

Colonic Volvulus

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Definition

- Torsion of the colon around its mesenteric axis, leading to
 - 1) **Compromised blood flow**, and
 - 2) A **closed loop obstruction**
- Dual mechanism of infarction:
 - 1) Torsion of **vessels** stops flow of blood to colonic wall.
 - 2) Torsion of **colon** creates closed loop obstruction (with venous obstruction, luminal secretion, and colonic wall distention leading to arterial obstruction).
- Anatomic requirements:
 - 1) Redundant segment of freely movable bowel.
 - 2) Proximity of points of fixation of the bowel.

Epidemiology of Volvulus

- Incidence: 2 per 100,000
- Accounts for 25% of obstruction cases in pregnancy because uterus displaces all mobile segments of colon.
- Sigmoid volvulus = 75-80%.
- Cecal volvulus = 20-25%.
- Transverse colon volvulus = 3% (70 cases); uncommon because of short, broad attachment of colonic mesentery.
- Splenic flexure volvulus = 1-2% (30 cases); risk factors: absence of gastrosplenic, splenocolic, & phrenicocolic ligaments.
- Stomach, gallbladder, and small bowel volvulus are rare.

Epidemiology of Sigmoid Volvulus

- In the United States, sigmoid volvulus accounts for <10% of intestinal obstruction cases.
- In Bolivian and Peruvian Andes, sigmoid volvulus accounts for 80% of intestinal obstruction cases.
- In US and Western Europe, sigmoid volvulus is associated with chronic constipation and laxative abuse (develop megacolon with maximal dilation of sigmoid); no gender difference.
- In developing countries, sigmoid volvulus is associated with diets high in vegetable fiber (90% of pts are men).

Epidemiology of Sigmoid Volvulus

- Elderly patients (average age: 72) . 40% institutionalized or debilitated. Unclear why elderly more predisposed, but possibly poor fluid/fiber intake, and constipation.
- Seen in patients with neurologic or psychiatric disorders such as Parkinson's disease, multiple sclerosis, Alzheimer's disease, pseudobulbar palsy, & chronic schizophrenia.
- Is also associated with hypothyroidism, scleroderma, amyloidosis, Crohn's disease, pregnancy, Chagas' disease, and colonic hypertrophy associated with high fiber diets.

Clinical Presentation of Sigmoid Volvulus

- Abrupt onset of severe, continuous crampy abdominal pain with colicky component due to peristalsis
- Constipation vs absence of stools vs. absence of flatus
- Nausea + vomiting with consequent dehydration
- Abdominal tenderness with tympanitic distension
- Rectal exam demonstrates no stool.
- Peritoneal signs, fever, and tachycardia indicate ischemia or infarction. 7% of patients present with gangrene.
- Duration doesn't correlate with gangrene or mortality.
- Young patients may have recurrent attacks due to spontaneous torsion and detorsion (40-60%).

Differential Diagnosis of Large Bowel Obstruction

- Colorectal carcinoma
- Volvulus
- Diverticular disease with stricture formation
- Intussusception
- Ogilvie syndrome
- Constipation
- Distal small bowel obstruction

