AMSER Case of the Month
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5-week-old male with poor weight gain and bilious vomiting

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Patient Presentation

- **HPI:** 5-week-old male presented to outpatient GI clinic with poor weight gain and recurrent bilious emesis. Patient initially did well after birth, progressing to episodes of small “spit-ups” at day of life (DOL) 4. These gradually increased to large volume emesis intermittently 4-5 times per day. Emesis is not always immediately following feeds. Patient is exclusively breastfed, and despite adequate feeding has had poor weight gain. Bowel movements normal and non-painful. PCP trialed Pepcid for suspected gastroesophageal reflux without relief of symptoms.

- **PMHx:** mild unconjugated hyperbilirubinemia on DOL 1, presumed to be secondary to breastfeeding jaundice (poor latching), monitored in newborn nursery without phototherapy, resolved.

- **Prenatal Hx:** Normal prenatal screens. Born at 40w2d to a 23-year-old G1P1 via C-section due to prolonged maternal rupture of membranes. APGARS 8 and 9.

- **Physical Exam:** Alert and active in NAD. Abdomen is soft and non-tender. No palpable abdominal masses or organomegaly. No jaundice.

- **Pertinent Labs:** none
What Imaging Should We Order?
Select the applicable ACR Appropriateness Criteria

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoroscopy upper GI series</td>
<td>Usually Appropriate</td>
<td>🌟🌟🌟🌟</td>
</tr>
<tr>
<td>US abdomen (UGI tract)</td>
<td>May Be Appropriate</td>
<td>🌟</td>
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<tr>
<td>Radiography abdomen</td>
<td>May Be Appropriate (Disagreement)</td>
<td>🌟🌟</td>
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<tr>
<td>Fluoroscopy contrast enema</td>
<td>Usually Not Appropriate</td>
<td>🌟🌟🌟</td>
</tr>
<tr>
<td>Nuclear medicine gastroesophageal reflux scan</td>
<td>Usually Not Appropriate</td>
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This imaging modality was ordered by the GI physician.
Findings (unlabeled)

Lateral view:

~7 minutes

Frontal view:

~7 minutes

Scout image
Findings (labeled)

Lateral view:
- Markedly dilated first and second portions of duodenum with appropriate retroperitoneal D2 segment
- ~7 minutes

Frontal view:
- Dilated proximal duodenum
- ~7 minutes

Air in distal colon/rectum suggests non-obstructive pattern.

Distorted and tortuous course of loop of proximal small bowel prompted the radiologist to order an US abdomen to aid in ruling out volvulus.

Markedly dilated first and second portions of duodenum with appropriate retroperitoneal D2 segment.

Delayed emptying through a narrowed distal D2 lumen.

Scout image
Findings (unlabeled)
Findings: Normal anatomic relationship of the superior mesenteric vein and superior mesenteric artery (SMA on left, SMV on right). No volvulus is identified.
Diagnosis

Differential:
• duodenal stenosis
• duodenal web with perforation
• annular pancreas

→ Exploratory laparotomy was performed.
• Findings:
  • Approximately 75% duodenal stenosis in D1/D2 near Ampulla of Vater
Case Discussion – Disease Overview

• Between the 8th and 10th weeks of embryonic development, the closed duodenum undergoes recanalization.
  • Complete failure of recanalization -> total occlusion of duodenal lumen = duodenal atresia
  • Partial failure of recanalization -> partial occlusion of duodenal lumen = duodenal stenosis

• The incidence of duodenal atresia is approximately 1 per 10,000 live births however less data exist on the incidence of duodenal stenosis.

• The second portion of the duodenum near the Ampulla of Vater is involved in approximately 70% of cases of duodenal atresia and stenosis.

• Approximately 30% of cases of duodenal atresia/stenosis are associated with Down syndrome.
Case Discussion – Disease Overview

• Duodenal atresia commonly results in polyhydramnios with the double-bubble sign visualized on prenatal US. If undetected prenatally, patient will present with vomiting (typically bilious) a few hours after birth. First line imaging is an abdominal radiograph which will show the double-bubble sign and gasless distal bowel.

• The presentation of duodenal stenosis is variable and dependent on the degree of stenosis. Severe stenosis can present similarly to duodenal atresia. Mild stenosis typically presents with vomiting after a few days of life. Abdominal radiograph of duodenal stenosis may show the double-bubble sign but is less specific and gas will be present distal to the obstruction.

• Treatment for both duodenal atresia and stenosis = immediate surgical correction with bypass of the obstruction. Post-treatment prognosis is excellent.
Case Discussion

ACR Appropriateness Criteria for non-bilious vomiting within the first 2 days after birth recommend abdominal radiograph to assess for bowel obstruction rather than Upper GI series.

Prenatal US showing classic double-bubble sign of duodenal atresia

Abdominal radiograph: double-bubble sign and paucity of distal bowel gas (duodenal atresia)

Abdominal radiograph: dilated stomach and proximal duodenum with distal bowel gas (duodenal stenosis)

**Variant 1:** Vomiting within the first 2 days after birth. Poor feeding or no passage of meconium. Initial imaging.

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ACR Appropriateness Criteria for non-bilious vomiting within the first 2 days after birth recommend abdominal radiograph to assess for bowel obstruction rather than Upper GI series.
Patient Outcomes

- Patient underwent exploratory laparotomy with duodenoduodenostomy and anastomosis without complication.
- Thereafter patient had a decrease in vomiting episodes and began to gain weight appropriately.
References:


