

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Surgery Quiz – Case 55

Female, 21-year-old patient with a history of total gastrectomy due to gastric volvulus, two years prior. She presented in the emergency department with sudden onset of central abdominal pain. She underwent a computed tomography (CT) scan revealing a distended colon and air bubbles within the enteric wall (figures 1, 2). An acute median laparotomy under general anesthesia was performed.

Comment

Intestinal malrotation has been traditionally taught as a disease of neonates and young children, but the identification of highly symptomatic malrotation in an adult suggests the diagnosis of midgut ischemia with or without volvulus. Intestinal malrotation, refers to any variation in the rotation and fixation of the gastrointestinal (GI) tract during development. During normal abdominal development, the three divisions of the GI tract (i.e., foregut, midgut, hindgut) herniate out from the abdominal cavity, where they then undergo a 270° counterclockwise rotation around the superior mesenteric vessels.² Following this rotation, the bowels return to the abdominal cavity, with fixation of the duodenojejunal loop to the left of the midline and the cecum in the right lower quadrant.

The alimentary tract develops from the embryologic foregut,

midgut, and hindgut.³ Normal rotation takes place around the superior mesenteric artery (SMA) as the axis. It is described by referring to two ends of the alimentary canal, the proximal duodenojejunal loop and the distal caeco-colic loop, and is usually divided into three stages. Both loops make a total of 270° in rotation during normal development. Both loops start in a vertical plane parallel to the SMA and end in a horizontal plane (fig. 3).

Interruption of typical intestinal rotation and fixation during fetal development can occur at a wide range of locations; this leads to various acute and chronic presentations of disease. The most common type found in pediatric patients is incomplete rotation predisposing to midgut volvulus, requiring emergent operative intervention. Male predominance is observed in neonatal presen-

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2024, 41(6):858–859

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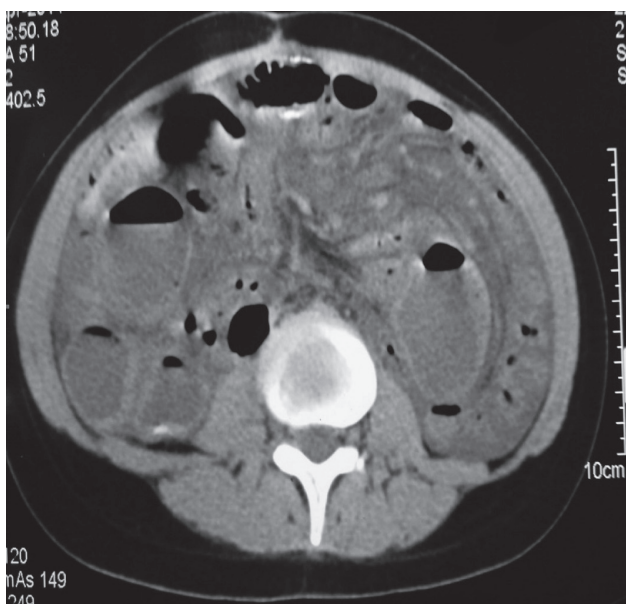


