
بسم الله الرحمن الرحیم

Management of GERD

Abolfazl Iranikhah-MD;
Associate Professor in Pediatric Gastroenterology
MUQ
May. 2025

MANAGEMENT

- *Positioning and Feeding*
- *Pharmacologic Therapy*
- *Testing*

NASPGHAN FOUNDATION

NASPGHAN

Conservative Measures of GERD Management in Children & Adolescents

- A paucity of randomized controlled trials are available in children or adolescents which evaluate efficacy of conservative measures for GERD treatment
- Dietary modification
  - Weight loss in the case of overweight or obese
  - Avoid caffeine, tomato, spicy and citrus containing foods, deep-fried or fatty foods, chocolate
  - No food/meal less than 1 hour prior to sleep
  - Smaller, more frequent meals
- Positioning changes
  - Raising the head of the bed
  - Left lateral decubitus sleeping position
- Avoidance of passive (2nd hand) cigarette/tobacco smoke

Life style changes:

Measures recommended for all infants with GER

•Breast milk versus formula feeding

- Continuation of breastfeeding should be encouraged if practicable.
- Breastfeeding may have a protective effect on regurgitation in infants, experience less nocturnal esophageal acid exposure compared with formula-fed neonates.

•Avoid overfeeding

•Avoid tobacco smoke exposure

•Avoidance of cow's milk and soy protein –suspicion for cow's milk protein intolerance, as evidenced by gross or occult blood in the stool, eczema, a strong family history of atopy, or poor weight gain.

- . Because GERD is generally a clinical diagnosis, two-week trial of a milk- and soy-free diet (extensive or AA formula)is appropriate,
- Breastfed infants : elimination of all cow's milk proteins and beef from the mother's diet & major sources of soy protein.
- lactose-free cow's milk-based formulas are not likely to be helpful
- Infants who respond to the dietary change are generally maintained on a milk-free diet until one year of age.

Thickening feeds:

- Safety concerns regarding rice cereals were raised because of high levels of inorganic arsenic, which may cause neurotoxicity and long-term cancer risk.
- However rice cereal have some advantages over other cereals, including its ability to dissolve easily, its low cost, and it has been used for a long time.
- Breast milk cannot be used to thicken with cereal because of the amylases present. Troublesome regurgitation and GERD are (almost) never a good reason to stop breastfeeding.
- Commercially-prepared thickened formula is preferred over adding thickeners to formula, because the effect of the thickener on the composition of the formula has been taken into account in commercially-prepared formula.
- Most of the infant formula companies have developed AR and Comfort formula. While the first is positioned to reduce regurgitation in the "happy spitter", the second is positioned in the management of the infant presenting with regurgitation and distress.
- Comfort formulas are thickened, often the proteins are partially hydrolyzed, and lactose is reduced.

Be Aware of Caloric Impact of Thickening Feeds with Rice Cereal

- Thickening a 20 kcal/oz infant formula with:
  - 1 tbsp rice cereal per 2oz ---- 27 kcal/oz
  - 1 tbsp rice cereal per oz ---- 33kcal/oz (1.1Kcal/ml)

- Change from appropriate macronutrient distribution to one that is not appropriate
  - Fat from 48% to 24% and carbohydrate from 43.5% to 68%.

NASPGHAN NASPGHAN FOUNDATION
©2016 NASPGHAN FOUNDATION

Positioning Therapy for Infants

Sitting

Supine

Prone

- Decreased acid reflux in flat prone position vs. flat supine position
- Prone position is acceptable if the infant is observed and awake, particularly in the postprandial period
- Prone position during sleep can only be considered if risk of death from GERD outweighs the risk for SIDS
- Prone position may be beneficial for children older than 1 year of age as the risk for SIDS is negligible
- Side-lying is not recommended as it is an unstable position from which the infant may slip into the prone position