Management

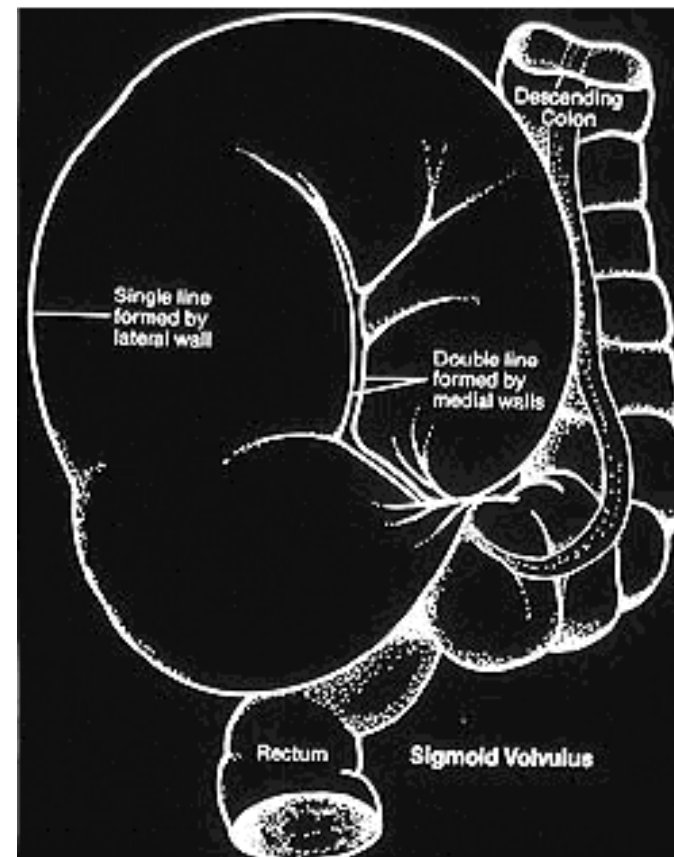
- Labs: CBC, electrolytes, coagulation profile, type & cross
- CXR - free air under the diaphragm indicates perforation
- Supine and upright abdominal plain films
- NG tube if patient has been vomiting
- Volume, as needed.
- Abx for gram negative aerobic/anaerobic bacteria
- Complications:
 - Perforation
 - Sepsis
 - Death
 - Abscess formation

Imaging - Sigmoid Volvulus

- Plain films are diagnostic in 60% of cases
 - “Bent inner tube sign” - dilated ahaustral sigmoid colon arising from pelvis and extending to RUQ
 - Dilation of large bowel proximal to the volvulus
 - Two air-fluid levels in small bowel at different levels and air-fluid ratio of 2:1
 - Minimal gas in the rectum
- Can also use barium or water soluble contrast enema or CT scan (whirl pattern due to dilated sigmoid colon around its mesocolon and vessels; bird’s beak of afferent/efferent colonic segments).

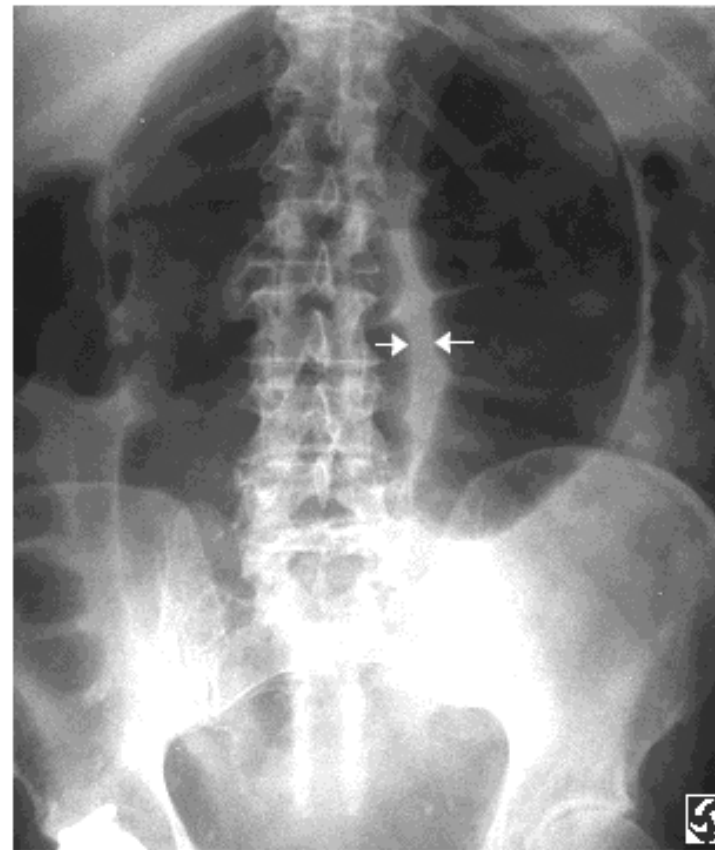
Sigmoid Volvulus - Diagram

- 50% of cases have 360 degrees of torsion
- 35% of cases have 180 degrees of torsion
- 10% of cases have 540 degrees of torsion



