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
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 6th to 12th 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

Questions?