Happy Spitter or Surgical Referral?
Sonographic Approach to the Vomiting Infant

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Disclosure

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Pathologies

- Hypertrophic Pyloric Stenosis (HPS)
- Mid Gut Volvulus
- Duodenal Stenosis
Hypertrophic Pyloric Stenosis

- Thickening of the antropyloric portion of stomach causing partial gastric outlet obstruction
- Presents as “projectile” non-bilious vomiting typically around 3-12 weeks of age
- Males affected more than females (2.5-5.5:1)
- Palpable olive
- Familial link
Hypertrophic Pyloric Stenosis

- Thickened Muscle (≥3mm)
- Elongated Channel (≥15mm)
- Thickened mucosa (≥3mm)
- Antral “nipple” sign
- Hyperemia
- No muscle relaxation with peristalsis
Hypertrophic Pyloric Stenosis

Technique

- Use high frequency linear transducer 7.5-15 MHz
- Begin with infant supine, transverse at the GE junction, follow the antrum of the stomach to the pyloric channel, sweep inferior until distal antrum and duodenal cap is identified
- Usually located just medially to GB and anterior to pancreatic head
- Assess for double mucosa layer, excessive antral peristalsis, *delayed* or absent passage of fluid into duodenum
Hypertrophic Pyloric Stenosis

Helpful Scanning Tips

- Allow gravity to help
  - If stomach is gas filled then LLD
  - If stomach is overly distended then RLD

- Use liver as an acoustic window

- Administer Pedialyte if stomach is empty to improve visualization of pyloric channel and duodenal bulb
Hypertrophic Pyloric Stenosis

Normal

Abnormal
Hypertrophic Pyloric Stenosis

Measurements and Color

Length and muscle thickness measurements are taken on the long axis, while mucosa thickness is taken transversely.
Gastric antral contractions can mimic HPS, so be sure to return to pylorus after completing all other required images (SMA/SMV orientation, bilateral kidneys in long axis).
Mid Gut Volvulus

• Occurs in patients with malrotation
• 60% to 80% present in first month of life
• Typically presents with new onset of bilious vomiting
• 10%-15% experience intraluminal bleeding and hematochezia due to vascular compromise
Mid Gut Volvulus

- SMA supplies blood flow to lower part of duodenum and two thirds of transverse colon.
- If ischemia of the midgut occurs, patient can present in shock with cardiovascular collapse.
Mid Gut Volvulus

Sonographic Features

• “Whirlpool” sign of duodenum and superior mesenteric vein wrapped clockwise around superior mesenteric artery

• Distended stomach and dilated duodenum can be seen due to distal obstruction
Mid Gut Volvulus

Technique

- Use high frequency linear transducer 7.5-15 MHz
- Begin with infant supine, transverse at level of the pylorus, follow duodenum inferior and medial to the level of the SMV/SMA.
- Duodenum should normally course between aorta and SMA
Mid Gut Volvulus

UGI demonstrating duodenum wrapped around SMA
Mid Gut Volvulus
Utilization of color and spectral Doppler imaging of the “whirlpool” sign demonstrates venous flow in SMV around the SMA
Mid Gut Volvulus
2 year old male presented to ED with vomiting and acute kidney injury. Renal ultrasound requested
Mid Gut Volvulus
Duodenal Stenosis

- Occurs in approximately 1:7000 live births
- Typically present with bilious vomiting but 23% can present with nonbilious vomiting due to level of obstruction
- Can present later in life depending on degree of obstruction
- Can present same as pyloric stenosis
Duodenal Stenosis

Technique

• Use high frequency linear transducer 7.5-15 MHz
• Find pyloric channel and sweep inferior following the duodenal as it crosses midline between the SMA and aorta
• Utilize cine clips!!
2 week old male with Trisomy 21 presents to ED with projectile vomiting
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References