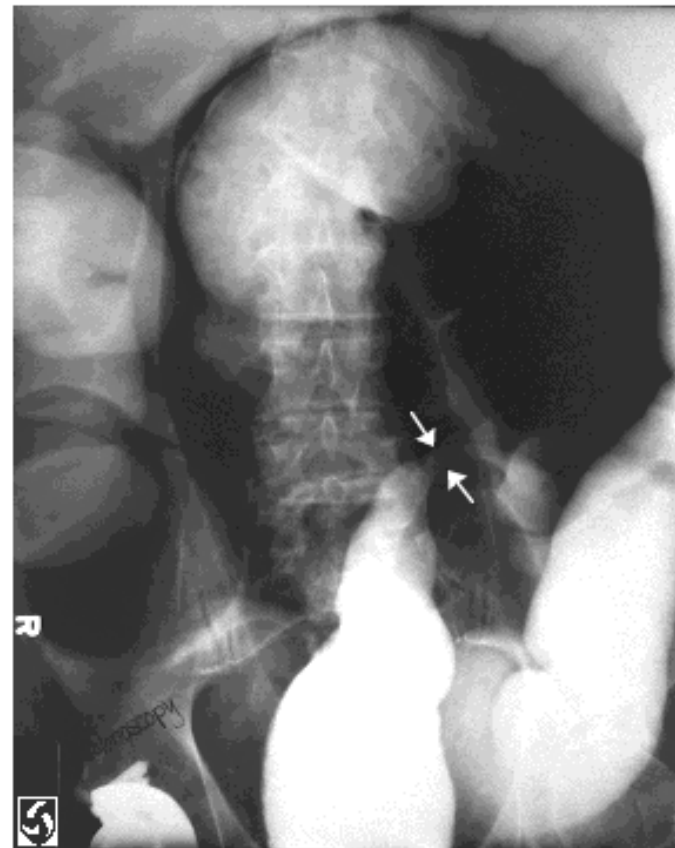
Sigmoid Volvulus by Supine Plain Film (1)

- A markedly distended, ahaustral loop of sigmoid colon is seen with a convex superior margin projecting into the RUQ.
- The twisted loop forms 2 large compartments with a central double wall (arrows) -- “coffee bean” sign. A single wall forms the outer margin of the two compartments.



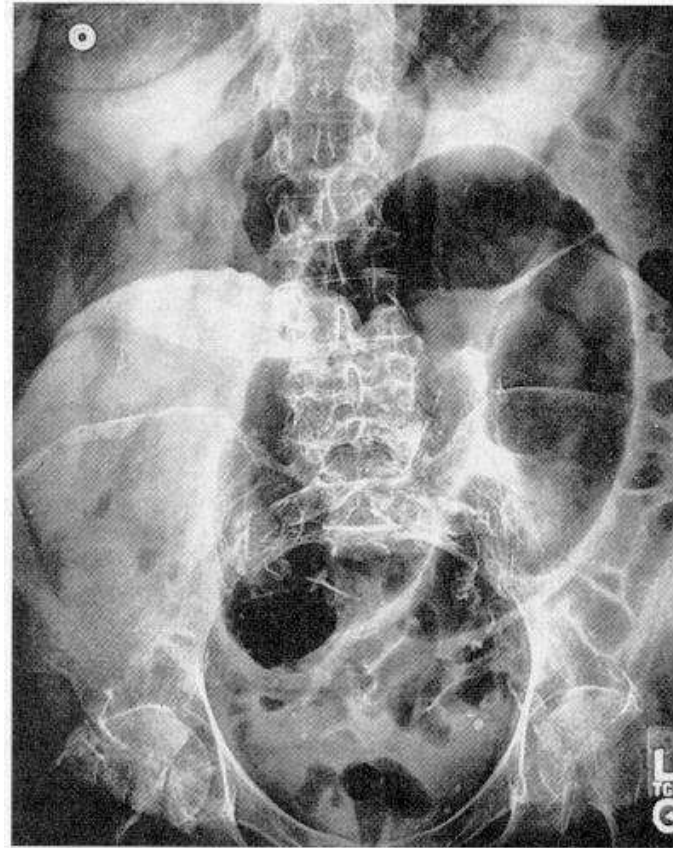
Sigmoid Volvulus by Barium Enema (1)

- A narrow twisted portion of lumen (arrows) with proximal gaseous distention of the sigmoid colon. Barium has coursed through the sigmoid and fills the remainder of the colon.