Left Lateral Position May Lead to Reduced Reflux

- Studies of manometry and impedance have shown:
  - the number of transient LES relaxations increases in the right lateral position (RLP)
  - the number of reflux events increase in the RLP
- These effects are reversed when the child is turned to the left lateral position (LLP) which may be beneficial for reflux
- Gastric emptying is faster in the right lateral position but this benefit is not outweighed by the increased TLESRs

Left Side Down:
Pooling in the Fundus

Right Side Down:
Faster emptying but direct esophageal access

Available Pharmacotherapy

- Antacids
- Histamine-2 receptor antagonists
- Proton pump inhibitors
- Prokinetic agents
- Surface agents
- GABA-B agonists

NASPGHAN FOUNDATION
NASPGHAN
© 2012 NASPGHAN Foundation & NASPGHAN

Prokinetic agents:

_ Have a minimal role in the treatment of GER in infants.

_ Prokinetic agents with any established efficacy also have significant safety concerns, including CNS side effects for metoclopramide and cardiac arrhythmias for cisapride, which resulted in its removal from the market in USA & Canada, and lack of evidence for efficacy and possible safety concerns for domperidone (primarily prolonged QTc interval and related drug interactions).

Baclofen reduce transient (LES) relaxations, reflux episodes, and to accelerate gastric emptying.

- It may be used for the management of GERD, but not as a first-choice drug because of the side effects, including dyspeptic symptoms, drowsiness, dizziness, fatigue, and a lowered threshold for seizures .

Baclofen should be considered for use only in carefully selected patients after a fully informed discussion with their caregivers, and with appropriate monitoring for concerns and drug interactions .

Anti-acid medication

- Antacids and alginates neutralize acid and contain sodium/potassium bicarbonate, or aluminum, magnesium, or calcium salts.
- Alginates reduce reflux symptoms and the number of episodes of regurgitation and vomiting but some studies failed to show efficacy of alginate.

. The National Institute for Health and Care Excellence guidelines recommend alginates as an alternative treatment to feed thickening agents in breastfed infants or as a trial in infants whose symptoms persist despite conservative measures .

On-demand and short-term administration of alginate have no significant adverse effects.

PPIs

- There has been a tremendous rise in use of proton pump inhibitors (PPIs) in children over past 15 years[1]
  - Particularly an issue in infants <12 months of age [2]
- Preponderance of evidence that PPIs ***do not***
  - reduce GER symptoms in infants [3, 4] or
  - decrease infant crying and irritability [5]

PPIs..

- PPIs are extremely effective at acid suppression[1]
  - Preferred treatment for a number of acid related disorders [2]
  - Relatively safe medications [3]
- However, there are growing concerns over risks associated with PPI utilization
- Important to know pediatric indications
  - To use vs. when not to use PPIs
  - Recommended durations of use

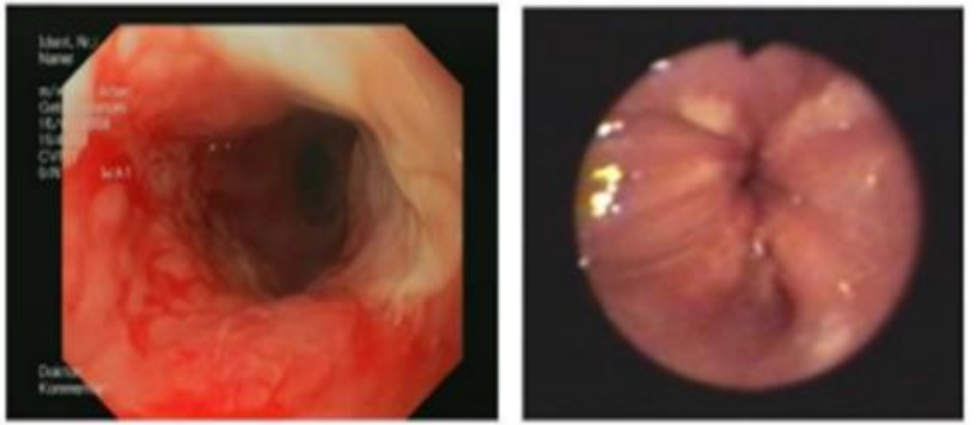
Preponderance of Evidence that Treating Infants for GERD with PPI Does Not Reduce Crying and Irritability

