A 27-year-old man had a 3-day history of left lower quadrant abdominal pain, anorexia, nausea, vomiting, and diarrhea. Physical examination results were remarkable for a temperature of 39°C with rebound tenderness and guarding in the left lower quadrant. Laboratory values were significant for a white blood cell count of 12.3 × 10⁹/L, and abdominal x-rays showed a gas pattern consistent with an ileus. A computed tomographic scan of the abdomen is shown in the Figure.

What Is the Diagnosis?

A. Small-bowel intussusception
B. Acute left-sided appendicitis
C. Ulcerative colitis
D. Crohn disease
E. Acute diverticulitis
**Answer**

**Acute Left-Sided Appendicitis**

Figure. Computed tomographic image characteristic of acute appendicitis with associated inflammatory changes. The “inflammatory mass” appears on the left side because of the presence of malrotation in this patient.

Because the patient’s history and physical examination results were atypical for appendicitis, a diagnostic laparoscopy was performed. It showed a large phlegmon in the left lower quadrant, but the appendix could not be visualized. Further exploration through a midline laparotomy showed a perforated gangrenous appendix, adhesive bands between the cecum and the right upper quadrant, and partial malrotation of the midgut. The patient underwent an appendectomy and lysis of the adhesive bands with broadening of the mesentry. After the operation, the duodenal-jejunal junction was to the right of the patient’s midline, and the cecum was located in the left lower quadrant.

Malrotation of the midgut is a result of failure or incomplete rotation of the midgut between the 4th and 12th weeks of gestation. Although about 80% of cases are diagnosed in patients younger than 1 month, malrotation has also been reported in older children and adults. It was found incidentally in only 4 of 2000 patients undergoing barium enema procedures for a variety of nonspecific gastrointestinal complaints. Because of this low prevalence in the adult population, early diagnosis is infrequent. Symptoms in the adult include intermittent abdominal pain and vomiting or a pattern of chronic diarrhea and malabsorption. Acute midgut volvulus with intestinal infarction can be the initial characteristics at any age.

The typical appearance in the newborn is sudden onset of bilious vomiting and x-rays that show a dilated duodenum with the distal presence of gas, distinguishing it from duodenal atresia. An upper gastrointestinal contrast study can usually diagnose the condition, but a barium enema may confirm the diagnosis by demonstrating an abnormal position of the cecum in the middle or left side of the abdomen. Characteristic findings on a computed tomographic scan of the abdomen include a right-sided duodenal-jejunal junction, a left-sided colon, an abnormal relationship of the superior mesenteric vessels, or a whirl-like pattern of encircling loops of small bowel around the superior mesenteric artery. The “whirlpool” sign has been described as an ultrasonic finding of malrotation. Diagnostic features of acute appendicitis have been reported for both computed tomographic scan and ultrasound.

Even if the patient is only mildly symptomatic, laparotomy is indicated once the diagnosis is made because of the risk of midgut volvulus. During the operation, the bowel is derotated in a counterclockwise direction, thickened peritoneal bands that extend from the cecum to the posterior abdominal wall are divided, and the base of the mesentery is broadened. The adhesive bands cross the duodenum, causing various degrees of obstruction; these are termed “Ladd bands” after Dr William Ladd’s description of treatment for duodenal obstruction in 1932. The bowel does not need to be plicated to the lateral peritoneal walls, but an appendectomy is performed to prevent future diagnostic dilemmas following the placement of the cecum in the left lower quadrant. If the bowel is ischemic, it is derotated and intravenous administration of dextran 40 at 40 mL/h is begun. A second-look laparotomy is recommended within 24 to 48 hours to assess bowel viability.

**REFERENCES**


**Image of the Month**

The Editor welcomes contributions to the Image of the Month. Send manuscripts to Grace S. Rozycki, MD, Department of Surgery, Emory University School of Medicine, 69 Butler St SE, Atlanta, GA 30303; (404) 616-3553; fax (404) 616-7333 (e-mail: grozyck@emory.edu). Articles and photographs accepted for publication will bear the contributor’s name. Manuscript criteria and information are per the Instructions for Authors for Archives of Surgery. No abstract is needed, and the manuscript should be no more than 3 typewritten pages. There should be a brief introduction, 1 multiple-choice question with 4 possible answers, and the main text. No more than 2 photographs should be submitted. There is no charge for reproduction and printing of color illustrations.