

Update on Pediatric Gastroenterology

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Objectives

- Review of common pediatric GI issues (Abdominal pain, GERD, EOE, constipation)
- Discuss treatment strategies for common pediatric GI issues
- Review when to refer patients for specialty care for GI issues

Chronic Abdominal Pain (Functional Abdominal Pain Disorders)

- Prevalence: ~13.5%, female predominance
- Etiology: unknown, multifactorial
- Rome IV criteria:
 - “after appropriate medical evaluation, the symptoms cannot be attributed to another medical condition.”
 - Related conditions: irritable bowel syndrome, functional dyspepsia, abdominal migraine, etc

Rome IV Diagnostic Criteria

TABLE 2. Rome IV diagnostic criteria for functional abdominal pain disorders in the child/adolescent.^{8,9}

Functional abdominal pain - not otherwise specified

- Occurs ≥ 4 times per month for ≥ 2 months
 - Episodic or continuous abdominal pain that does not occur solely during physiologic events (eg, eating, menses)
 - Insufficient criteria for other functional GI disorders i.e. irritable bowel syndrome, functional dyspepsia, or abdominal migraine
 - After appropriate evaluation, abdominal pain cannot be fully explained by another medical condition
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Evaluation

- History
- Physical
- ROS

Table 2. Potential Alarm Features in Children With Chronic Abdominal Pain^a

Family history of inflammatory bowel disease, celiac disease, or peptic ulcer disease
Persistent right upper or right lower quadrant pain
Dysphagia
Odynophagia
Persistent vomiting
Gastrointestinal blood loss
Nocturnal diarrhea
Arthritis
Perirectal disease
Involuntary weight loss
Deceleration of linear growth
Delayed puberty
Unexplained fever

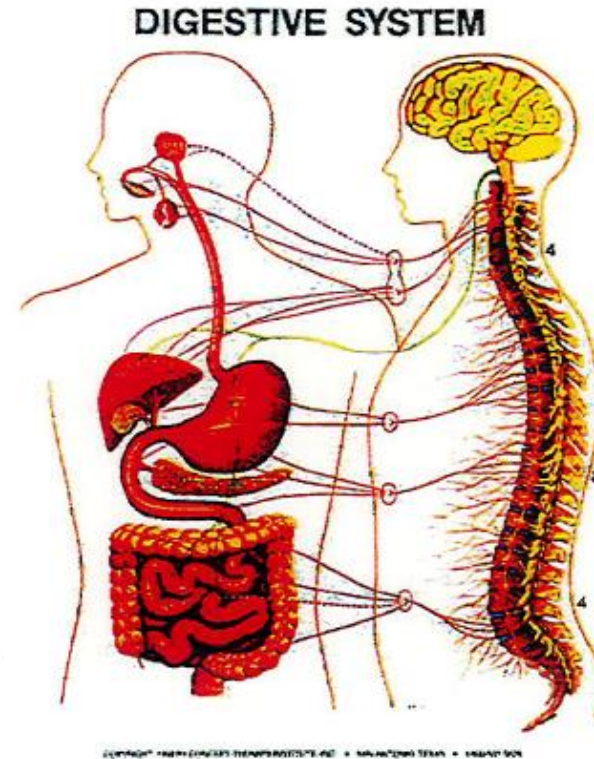
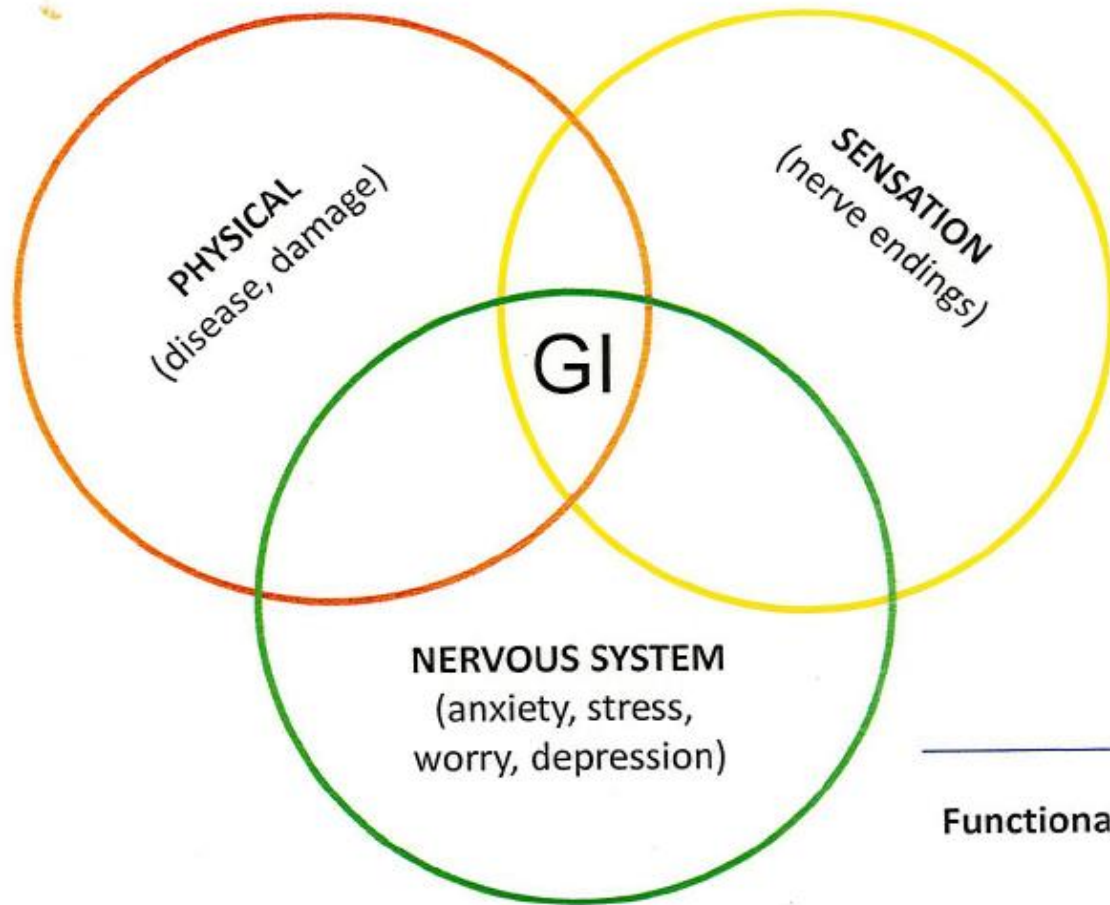
^aClinical judgment should be exercised, putting what might be considered an alarm sign into the whole context of the history and physical examination.