- Minimal evidence supports the contention that acid reflux may cause irritability in infants
- Variations in parental perception of excessive crying/sleep disturbance complicate interpretation

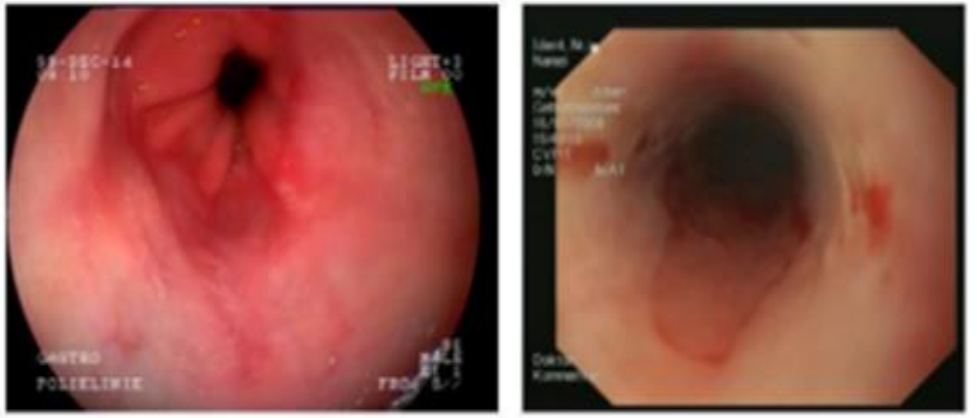
Correlation of Symptoms and Injury

In infants, symptoms are not reliable to predict the presence or severity of erosive esophagitis.

≠



≠



New PPI K/H ATPase reversible blocker with therapeutic potential for GERD by reversibly suppressing gastric H+/K+_ATPase

- Fexuprazan
- Vonoprazan
- Tegoprazan
- Revaprazan

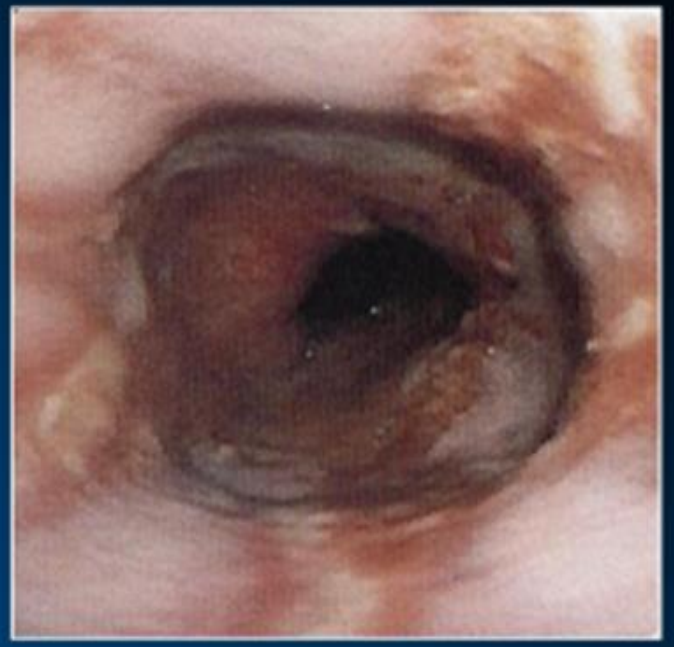
- Very fast competitive and reversible inhibition of acid secretion.
- More rapid elevation of intragastric PH than DR-PPIs
- Long antisecretory effect duration.

