

Fecal Disimpaction

- ✓Can be achieved by either oral or rectal meds
- ✓1 RCT showed: 3 day administration of PEG3350 at a dose of 1g/kg/d to 1.5g/kg/d (max 100g/d) successfully disimpacted 95% of children AND was well tolerated.
- ✓Another study: regimen of daily enemas for 6 days was equally effective but may be less well tolerated.
- ✓High dose mineral oil also shown to be effective.

Fecal Disimpaction

- ✓Children with severe FI may need to be admitted to hospital or an outpatient medical unit for nasogastric lavage of PEG if the volume required is intolerable orally.
- ✓Usually continued until rectal effluent is clear.
- ✓Digital disimpaction CANNOT be recommended based on available information and may have harmful effects.

Medical Management

- ✓ Once impacted stool has been removed, focus is on preventing recurrence with use of laxatives.
- ✓ Medications proven to be more useful than behavioural change alone.

TABLE 1
Medications for the treatment of paediatric constipation

Laxative	Dosage	Side effects
Lactulose	1 mL/kg/day – 3 mL/kg/day in divided doses	Flatulence, abdominal cramps
Milk of magnesia (Magnesium hydroxide)	1 mL/kg/day – 3 mL/kg/day of 400 mg/5 mL available as liquid	Magnesium poisoning (infants). In overdose, hypermagnesemia, hypophosphatemia and secondary hypocalcemia
Polyethylene glycol 3350	Disimpaction: 1 g/kg/day – 1.5 g/kg/day for 3 days Maintenance: Starting dose at 0.4 g/kg/day – 1 g/kg/day	Limited. Occasional abdominal pain, bloating, loose stools
Polyethylene glycol-electrolyte solution (lavage)	Disimpaction: 25 mL/kg/h (to 1000 mL/h) by nasogastric tube until clear effluent Maintenance: 5 mL/kg/day – 10 mL/kg/day (older children)	Nausea, bloating, abdominal cramps, vomiting and anal irritation
Mineral oil	Disimpaction: 15 mL/year – 30 mL/year of age (up to 240 mL daily) Maintenance: 1 mL/kg/day – 3 mL/kg/day <1 year of age: Not recommended	Lipid pneumonia if aspirated. Theoretical interference with absorption of fat-soluble substances, but no evidence
Senna	2–6 years: 2.5 mL/day – 7.5 mL/day 6–12 years: 5 mL/day – 15 mL/day	Idiosyncratic hepatitis, melanosis coli, hypertrophic osteoarthropathy, analgesic nephropathy
Bisacodyl	Oral: 3–12 years: 5 mg – 20 mg Rectal: <2 years: 5 mg/day 2–11 years: 5 mg/day – 10 mg/day	Abdominal cramping, nausea, diarrhea, proctitis (rare)
Docusate sodium	5 mg/kg/day divided three times a day or as a single dose	Abdominal pain, cramping, diarrhea
Glycerin suppositories	–	None
Phosphate enemas	<2 years old: Not recommended >2 years: 6 mL/kg (up to 135 mL)	Risk of mechanical trauma to rectal wall Abdominal distention or vomiting Hyperphosphatemia, hypocalcemia

Adapted from references [6] and [42]

Medical Mx

- ✓ Growing support in the efficacy and safety of PEG3350 in the maintenance and treatment of children with constipation.
- ✓ PEG3350 w/o electrolytes, is a tasteless, odorless, osmotic laxative.
- ✓ Dissolves well in water/juice
- ✓ Absorbed only very minimally by the gut
- ✓ Does not cause electrolyte imbalance
- ✓ Starts to work within 1 week
- ✓ Compared to placebo, more effective than lactulose, equal to milk of magnesia (but better tolerated)

Long-Term Management

Behavioural Changes

- ✓A toileting regime that dedicates time for defecation is valuable
- ✓Most with regular BM do so at the same time daily
- ✓This is a conditioned reflex (w/in 1hr of eating)
- ✓Routine toileting for 3-10min BID
- ✓Footstool (increase intra abdominal pressure)
- ✓No punishment
- ✓Regular physical activity (unclear role)

Dietary Modification

- ✓ Balanced diet (whole grains, fruits, vegetables)
- ✓ Carbohydrates (especially sorbitol) found in prune, apple and pear juices can be helpful in increasing the water content in stool
- ✓ Low fiber intake has been shown to be a risk factor in constipation. AAP recommends 0.5mg/kg/day to max of 35g daily. No evidence to increase beyond that.
- ✓ No studies regarding the use of wheat dextrin, psyllium (Metamucil) in children.
- ✓ Adequate fluid intake must be ensured.
- ✓ Excessive milk can exacerbate, no evidence to eliminate.

Follow-Up

- ✓Regular follow-up and ongoing support and encouragement is necessary.
- ✓Stool softeners often needed for months to years to promote soft daily stools
- ✓Treatment duration should be at least 6 months
- ✓Should have regular bowel movements without difficulty before considering a trial of weaning
- ✓Relapse rate for constipation can be quite high, problems can persist into adulthood.

Gastroenterology??

- ✓Referral can be contemplated if therapeutic measures fail or there is concern that organic disease exists
- ✓Further investigations are warranted at that time

Summary

Summary

- ✓ Thorough Hx and Px
- ✓ Ix are seldom required
- ✓ Education is critical at the initial visit and should be regularly reinforced.
- ✓ Disimpaction can be achieved with either oral or rectal medication
- ✓ Balanced diet with adequate fiber intake
- ✓ Behavioural management should be used in conjunction to medical management
- ✓ PEG 3350 is safe, effective and well-tolerated long term treatment.

Questions??

Thank you!

for participating in today's

Pediatric Telehealth Rounds

Join us next time:

Eating Disorders

With Dr. Robinson

May 1st, 2015

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