Evaluation

- Labs
 - CBC, Chem 14, ESR, CRP
 - Celiac testing, Thyroid tests, Amylase, Lipase, urinalysis
 - Others based on thorough history, physical, and ROS

Influences that contribute to abdominal pain

The Three Influences on the GI System



Functional GI Disorder (FGID)

Management

- Treat underlying disease
- Education and reassurance
 - Emphasize absence of organic disease
- Diet and lifestyle changes
 - Avoid triggers (consider Low FODMAP foods)
 - Probiotics and fiber
 - Yoga, meditation, relaxation
- Symptom relief
 - Peppermint oil
 - Histamine receptor antagonist (ciproheptadine)
 - Anticholinergic agents (dicyclomine or hyoscyamine)
 - Tricyclic antidepressants (amitriptyline)
- Cognitive-Behavioral therapy

When to refer

- Red flags on history and physical
- Abnormal labs (celiac disease, inflammation, etc.)
- Need for upper and/lower endoscopy.
- Unclear diagnosis after thorough evaluation

Gastroesophageal reflux disease

- GER: Passage of gastric contents into the esophagus with or without regurgitation or vomiting.
- GERD pathologic GER
- Prevalence:
 - Infant: 23.1% to 40.0%; decreases as infant age increased
 - Less than 10 years: 3.2%
 - Older than 10 years: 0.2%-18.8%

GERD Red Flags

Infant	Child
Onset immediately after birth	Weight loss
Weight loss	Dysphagia or odynophagia
Fever	Hematemesis
Dyspnea or cough	Hematochezia
Projectile vomiting	Chest pain
Bilious emesis	Cyclical/specific timing
Bulging fontanelle	Nocturnal
Seizure	
Macrocephaly	
Abdominal distention	
Hematemesis	
Hematochezia	

