Presentation

- 8 day old male
- Little prenatal history is known
- Intermittent emesis since birth with >1 lb wt loss
- 1 day of constant minimal urine output day of presentation
- “pea soup green” emesis day of presentation

Reason for Consultation: 8 do bilious emesis and wt loss - studies pending

Relevant Clinical Info or Diagnoses: 8 do bilious emesis and wt loss studies pending

What are your suspicions/concerns?
Physical Exam

- Vitals: HR 180, RR 38, sats 100%, BP 62/46, T 97.9, kg 2.64
- crying, sunken fontanels, pale, delayed cap refill, poor skin turgor, soft nondistended abdomen, listless
What do you do first?

- Labs
- Fluids
## Labs

<table>
<thead>
<tr>
<th></th>
<th>19.9</th>
<th>21.9</th>
<th>267</th>
<th>131</th>
<th>62</th>
<th>58</th>
<th>61</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>59</td>
<td></td>
<td></td>
<td>6.6</td>
<td>39</td>
<td>2.02</td>
<td>61</td>
</tr>
</tbody>
</table>

### Blood Gas
- pH-Ven: 7.55*
- pCO2-V: 57*
- pO2-V: 15*
- BEVN: 23.9
- Na-WB: 117*
- K-WB: 7.0*
- GluWB: 65
- HCTWB: >65*
- LAC: 5.2

*Normal values marked with an asterisk.*
Differential diagnosis

- Non-surgical
  - Sepsis of the newborn, medical conditions associated with ileus

- Surgical
  - Intestinal atresia or stenosis, imperforate anus, Hirschsprung’s, Malrotation/nonrotation with volvulus, small left colon syndrome, meconium ileus, meconium plug, hernia
## Further diagnostic studies?

- **Plain films of the abdomen** – high intestinal obstruction, jejunal atresia, ileal atresia, meconium ileus, meconium plug, small left colon syndrome
- **Contrast enema** – microcolon, small left colon syndrome, Hirschsprung’s, Colonic atresia
- **Upper GI** – Malrotation
- **Rectal biopsy** – Hirschsprung’s, hypothyroidism
Imaging in this patient?

- KUB
- UGI
- US
- CT
Imaging: Abdominal Plain Films
Next Study?
Imaging: Normal US Findings

Imaging: Ultrasound Findings

Imaging:
Ultrasound
Imaging: Diagram of the whirlpool sign

Imaging: UGI
Clinical Decision Making: Ultrasound

Shortcomings of current diagnostic modalities

UGI: false positives and negatives

US: a normal US does not exclude malrotation

CT: whirlpool sign

Demonstration of a retromesenteric D3 excludes malrotation and midgut volvulus

Yousefzadeh, The position of the duodenojejunal junction: the wrong horse to bet on in diagnosing or excluding malrotation, Pediatr Radiol, 2009, 39, suppl 2: s172-s177.

Normal midgut rotation

http://portal.surgicalcore.org/content/chapter_lww_greenfield_110
Nonrotation or Incomplete rotation

http://portal.surgicalcore.org/content/chapter_lww_greenfield_110
Malrotation with midgut volvulus
Ladd’s procedure

Relieve midgut volvulus

Broaden the base of the mesenteric vascular pedicle: divide the peritoneal bands that tether the cecum, small bowel mesentery, mesocolon, and duodenum around the base of the SMA.

Divide the peritoneal bands that attach the cecum to the abdominal wall.

Demonstrate duodenal and distal small bowel patency.

[Appendectomy]

http://portal.surgicalcore.org/content/chapter_lww_greenfield_110
Operative images
Operative images
Post-op course

- NICU post-operatively for monitoring during continued resuscitation and correction of electrolyte abnormalities.
- He received TPN beginning POD#1 and was steadily advanced on enteral feeds beginning POD#5.
- The patient developed a gram positive bacteremia and the patient remained in the hospital on IV Abx until negative cultures were confirmed.
- Discharged to home on HD#17. Doing well at 2 week follow up visit.
Discussion

- Resuscitation
- Long term outcomes
- Lap vs open
Questions?
Additional References

### TABLE 110.2 DIAGNOSIS: NEONATAL INTESTINAL OBSTRUCTION

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>History</th>
<th>Physical examination</th>
<th>Diagnostic studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intestinal atresia or stenosis</td>
<td></td>
<td>Abdominal distention</td>
<td>Plain abdominal film</td>
</tr>
<tr>
<td>Duodenal atresia or stenosis</td>
<td>Bilious emesis</td>
<td>Gastric distention Trisomy 21</td>
<td>Plain abdominal film Upper GI contrast study</td>
</tr>
<tr>
<td>Imperforate anus</td>
<td>Bilious emesis (late) Abdominal distention VACTERL association</td>
<td>Ultrasound kidneys, sacrum, rectum Echocardiogram</td>
<td></td>
</tr>
<tr>
<td>Necrotizing enterocolitis</td>
<td>High-risk, premature infant Bilious emesis</td>
<td>Abdominal distention Hematochezia, guaiac-positive stool</td>
<td>Plain abdominal film</td>
</tr>
<tr>
<td>Meconium ileus</td>
<td>Cystic fibrosis (10%) Bilious emesis</td>
<td>Acholic meconium Abdominal distention</td>
<td>Plain abdominal film Contrast enema</td>
</tr>
<tr>
<td>Malrotation</td>
<td>Bilious emesis</td>
<td>Term, healthy infant No abdominal distention</td>
<td>Plain abdominal film Upper GI contrast study</td>
</tr>
<tr>
<td>Hirschsprung disease</td>
<td>Delayed passage of meconium Trisomy 21</td>
<td>Abdominal distention</td>
<td>Plain abdominal film Contrast enema</td>
</tr>
<tr>
<td>Uncommon causes of obstruction (intussusception, Meckel's diverticulum, duplication)</td>
<td>Bilious emesis</td>
<td>Abdominal mass, incarcerated hernia</td>
<td>Variable</td>
</tr>
<tr>
<td>Medical conditions associated with ileus</td>
<td>Bilious emesis</td>
<td>Sepsis, hypothyroidism, etc.</td>
<td>Plain abdominal film</td>
</tr>
</tbody>
</table>

GI, gastrointestinal; VACTERL, vertebral, anal, cardiac, tracheal, esophageal, renal, and limb anomalies.

[http://portal.surgicalcore.org/content/chapter_lww_greenfield_110](http://portal.surgicalcore.org/content/chapter_lww_greenfield_110)