Emesis in the Newborn

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Objectives

- Brief case discussion
- Evaluation of a newborn with emesis
- Discuss acute general management of neonate with emesis
- Establish clear definition of vomiting
- Review importance of characterizing emesis
- Review common causes of neonatal emesis
- Summarize key points

Case Presentation

- You just took over care for an 18-hour-old male who was born at 38+5 weeks by c-section. The mother reports that the baby is not feeding well and has vomited after each of his last 2 feedings.

What additional information would you like to know?

Pertinent Information

- Define “vomiting”
- Describe the emesis
- How is the baby’s exam?
- Stool? Void?
- Does the baby act hungry?
- Risk factors for sepsis?
- Important maternal/prenatal history?
- Other symptoms?


BACK
to the
BASICS

Definition of Vomiting

- Vomiting is a coordinated, sequential series of events that leads to forceful oral emptying of gastric contents
  - Must be differentiated from spitting up, which is effortless and often occurs with a burp
- Vomiting occurs when the brain signals the abdominal muscles and diaphragm to contract vigorously

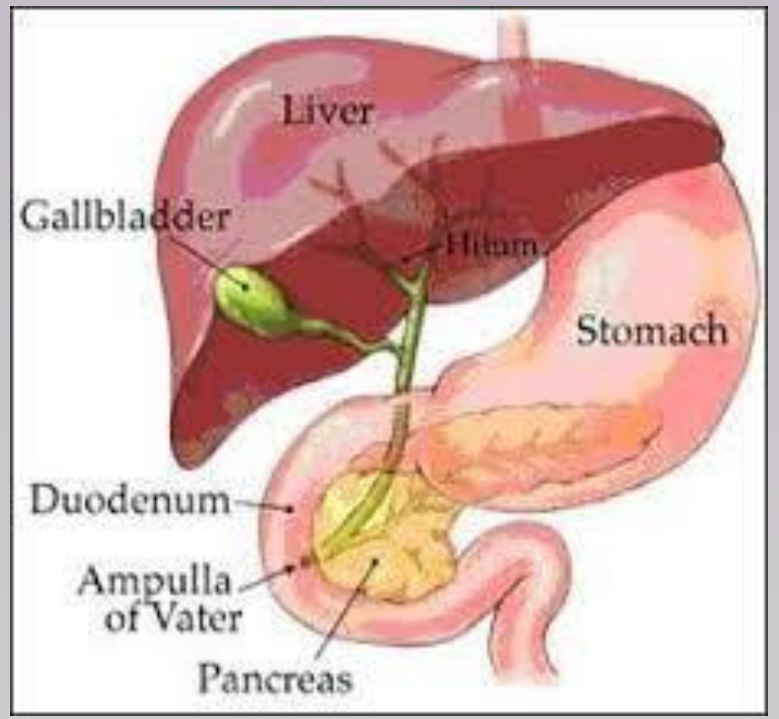
Characterizing Emesis: What does it look like?

- Amount
- Color
  - Clear
  - White
  - Yellow
  - Red/bloody
  - Brown
  - Green/bilious
- Consistency
  - Mucousy
  - Watery
  - Curdled milk

What is bilious emesis and why is it important?