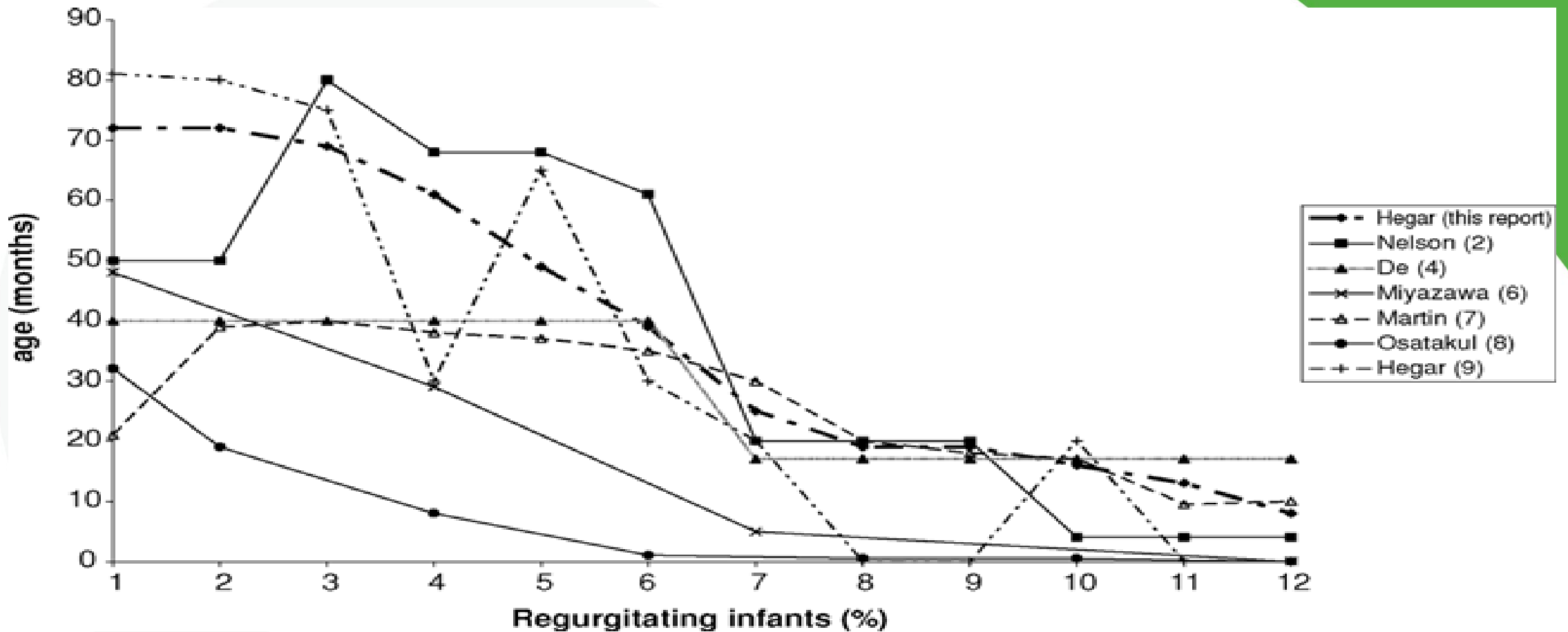
Not all-inclusive. Use clinical judgement based on thorough history and physical

Physiologic GER

- “Happy spitter”
 - Rare prior to 1 month or after 6 months
 - Usually resolves by 12 months
 - Consider work if not following this pattern
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- Sandifer syndrome: arching of the back with opisthotonic posturing.
 - May resemble seizure – unlike seizures, patient is responsive to stimulus