Potential Risks of prolonged Acid Suppression

- Infections:
  - *C. difficile*
  - Small bowel bacterial overgrowth
  - Other enteric infections
  - Pneumonia and other respiratory infections
- Necrotizing enterocolitis and candidemia
- Effects on vitamins and mineral absorption:
  - Iron
  - Calcium
  - Magnesium
  - Vitamin B12
- Gastric fundic gland polyps
- Interstitial nephritis (rare, idiosyncratic reaction)
- Myocardial infarction and Dementia

NASPGHAN NASPGHAN FOUNDATION
©2016 NASPGHAN FOUNDATION

Esophagitis - Management



- A PPI for 3 months is recommended as initial therapy
- Increase the PPI dose at 4 weeks if symptom control is not adequate
- In most cases efficacy can be monitored by extent of symptom relief without routine endoscopic follow-up

- Most patients require a once daily dose of PPI to relieve symptoms and heal esophagitis

GERD in Neurologically Impaired Populations Management

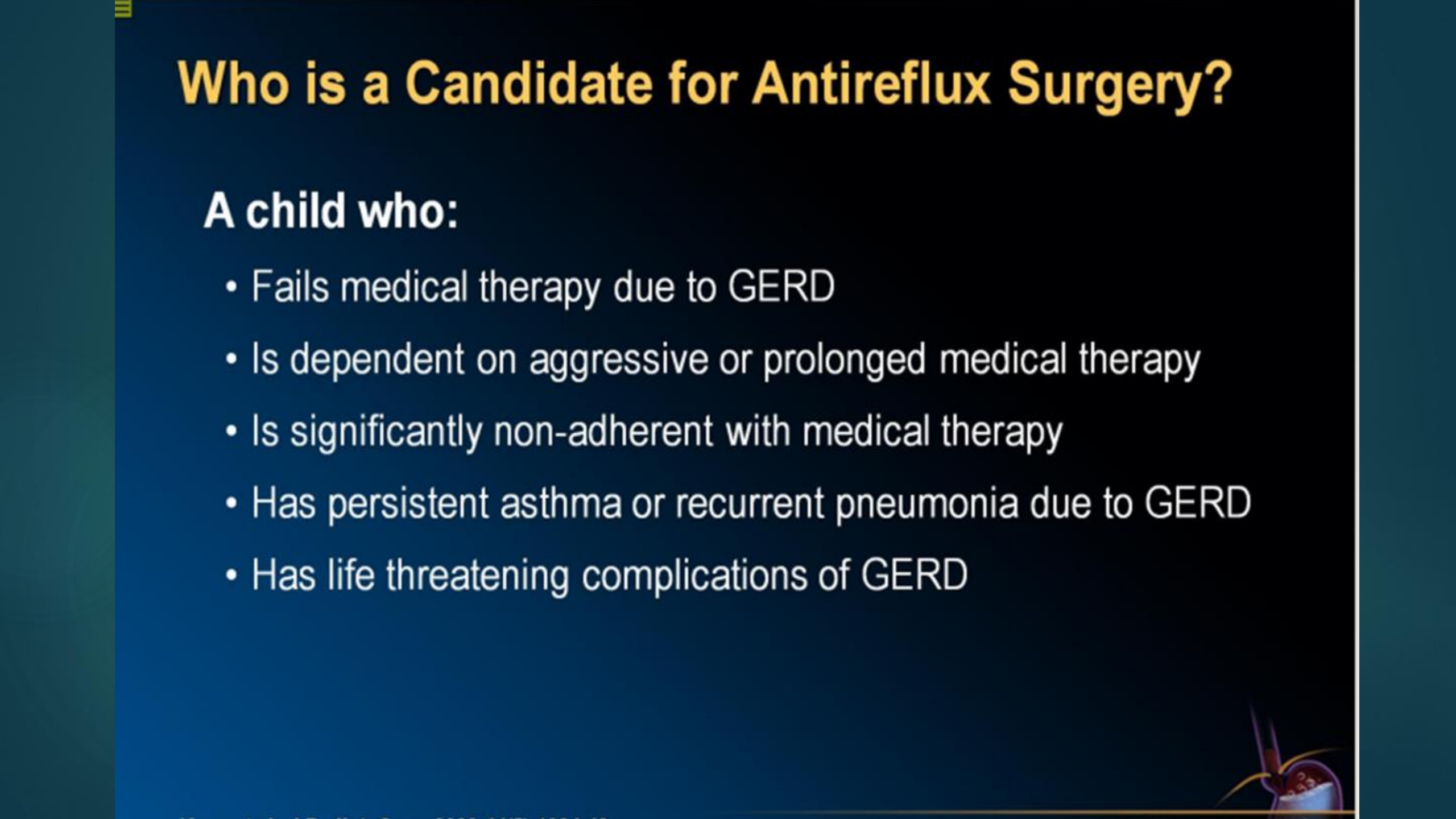
- Long term PPI is effective and often necessary for symptoms control and maintenance or remissions of esophagus.