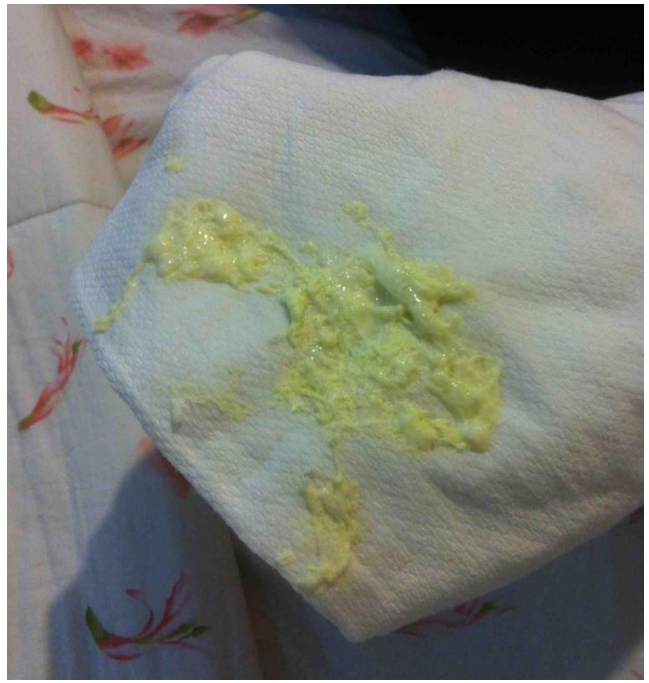
Bilious Emesis

- Refers to the vomiting of bile, making contents green in appearance
- Often indicates an intestinal obstruction distal to the ampulla of Vater
- Must be evaluated urgently, as early detection may improve outcomes
- May require emergent surgical intervention



Bilious vs. Non-bilious Emesis

Non-bilious



Bilious

Bilious? Think Ghostbusters!

Evaluating a Newborn with Emesis

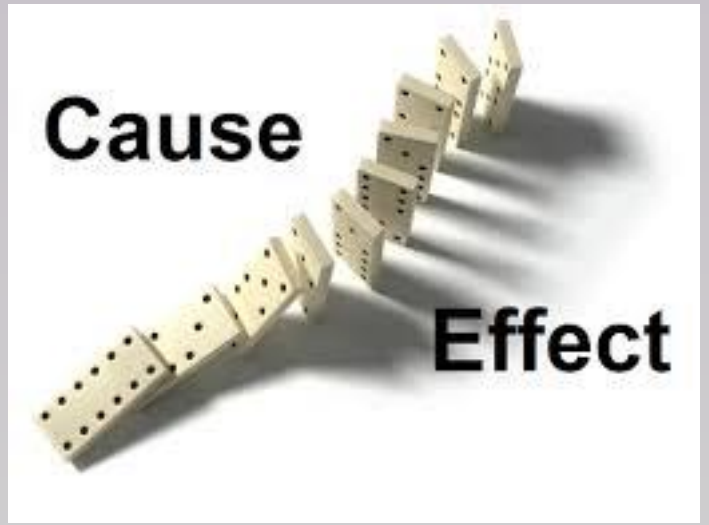
Physical Exam

- Assess activity/general appearance
- Note vital signs (i.e. temperature, HR, RR, BP)
- Assess hydration status (i.e. capillary refill, moist mucous membranes, skin turgor)
- Abdominal exam: evaluate for distention, organomegaly, bowel sounds, tenderness, guarding
- Inspection of the perineum
- Evaluate for hernias

Acute General Management of Emesis

- Make patient NPO
- Decompress GI tract with NG tube +/- suction
- Establish IV access and begin hydration/electrolyte replacement
- Obtain labs (if indicated)
- Start antibiotics (if indicated)

Causes of Emesis in the Newborn



Differential Diagnosis

- Gastroesophageal reflux
- Allergic
- Congenital obstructive lesions
- Metabolic disorders
- Infection
- Problems with the central nervous system

Gastroesophageal Reflux (GER)

- Normal condition in neonates!
- Occurs when gastric contents exhibit retrograde flow
- Diagnosis often clinical, but may be supported by esophageal pH monitoring and/or contrast esophagram
- Persistent and/or severe reflux can lead to chronic vomiting with failure to thrive, esophagitis, and risk for aspiration

Treatment of GER

- Infants whose symptoms are persistent may qualify for therapy
- Medical intervention:
  - Head-up positioning
  - Thickening of feeds
  - Prokinetic agents
  - Neutralization of gastric acid
- Surgical intervention:
  - Reserved for high-risk infants with complications from GER
  - Nissen fundoplication

Allergic Enteropathy

- Typically presents in the first few months of life, but symptoms have been documented as early as two days
- Often associated with bloody stools
- Most commonly protein-induced with antigens from cow's milk protein and soy protein
- Infants with cow's milk protein allergy have 30-40% chance of being allergic to soy protein
- Treatment involves removal of allergen from diet (i.e hydrolyzed formulas, elemental/amino acid formulas)