Physiologic GER

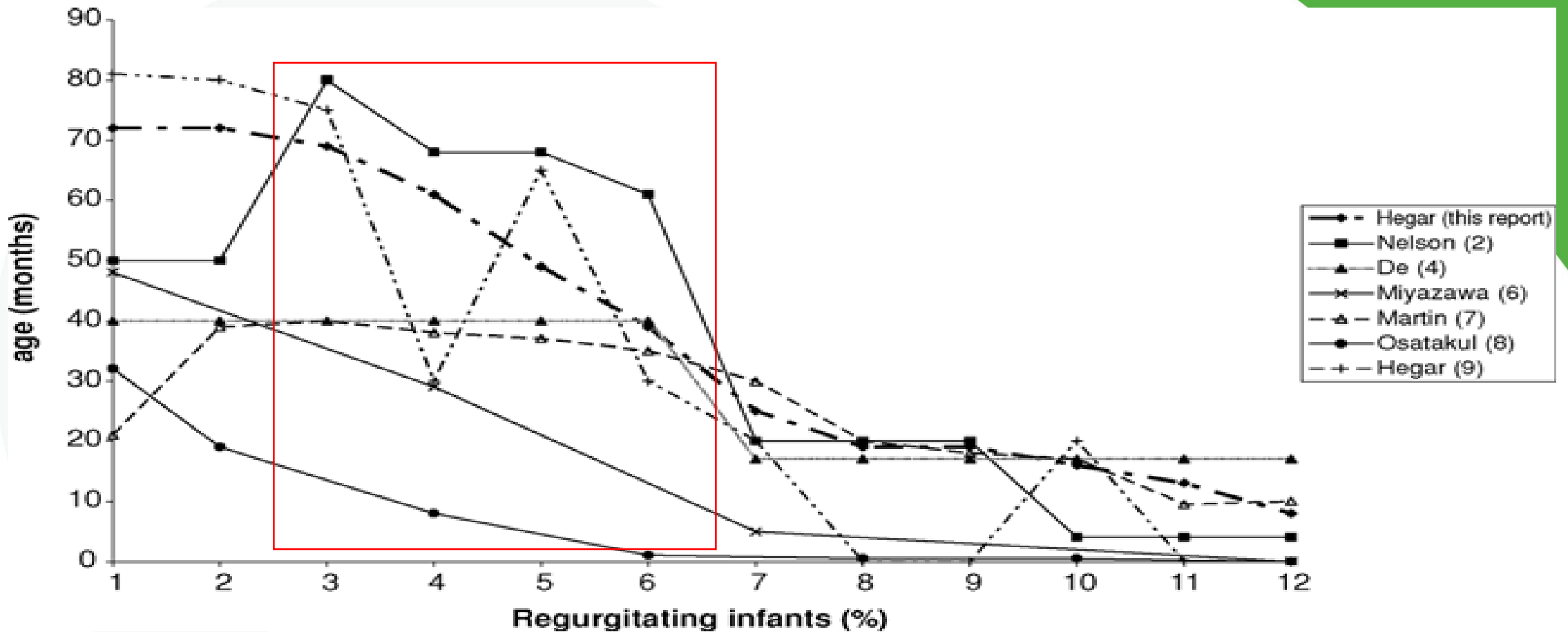
- “Happy spitter”



Prevalence of daily regurgitation during the first year of life.

Physiologic GER

- “Happy spitter”



Prevalence of daily regurgitation during the first year of life.

Evaluation

Study	Findings
Deglutition	Oral and pharyngeal phase swallowing Laryngeal penetration Tracheal aspiration
Esophagram	Identifies esophageal webs, tracheoesophageal fistula, achalasia, diaphragmatic hernia
Upper GI series	Assesses through to the ligament of Treitz Identifies esophageal pathologies in esophagram and gastric antral webs, microgastria, pyloric obstruction/stenosis, duodenal atresia/stenosis, malrotation
EGD	Aids in diagnosis of eosinophilic esophagitis, diaphragmatic hernia, gastritis, peptic ulcer disease, Crohn's disease
pH and impedance probe	Evaluation of changes in pH and solid, liquid, and gas passage in the esophagus Measures reflux events and correlates with symptoms

Management

“In the absence of red flag signs and symptoms, diagnostic testing and/or therapies including acid suppression are not indicated if there is no impact of the symptoms on quality of life such as feeding, growth or acquisition of developmental milestones”

~Rosen R, et al. Pediatric gastroesophageal reflux clinical practice guidelines: joint recommendations of NASPGHAN and ESPGHAN. *J Pediatr Gastroenterol Nutr* 2018;66:516–54.

Management

- Diet and lifestyle changes:
 - Infants remain in supine position
 - Thickening milk/formula
 - Trial of dairy and soy elimination (minimum 2 weeks)
 - Avoidance of chocolate, tomato based and acidic foods, caffeine, fatty foods, tobacco, and alcohol
- Acid suppression:
 - Infant: no benefit found
 - Child: 4-8 weeks after diet and lifestyle changes
 - PPI's are preferred
 - Long term use increased incidence of pulmonary infections, Clostridium difficile, and necrotizing enterocolitis.
 - May impact skeletal and renal health

When to refer

- Red flags suggesting underlying disease, unexplained weight loss, persistent forceful vomiting, dysphagia or odynophagia or hematemesis.
- GERD symptoms in an older child that are refractory to treatment, (8 weeks with little or no response to optimal treatment).
- 3) Endoscopically-confirmed GERD that requires chronic treatment with acid suppressing medications.

