Cecal Volvulus and Malrotation

Andrew Dauber, Harvard Medical School Year III
Gillian Lieberman, MD
Patient AF – Clinical History

AF is a 37 year old female who presents to the ED with a 24 hour history of intermittent right midepigastric pain with nausea. She denies any vomiting, hematemesis, diarrhea, melena, or rectal bleeding.

PMH – Three c-sections. No history of GI problems.

PE – Abdomen tympanitic, soft, bowel sound present. Diffusely tender to palpation, worst over right midepigastrium. No guarding. Guaiac negative. No cervical motion tenderness on pelvic exam.
Differential Diagnosis

- Hepatitis
- Cholecystitis
- Cholangitis
- Gastritis
- Pancreatitis
- Peptic ulcer disease
- Bowel obstruction
- IBD
- Salpingitis
- Appendicitis
AF Lab Values

CBC 10.6/33.7/319  93.9% PMN
Electrolytes 137/4.4/98/23/12/0.7/107
ALT 29, AST 48, Alk Phos 66, Amylase 49, Lipase 28, T. Bili 0.3
Urinalysis normal
GC and Chlamydia gene probe negative
AF Ultrasound

- Gallbladder normal, no wall thickening or stones
- Common bile duct not dilated
- Pancreas could not be evaluated due to overlying bowel gas
- Liver only remarkable for 2 small hemangiomas

Courtesy of Michael Schuster, MD BIDMC
Revised Differential Diagnosis

- Hepatitis
- Cholecystitis
- Cholangitis
- Gastritis
- Pancreatitis
- Peptic ulcer disease
- Bowel obstruction
- IBD
- Salpingitis
- Appendicitis

Diagnoses still under consideration
Dilated large bowel ascending from the pelvis to the LUQ
Differential Diagnosis of Intestinal Obstruction in an Adult – Common Causes

- Adhesions
- Crohn’s Disease
- Fecal Impaction
- Hernia
- Neoplasm – Malignant or Benign
- Volvulus
AF CT Scan – Image 1

- Normal Stomach
- Dilated Cecum

Courtesy of Michael Schuster, MD BIDMC
AF CT Scan – Image 2

- Dilated Cecum
- Contrast in the descending colon indicating that there is only a partial obstruction

Courtesy of Michael Schuster, MD BIDMC
AF CT Scan – Image 3

- Dilated Cecum
- Site of torsion – CT whirl sign of volvulus
- Normal small bowel – not dilated or thickened

Courtesy of Michael Schuster, MD BIDMC
AF CT Scan – Images 4 + 5

- Duodenum only seen on right side of abdomen
- Difficult to visualize duodenojejunal junction and ligament of Treitz
- Findings raise question of malrotation

Courtesy of Michael Schuster, MD BIDMC
Cecal Volvulus

- Approximately 40–50% of colonic volvulus
- Average age of presentation in the 50s
- Majority of patients with cecal volvulus have full axial rotation which twists the mesentery and blood supply
- ~10% have cecal bascule = cecum folds in an anterior cephalad direction
- Cecal bascule does not lead to torsion of the mesentery but can cause bowel wall distension and ischemia
Cecal Volvulus - continued

- Usually occurs in patients with increased cecal mobility due to abnormal fixation of the right colon
- Patients present with abdominal pain, nausea, vomiting, and obstipation
- Diagnosis established with CT or barium enema
- Plain film may be suggestive
- Treatment consists of cecal resection or reduction of volvulus and cecopexy
Cecal Volvulus – Plain film and Barium Enema

Dilated cecal bascule

Site of torsion in mid-ascending colon seen on barium enema
Malrotation

- Definition = any variation in the position of the intestines
- Always accompanied by malfixation of the intestines
- Peritoneal (Ladd) bands can stretch from abnormally placed cecum to porta hepatis and abdominal wall
- Ladd bands can cause duodenal obstruction
- Malfixation leads to abnormally short mesenteric base which predisposes to midgut vovulus
Malrotation - continued

- May be associated with duodenal stenosis and atresia, abdominal wall defects, heterotaxy syndromes, and Hirschsprung’s
- Typically presents in first month of life with bilious emesis
- Older children and adults may present with non-specific symptoms such as intermittent abdominal pain, non-bilious emesis, diarrhea, failure to thrive, or volvulus
- If detected, must be surgically corrected to prevent volvulus
Normal Gut Development

• Gut begins as a straight midline tube which as it grows herniates into the base of the umbilical cord
• During weeks 6-10 of fetal life, midgut loop rotates 90 degrees counterclockwise around SMA
• Week 10 – gut returns to abdominal cavity and gut rotates another 180 degrees counterclockwise
• Duodenal-jejunal loop ends up in LUQ posterior to SMA fixed at ligament of Treitz
• Ileocecal junction is fixed in RLQ
• Mesentery runs from ligament of Treitz to ileocecal junction
Malrotation – Radiologic Diagnosis

• No specific findings on plain film – may result in findings of duodenal obstruction if volvulus present
• Upper GI contrast study is diagnostic
• UGI can locate the position of the duodeno-jejunal junction which is normally to the left of the left sided pedicles at the duodenal bulb
• In malrotation, duodeno-jejunal junction is displaced inferiorly and to the right side
Malrotation – Radiologic Diagnosis continued

• Barium enema may show malposition of the cecum
• On ultrasound, SMV located to the left of the SMA is suggestive of malrotation
Malrotation Plain Film

- No specific plain film findings in malrotation
- Classic picture of partial duodenal obstruction with dilation of proximal duodenum but presence of distal bowel gas

Grainger & Allison’s Diagnostic Radiology: A Textbook of Medical Imaging, 4th Ed.
Malrotation Variants on UGI #1

• Duodenal nonrotation in a 2 year old
• Duodenum and Jejunum are found completely to the right of the spine

Malrotation Variants on UGI #2

- Duodenal partial rotation in a 3 year old girl with non-bilious vomiting
- Duodenaljejunal junction (arrow) was midline
- At surgery, the ligament of Treitz was absent

Malrotation Variants on UGI #3

- Corkscrew configuration of the duodenum and jejunum
- Pathognomonic for midgut volvulus

Malrotation Variants on UGI #4

- Z-shaped configuration of duodenum and jejunum
- Associated with duodenal obstruction due to Ladd bands
- May be seen in volvulus as well

Malrotation Variants on Barium Enema #1

- Nonrotation of the colon in a 9 year old with abdominal pain
- Entire colon can be seen on the left side with the cecum (C) in the LLQ

Malrotation Variants on Barium Enema #2

• Partial rotation of the colon in a 10 month old boy with vomiting
• Cecum (C) is seen in the RUQ

Malrotation on Ultrasound

- 10 day old boy with emesis
- SMV (V) is seen at left ventral aspect of SMA (arrowhead)

- Normal SMV is to the right of the SMA


AF – Clinical Course

AF was taken to surgery where she was found to have a very dilated cecum with elongated right colon. There was very poor fixation of the colon to the retroperitoneum but a long mesenteric attachment was found.

AF did not have a malrotation. Her ligament of Treitz and hepatic flexure were in the proper positions.

Her cecum had rotated 270 degrees and folded on itself ending up in the LUQ.
AF – Clinical Course continued

At surgery, AF’s volvulus was reduced and a right colectomy was performed to prevent recurrence.

The pathologic specimen showed a dilated cecum with submucosal edema and muscularis propria ischemia.

AF recovered well and was discharged home.
References

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