Congenital Obstructive Lesions

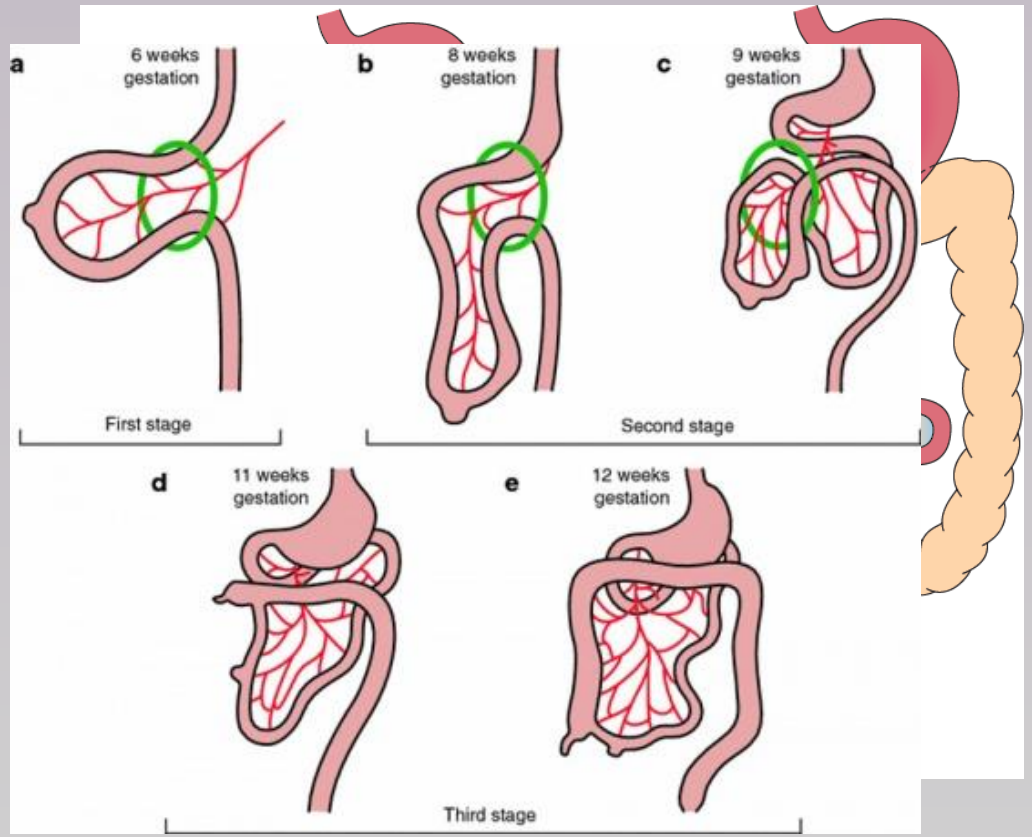
- Intestinal malrotation +/- midgut volvulus*
- Gastric volvulus
- Esophageal atresia
- Duodenal atresia/stenosis*
- Jejunal atresia/stenosis
- Hypertrophic pyloric stenosis*
- Gastrointestinal duplications
- Meconium syndromes*
- Hirschsprung Disease*
- Anorectal anomalies

Intestinal malrotation +/- Midgut Volvulus

- Bowel undergoes two independent 270-degree counterclockwise rotations during the 6^{th} to 12^{th} weeks of gestation
  - One rotation involves the duodenojejunal junction around the axis of the superior mesenteric artery
  - Other rotation involves the ileocolic junction around the same axis
- If bowel does not rotate properly, obstruction +/- volvulus may occur
  - Volvulus is a surgical emergency