Sigmoid Volvulus by Supine Plain Film (2)

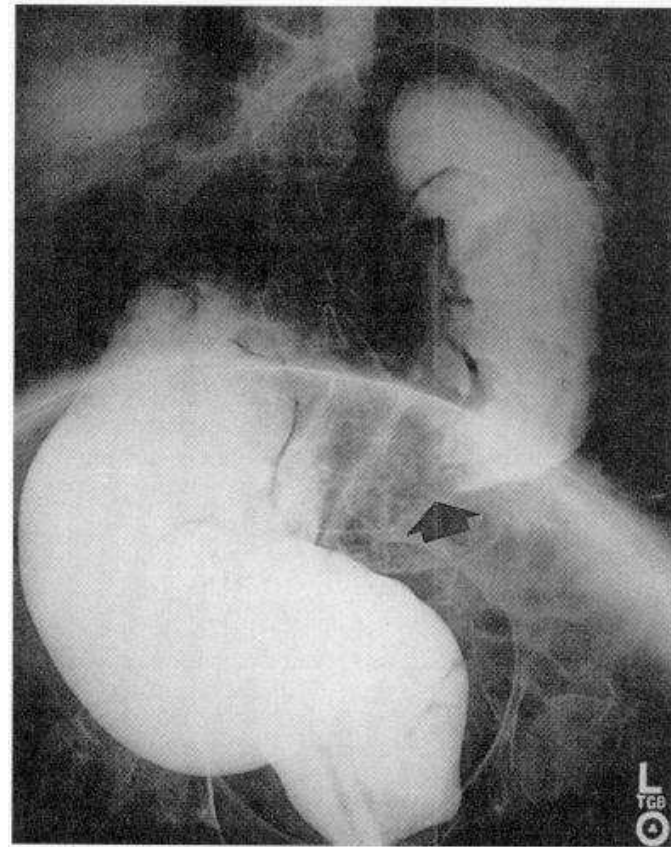
- A distended loop of bowel arises from the pelvis. The shape of this loop suggests a coffeebean, typical of sigmoid volvulus.



Townsend: Sabiston Textbook of Surgery, 16th Edition. Figure 46-20

Sigmoid Volvulus by Barium Enema (2)

- Contrast agent and air fill the rectum and distal sigmoid colon.
- The contrast agent stops abruptly at the narrowed point of torsion in the colon (arrowhead).