Eosinophilic Esophagitis

- First reported in 1990's
- Prevalence: 5-10 per 100,000 children
- Type 2 T-helper mediated allergy; NOT IgE mediated
- Higher incidence in those with other atopic conditions

Presentation

- Dysphagia or odynophagia
- Food impactions
- Vomiting
- Food refusal
- Chronic reflux
- Poor weight gain/weight loss

Evaluation and Initial Treatment of EoE

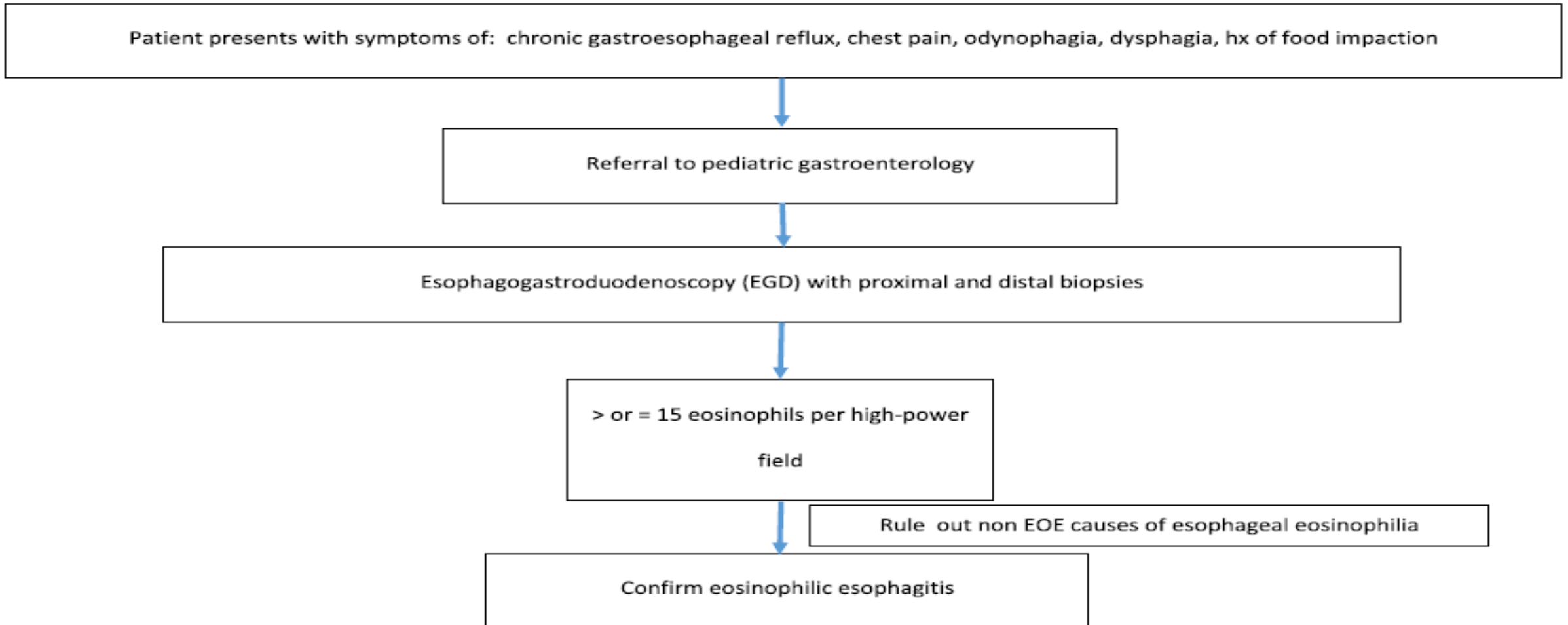


Fig. 1. Evaluation and treatment algorithm.