Normal Anatomy vs. Malrotation

Normal anatomy



Malrotation +/- volvulus

Intestinal Malrotation +/- Midgut Volvulus

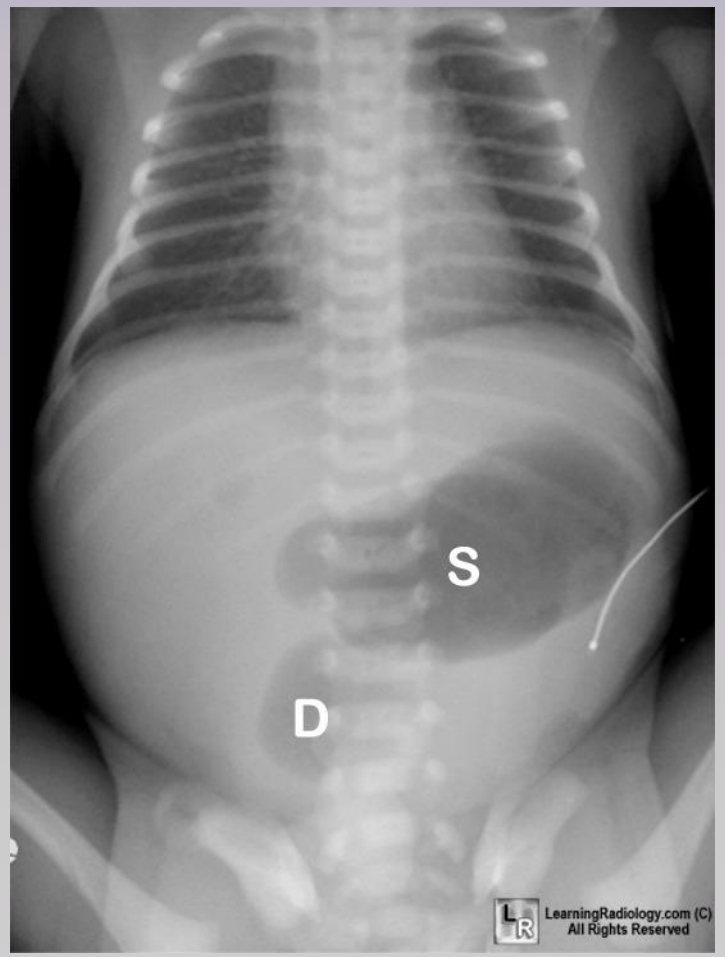
- Typically presents with bilious vomiting, which may be intermittent
- In cases with volvulus, abdominal distention with rectal bleeding and shock may occur
- Upper GI series is gold standard for diagnosis
- Treatment is surgical with Ladd's procedure

Bilious emesis in any child <1 year of age should be assumed to be due to malrotation until proven otherwise!

Duodenal Atresia/Stenosis

- May be intrinsic or extrinsic, complete or partial
- Often associated with other congenital anomalies, such as trisomy 21 and congenital heart disease
- Often discovered on prenatal ultrasound
- Maternal history of polyhydramnios is common
- Classic presentation includes bilious vomiting within 24 hours of life
- Abdomen is typically non-distended

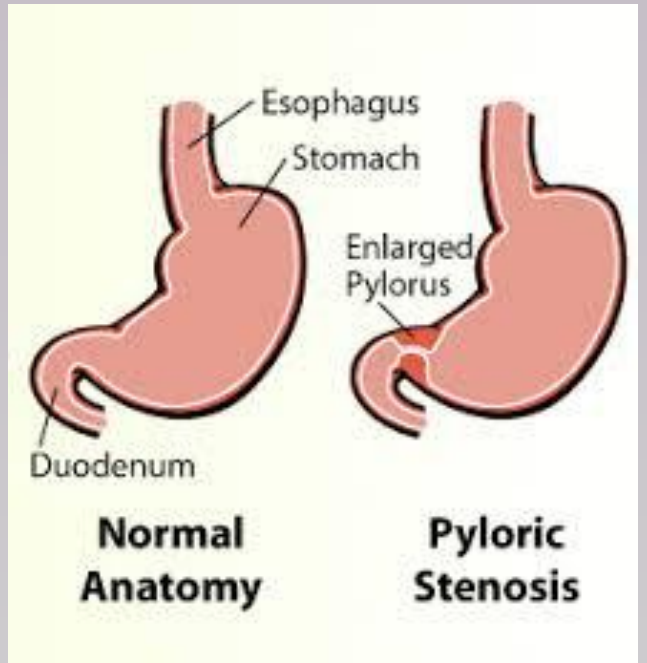
Duodenal Atresia/Stenosis



- Abdominal radiograph has classic “double-bubble” sign
- Treatment is surgical
- Preoperative preparation includes gastric decompression with NG tube, fluid and electrolyte replacement, and evaluation for associated anomalies

Hypertrophic Pyloric Stenosis

- Thickened circumferential muscle layer of the pyloric sphincter
- Leads to gastric outlet obstruction with compensatory dilation, hypertrophy, and hyperperistalsis of the stomach
- Acquired condition, cause unknown
- 4:1 male predominance
- Incidence in whites exceeds that in blacks
- Typically presents between 3-6 weeks of life



Hypertrophic Pyloric Stenosis cont.