- Anti-reflux surgery may not benefit in this patient group due to high morbidity and failure rate.

Who is a Candidate for Antireflux Surgery?

A child who:

- Fails medical therapy due to GERD
- Is dependent on aggressive or prolonged medical therapy
- Is significantly non-adherent with medical therapy
- Has persistent asthma or recurrent pneumonia due to GERD
- Has life threatening complications of GERD



Probiotics

- Because of the safety profiles of probiotics, this agent has been used worldwide in infants and children for many purposes such as acute diarrhea, colic, and regurgitation.
- A large RCT study in 589 term infants demonstrated significant efficacy of Lactobacillus reuteri DSM 17938 in preventing colic.
- In the same RCT, the author also demonstrated the efficacy of this probiotic in decreasing the mean number of regurgitations per day.
- Hence, probiotics are prescribed widely in clinical practice to prevent or treat GER. However, in GERD, there has been no strong evidence for their use and further research is warranted.

Case Presentation: History

- 7 mo white male cc frequent regurgitation and wheezing x 2 months
- Wheezing prominent in AM
- Regurgitation of bilious mixture postprandially
- Occ arches back while feeding
- Diet: Breat Milk ,
  Rice cereal,
  Appropriate Soup ,
  Egg,
  Fruit or veg.

Case Presentation: History

- Mother Denies: fever, diarrhea, rigors, lethargy
- PMH: RAD at 4mo,
- C-section 3w pre-term
- Poor weight gain
- Meds: Albuterol syrup for RAD; mother denies improvement of sx

Case Presentation: Physical Exam

- Irritable, slightly pale, app
- Smaller and younger than age
- Pulm: Intermittent stridor, no retractions or grunting
- Spit-up twice while in exam room
- Remainder: unremarkable

Patient Dx and Rx • Dx: GERD

- No Diagnostic Tests at this time
- Rx: - Nonpharmacologic
- Dec. volume of feeding, feeding more frequently, thickening formula with rice cereal, keeping infant upright g 30 min postprandially
- Pharmacologic

  • Ranitidine (Zantac) 5mg/kg/day orally divided into 2 doses.

  • Continue Albuterol syrup, prn • Follow-Up:

  - No official f/u; mother instructed to call if sx not resolving or worsening.

Patient Dx and Rx • Dx: GERD

- • Up to 4 of 10 infants under 6mo
- • Becomes less common as GI system matures; 5% of infants spit up regularly after 12mo
- • Most cases are benign, very few (3/1000) cases are significant w/ risk of complications (Ferri et al, 2006)

CONCLUSION

- Goals of Rx - Relieve Sx, promote normal growth, heal damage and inflammation, prevent complications

- Nonpharmacologic

  Thickening feeds, decreased volume of feeds, avoidance of carbonated / caffeinated beverages and smoke exposure, elevation of the head during feedings and 30 minutes postprandially

- Pharmacologic

  Antacids: sporadic Sx or w/ diarrhea or constipation

  H-2 receptor antagonists if esophagitis suspected - PPI's suppress acid and aid healing - Metoclopramide

- • Surgical - Fundoplication (RARE)