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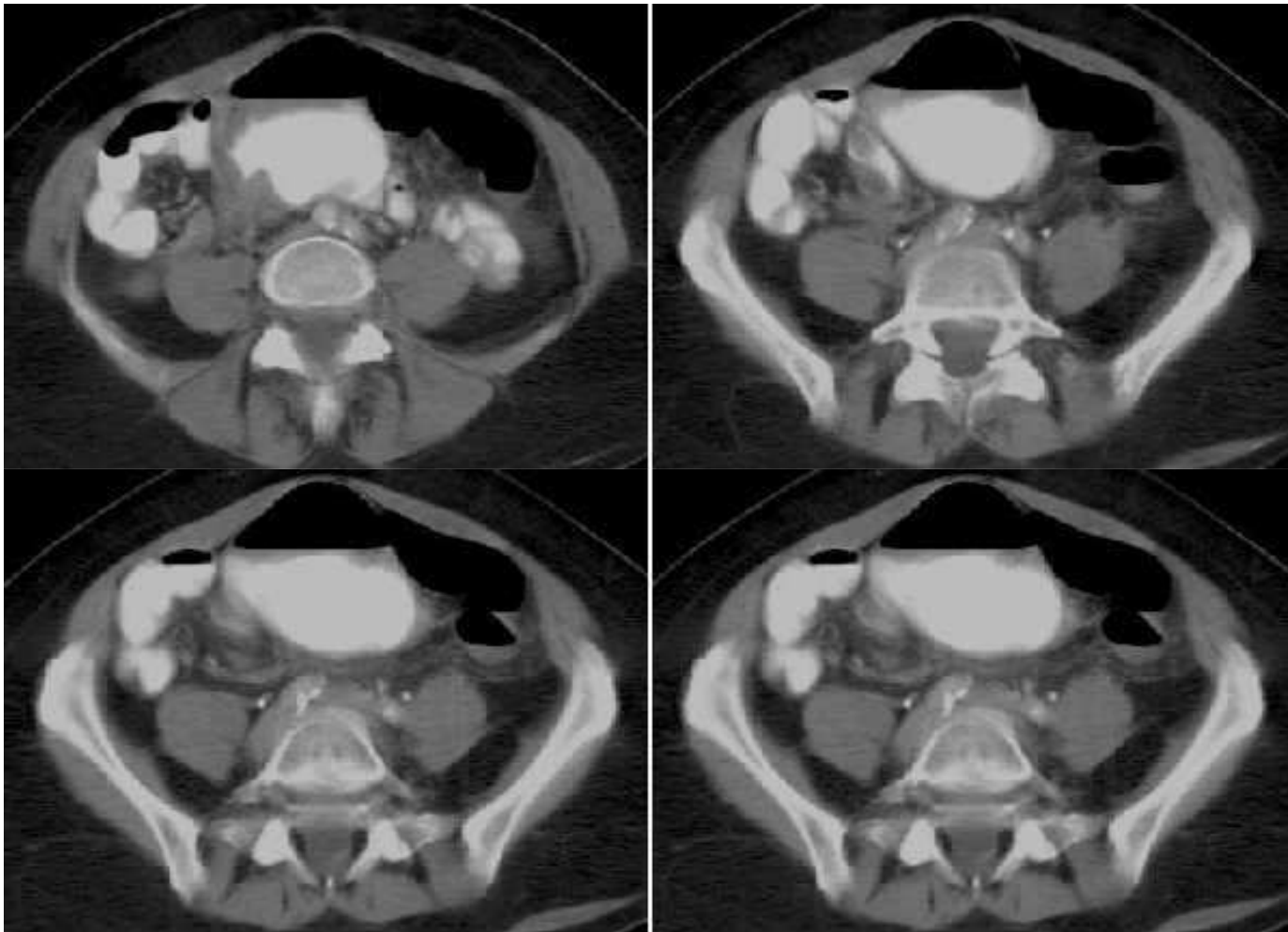
Sigmoid Volvulus by Contrast Enema

- The contrast enema terminates in a classic bird's-beak pattern in the distal sigmoid colon.



Feldman: Sleisenger & Fordtran's Gastrointestinal and Liver Disease, Sixth Edition, Figure 21-9.

Sigmoid Volvulus by CT Scan



Sigmoid Volvulus by CT Scan



Treatment - Sigmoid Volvulus

If strangulation is not suspected:

- **Rigid sigmoidoscopy** reduces the volvulus 85-95% of time (Mortality of 8%). Advanced to 25-30 cm. Successful if meet a gush of air/stool. Use colonoscopy if volvulus beyond length of rigid scope. Flexible sigmoidoscope is not as good.
- **Rectal tube** placed beyond area of torsion (48-72 hrs) until bowel function resumes prevents immediate recurrence.
- **Elective sigmoid resection** with primary anastomosis to prevent recurrence which is 50-90% in hours to weeks. Do a bowel prep! (Mortality of 5-10%). Recurrence after sigmoid resection is <3%.

Treatment - Sigmoid Volvulus

- If rigid sigmoidoscopy fails: Operative reduction (mortality of < 10%). Unless necrosis is found, do not remove unprepped bowel due to ↑ risk of anastomotic leak
- If necrosis is found on sigmoidoscopy → Stop to prevent perforation. Perform Hartmann's procedure (sigmoid resection with end-descending colostomy & stapling of rectal stump). Do reanastomosis later with bowel prep.
- If patient can't tolerate **elective** resection → case reports of endoscopic sigmoidopexy (fix sigmoid to abdominal wall).

If strangulation is suspected (mortality of 30-60%): Don't use sigmoidoscope since perforation may occur. Perform low anterior resection to remove affected segment.

Epidemiology of Cecal Volvulus

- Accounts for 1-2% of cases of intestinal obstruction.
- All ages (average age: 53.3 to 62.3; female:male ratio of 1.4:1.0).
- During midgut rotation, cecum is last segment to reach its final position. 11-22% of people with cecal volvulus have failure of fusion of parietal peritoneum and ascending colon. Results in anomalous parietal peritoneal fixation of right colon allowing increased cecal mobility.
- Is also associated with surgical adhesions, pregnancy, congenital malformations, colonoscopy & Hirschsprung's disease.