- Non-bilious, projectile vomiting
- Hallmark is palpable “olive” on exam
- Lab abnormalities include hypochloremic, hypokalemic, metabolic alkalosis
- Typically diagnosed radiographically by ultrasound
- Upper GI study may also be used
- Treatment is surgical pyloromyotomy
- Must adequately fluid resuscitate and correct electrolyte abnormalities prior to surgery

Meconium Syndromes

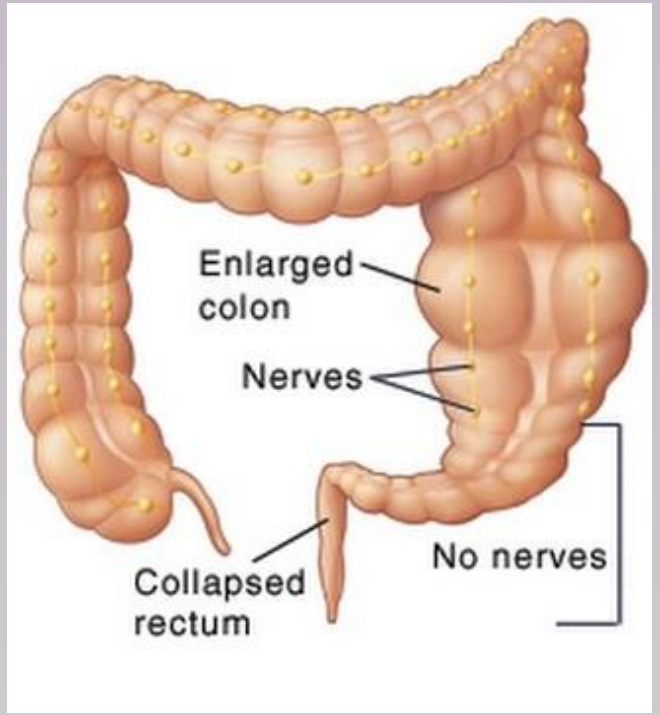
- Intestinal obstruction resulting from thick, inspissated meconium
- Meconium ileus:
  - Meconium obstructs small bowel
  - Almost always associated with cystic fibrosis (90% of patients have CF)
  - Hyperviscosity of mucosal cell secretion leads to formation of thick, tarlike meconium
  - Presents with increased abdominal distention (may be present at birth) with failure to pass meconium and eventual bilious emesis
  - Treatment is with enema or surgery

Meconium Syndromes cont.

- Meconium plug syndrome:
  - Related to colonic hypomotility
  - Presents with abdominal distention and failure to pass meconium
  - Water-soluble contrast enema is both diagnostic and therapeutic
  - Microcolon seen distal to obstruction
  - Surgery is infrequently required
  - Cystic fibrosis and Hirschprung disease should be considered in these patients

Hirschsprung Disease

- Congenital intestinal aganglionosis resulting from arrested fetal development of the myenteric nervous system
- Most common cause of intestinal obstruction in the neonate
- Associated with Down's Syndrome (5%)
- Typically present in neonatal period with abdominal distention, emesis, and failure to pass meconium in first 24 hours of life
- May be diagnosed by contrast enema, though definitive diagnosis is through rectal biopsy
- Treatment is surgical



Other Causes of Emesis

- Infection
  - May be viral or bacterial
  - May be associated with diarrhea or fever
- Metabolic disorders
  - Rare disorders, but may present with vomiting or feeding intolerance
  - Examples include organic acidemias, galactosemia, urea cycle defects, etc.
- Central Nervous System
  - Uncommon in neonates, but there are rare cases of congenital brain tumors or large intracranial hemorrhage that can cause vomiting from increased intracranial pressure

Key Points

- When should I be worried about neonatal emesis?
  - When it’s bilious!
  - When associated with abdominal distention
  - When it’s persistent and unrelenting
  - If baby fails to pass stool
  - When the baby does not look well!!

References

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Questions?