Work up

- Requires mucosal biopsies
- PPI trial not required to diagnose EOE
- PPI responsive esophageal eosinophilia
 - Dellon ES, et al. Updated... diagnostic criteria for eosinophilic esophagitis.... Gastroenterology 2018;155(4):1022–1033.e10.
- Food allergy testing does not rule in or rule out EOE
- Normal esophagram does not rule out EOE

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Treatment options

- PPI
- Swallowed steroids: fluticasone or budesonide
- Food elimination
 - Amino acid based diet
 - Allergy testing directed
 - 6-food elimination diet is the most effective dietary treatment for eosinophilic esophagitis

6 Food Elimination Diet

- Dairy
- Soy
- Wheat
- Eggs
- Nuts
- Fish

Management

- Repeat endoscopy required between every treatment change
- 8-12 weeks necessary to allow for histologic improvement
- Uncontrolled inflammation may lead to esophageal stricture

Constipation

- 35% of pediatric office visits
- 10-25% of pediatric gastroenterology referrals
- Functional constipation: 95% of constipation cases

Functional Constipation

TABLE 2. Rome IV criteria for functional constipation.⁴

Must include 2 or more of the following occurring at least once per week for a minimum of 1 month with insufficient criteria for a diagnosis of irritable bowel syndrome:

- 2 or fewer defecations in the toilet per week in a child of a developmental age of at least 4 years
- At least 1 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 can obstruct the toilet

After appropriate evaluation, the symptoms cannot be fully explained by another medical condition.



TABLE 3. Alarm signs (“red flags”) for organic causes of constipation in the history and physical exam of a child being evaluated for constipation.^{2,6}

History	<ul style="list-style-type: none">• Constipation starting extremely early in life (< 1 month of age)• Delayed passage of meconium (> 48 h)• Family history of Hirschsprung disease
Stool characteristics	<ul style="list-style-type: none">• Visible blood in the stools in the absence of anal fissures• Ribbon stools
Systemic symptoms	<ul style="list-style-type: none">• Poor growth/failure to thrive• Fever• Bilious vomiting
Physical exam	<ul style="list-style-type: none">• Severe abdominal distension• Perianal fistula• Abnormal position of anus• Absent anal wink or cremasteric reflex• Decreased lower extremity strength/tone/reflex• Tuft of hair on spine or sacral dimple• Gluteal cleft deviation• Extreme fear during anal inspection• Anal scars• Abnormal thyroid gland

Work up

- Labs and imaging in the presence of red flags
 - Chem 8, celiac markers, Thyroid function
 - Abdominal XR
 - Radio-opaque markers
 - Contrast enema
- Motility testing
 - Anorectal manometry
 - Colonic manometry

Bowel Clean-out Regimen



Laxative agents	1-2 years	2-4 years	5-10 years	10+ years
<u>Stimulant</u>	<u>Twice a day</u>	<u>Twice a day</u>	<u>Twice a day</u>	<u>Twice a day</u>
- Senna	7.5 mg	15 mg	22.5 mg	30 mg
- Bisacodyl	None	5 mg	5 mg	10 mg
<u>Osmotic</u>	<u>Take over 4-8 h</u>	<u>Take over 4-8 h</u>	<u>Take over 4-8 h</u>	<u>Take over 4-8 h</u>
- PEG 3350	2.5 capfuls in 16 oz of fluid	4 capfuls in 20 oz of fluid	7 capfuls in 32 oz of fluid	14 capfuls in 64 oz of fluid
- Magnesium citrate	None	2-4 oz (1 oz per age) plus 8-16 oz additional fluids	5-10 oz (1 oz per age); Plus 16-24 additional fluids	10 oz Plus additional 24-32 oz fluids

Tabbers MM, et al. Evaluation and treatment of functional constipation in infants and children: evidence-based recommendations from ESPGHAN and NASPGHAN. J Pediatr Gastroenterol Nutr 2014;58(2):258–74.