Clinical Presentation of Cecal Volvulus

- Abrupt onset of severe, continuous crampy abdominal pain with colicky component due to peristalsis.
- Absence of stools vs. absence of flatus
- Nausea + vomiting with consequent dehydration
- Abdominal tenderness with diffuse, asymmetrical tympanitic distension (due to dilated colon and small bowel) with compressible mass in LUQ or midabdomen.
- Peritoneal signs, fever, and tachycardia indicate ischemia or infarction.
- Some patients may have previous self-limited attacks due to spontaneous torsion and detorsion.

Differential Diagnosis of Large Bowel Obstruction

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- Intussusception
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- Constipation
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Management

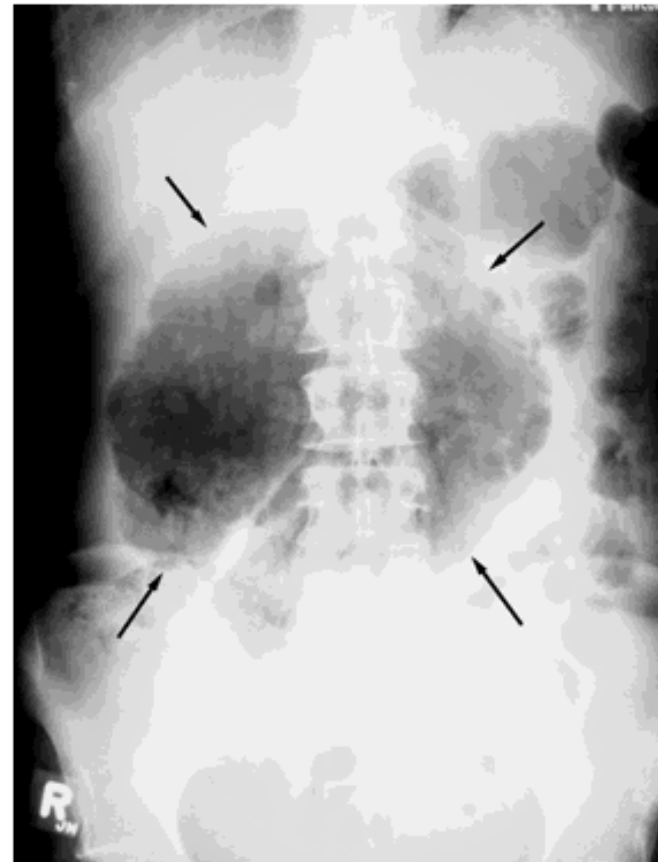
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- CXR - free air under the diaphragm indicates perforation
- Supine and upright abdominal plain films
- NG tube if patient has been vomiting
- Volume, as needed.
- Abx for gram negative aerobic/anaerobic bacteria
- Complications:
 - Perforation
 - Sepsis
 - Death
 - Abscess formation

Imaging - Cecal Volvulus

- Suggestive in 46% and diagnostic in 17% of cases
- Dilated, air-filled, displaced cecum (kidney-shaped mass extending into LUQ) with air-fluid levels
- Dilated small bowel & SBO (30% of cases)
- Can also use barium or water soluble contrast enema:
 - Diagnostic in 83-90%. Shows a narrowing (bird's beak) at point of the volvulus. Do not perform if gangrene is suspected due to risk of perforation and peritonitis.
- Can also use CT scan. (Markedly dilated loop extending from L to R abdomen, where it tapers as a bird's beak - mucosal spiral pattern; and dilated loops of small bowel).

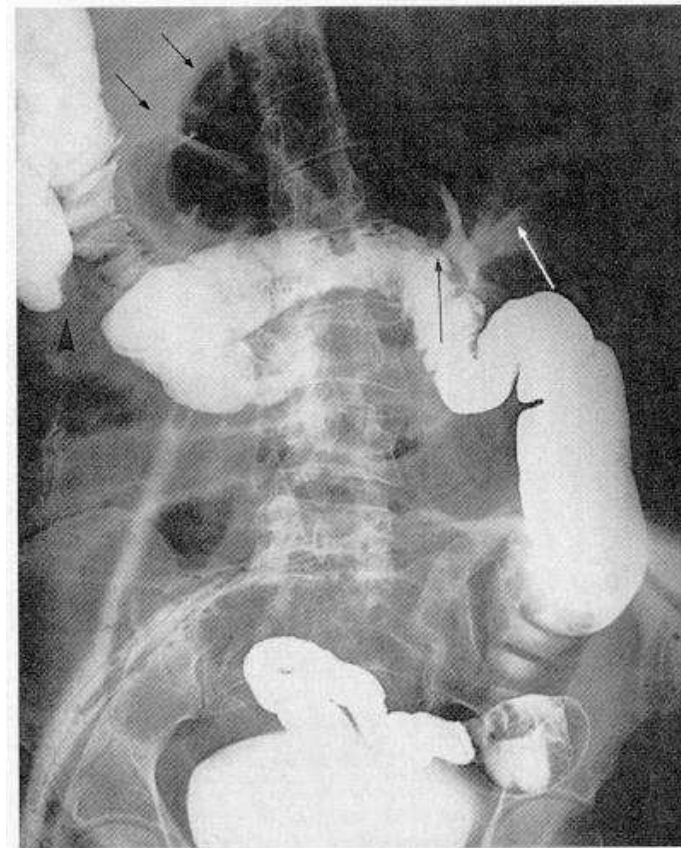
Cecal Volvulus by Plain Film

- A large air-filled cecum oriented transversely across the midabdomen (arrows) is seen.
- 90% of cases have full axial rotation (so cecum is located in the midabdomen or LUQ) with twisting of mesentery and blood vessels eventually causing gangrene.



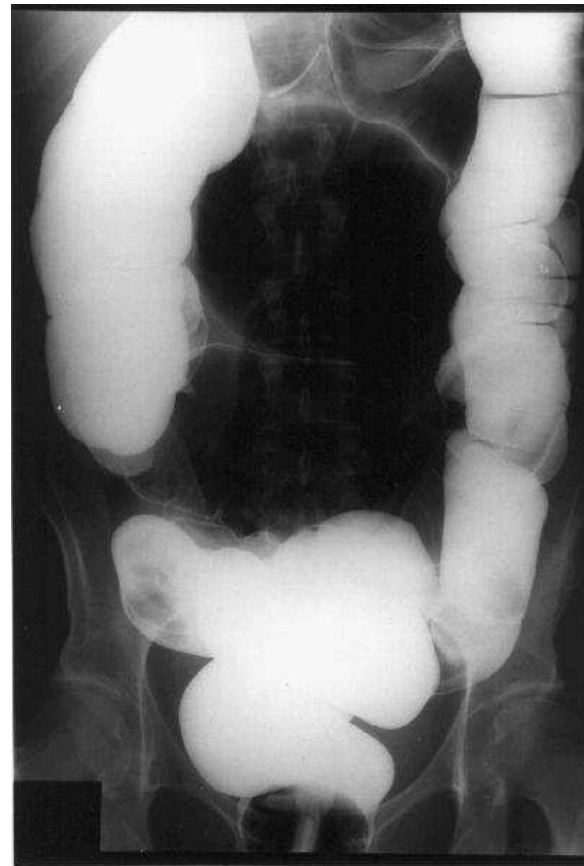
Cecal Volvulus by Barium Enema

- The barium column stops abruptly at the proximal end of the hepatic flexure (arrowhead). The dilated, air-filled cecum crosses the midline of the abdomen toward the LUQ (arrows).