Maintenance Regimens

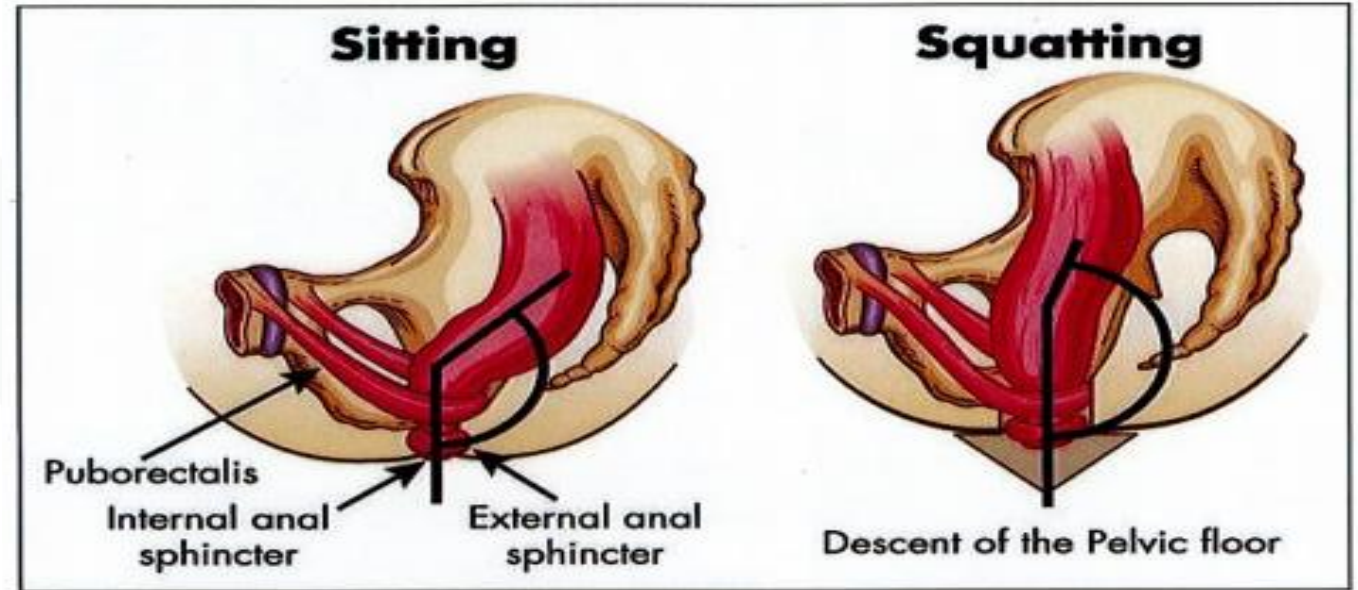
Laxative options	Dose
Osmotic agents - Lactulose - PEG 3350 - Milk of Magnesia	1-2 g/kg/day (1.5-3 ml/kg/day) div 1-2 times a day 0.2 to 0.8 g/kg/day (4-8 oz fluid per 17 gm) 2-5 yrs: 0.4-1.2 g/day 6-11 yrs: 1.2-2.4 g/day 12-18 yrs: 2.4-4.8 g/day
Stimulant agents - Senna - Bisacodyl	2-6 yrs: 2.5-5 mg/day 6-11 yrs: 7.5-10 mg/day >12 yrs: 15-20 mg/day 3-10 yrs: 5 mg/day >10 yrs: 5-10 mg/day

Behavioral Changes

- Toilet sitting 2-3 times a day
- Footstool
- Consistency
- Symptom control for 6-9 months before weaning medications
- Evidence does not support extra fiber or fluids

Proper Positioning

1. Increase the ease of having a bowel movement.



- Make sure feet are planted on a surface (stool, books, floor)
- Do not cross legs or hunch all the way over
- Have some patience and try to relax. Okay to play video game or read books! Try to sit on the toilet for 5-10 minutes.
- Sit on the toilet after **breakfast, lunch and dinner!**



When to refer

- Red flags present
- Poor response to laxatives
- Relapse
- Concern for motility disorder

Foreign Body Ingestions

TABLE 1. Timing of endoscopic intervention in pediatric foreign body ingestions

Type	Location	Symptoms	Timing	
Button battery	Esophagus	Yes or No	Emergent	
		Gastric/SB	Yes	Emergent
		No	Urgent (if age <5 and BB \geq 20 mm) Elective (if not moving on serial x-ray)	
Magnets	Esophagus	Yes	Emergent (if not managing secretions, otherwise urgent)	
		No	Urgent	
	Gastric/SB	Yes	Emergent	
		No	Urgent	
Sharp	Esophagus	Yes	Emergent (if not managing secretions, otherwise urgent)	
		No	Urgent	
	Gastric/SB	Yes	Emergent (if signs of perforation, then with surgery)	
		No	Urgent	
Food impaction	Esophagus	Yes	Emergent (if not managing secretions, otherwise urgent)	
		No	Urgent	
Coin	Esophagus	Yes	Emergent (if not managing secretions, otherwise urgent)	
		No	Urgent	
	Gastric/SB	Yes	Urgent	
		No	Elective	
Long object	Esophagus	Yes or no	Urgent	
	Gastric/SB	Yes or no	Urgent	
Absorptive object	Esophagus	Yes	Emergent (if not managing secretions, otherwise urgent)	
		No	Urgent	
	Gastric/SB	Yes or no	Urgent	

BB = button battery; SB = small bowel.

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