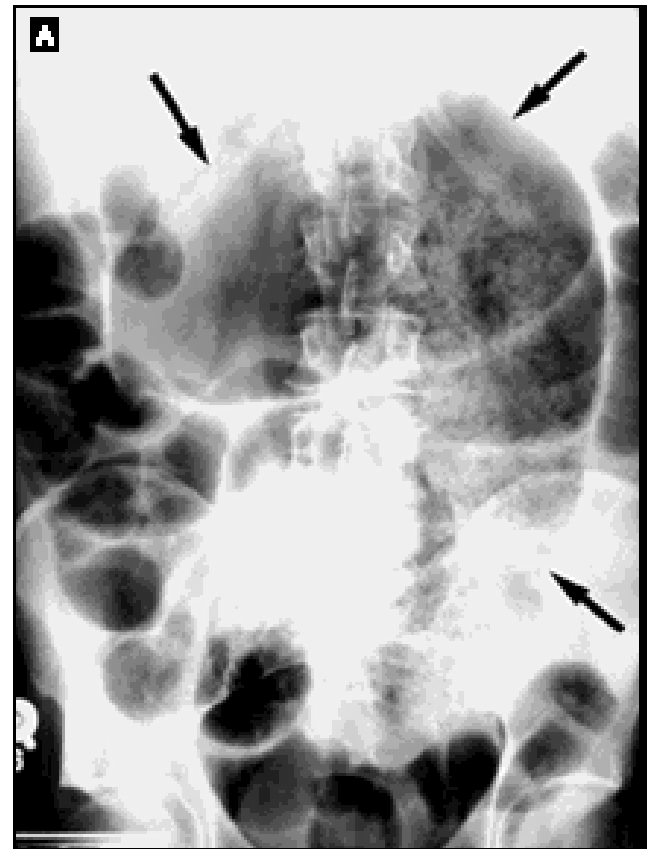
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Cecal Volvulus by Plain Film and Barium Enema



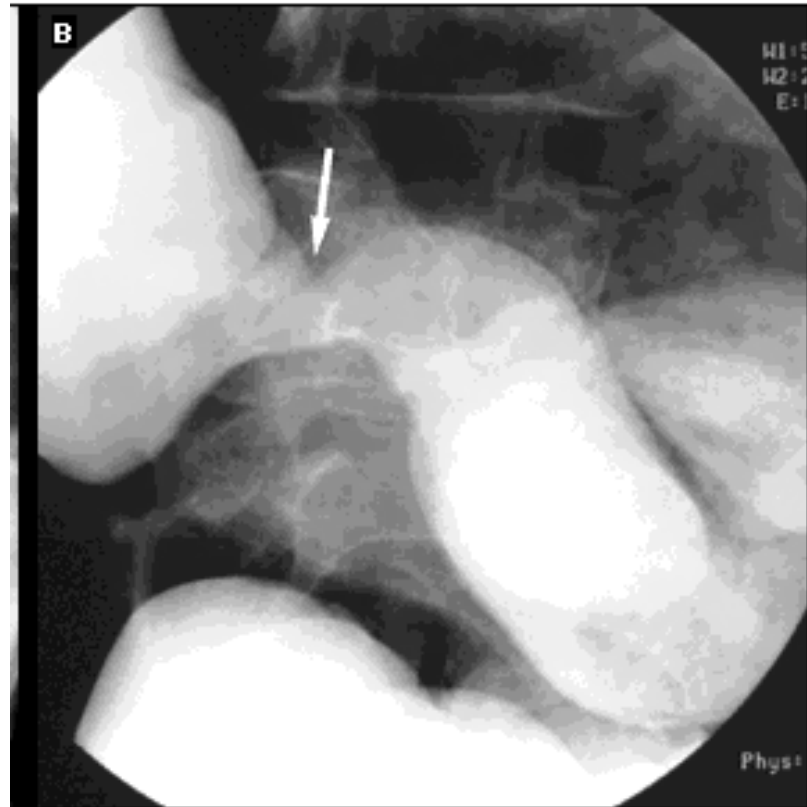
Cecal Bascule by Plain Film

- Marked dilation of a stool-filled cecal bascule (arrows).
- 10% of cases - cecal bascule - cecum folds in anterior cephalad direction across the ascending colon. Gangrene results from distention and bowel wall ischemia, not torsion of vessels.



Cecal Bascule by Barium Enema

- The site of torsion is evident as marked narrowing of the lumen in the mid-ascending colon.



Treatment - Cecal Volvulus

- Surgical intervention due to low success of non-operative intervention.
- Options:
 - 1) Cecopexy (anchoring of cecum to right paracolic gutter),
 - 2) Cecostomy (formation of a cecal fistula), and
 - 3) Right hemicolectomy with primary anastomosis even if unprepped to prevent recurrence.
- Mortality rate of <10% if no gangrene but 35-40% if gangrene is present.