Figure 1

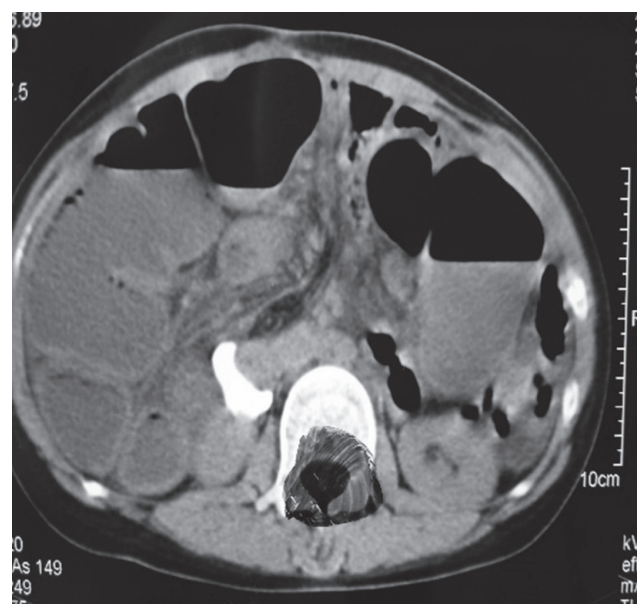


Figure 2

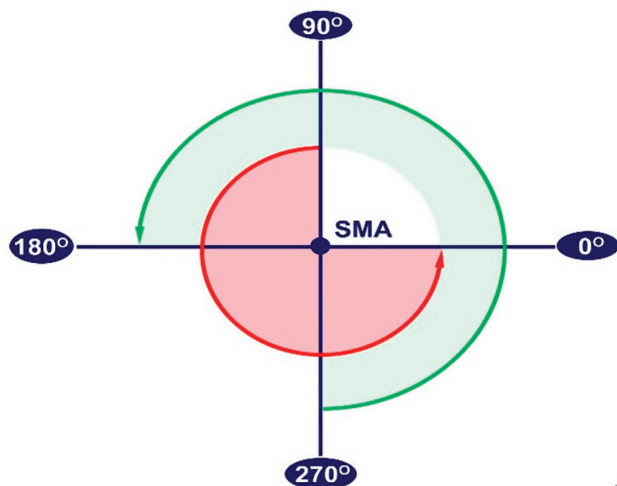


Figure 3

tations at a male-to-female ratio of 2:1. No sexual predilection is observed in patients older than one year.

The first reports of intestinal malrotation were based on surgical and autopsy findings and occurred prior to 1900; however, the first description of the embryologic process of intestinal rotation and fixation was not published until 1898. In 1923, Dott was the first to describe the relationship between embryologic intestinal rotation and surgical treatment.⁵ In 1936, William Ladd wrote the classic article on treatment of malrotation. His surgical approach, now known as the Ladd procedure, remains the cornerstone of practice today.

Symptoms may be chronic or acute in nature, and generally prompt a workup that includes a barium contrast study of the foregut and midgut that demonstrates the anatomic abnormality. Gastric volvulus is a rare clinical entity defined as an abnormal rotation of the stomach of more than 180°, creating a closed-loop obstruction that can result in incarceration and strangulation. Berti first described gastric volvulus in a female autopsy patient in 1866.¹¹ Years later, in 1896, Berg performed the first successful operation for this condition. In 1904, Borchardt described the classic triad associated with gastric volvulus: Severe epigastric pain, retching without vomiting, inability to pass a nasogastric tube.¹³ Males and females are equally affected. About 10–20% of cases occur in children,¹⁴ usually before the age of one year, but cases have been reported in children as old as 15 years.¹⁵ Gastric volvulus in children is often secondary to congenital diaphragmatic defects. The condition is uncommon in adults younger than 50 years.

Gastric volvulus can be classified as either type 1 (idiopathic, due to abnormal laxity of the gastrosplenic, gastroduodenal, gastrophrenic, and gastrohepatic ligaments) or type 2 (congenital or acquired-associated with congenital or acquired abnormalities that result in abnormal mobility of the stomach). Clinicians should be

aware that midgut malrotation with ischemia and necrosis may present in the adult patient as acute abdominal pain and carries a high mortality rate.

References

1. GROSS E, CHEN MK, LOBETE. Laparoscopic evaluation and treatment of intestinal malrotation in infants. *Surg Endosc* 1996, 10:936–937
2. BAX NM, VAN DER ZEE DC. Laparoscopic treatment of intestinal malrotation in children. *Surg Endosc* 1998, 12:1314–1316
3. YAMASHITA H, KATO H, UYAMA S, KANATA T, NISHIZAWA F, KOTEGAWA H ET AL. Laparoscopic repair of intestinal malrotation complicated by midgut volvulus. *Surg Endosc* 1999, 13:1160–1162
4. KIESEWETTER WB, SMITH JW. Malrotation of the midgut in infancy and childhood. *AMA Arch Surg* 1958, 77:483–491
5. DOTT NM. Anomalies of intestinal rotation: Their embryology and surgical aspects with reports of five cases. *Br J Surg* 1923, 11:251–286
6. KANTOR JL. Anomalies of the colon: Their roentgen diagnosis and clinical significance. *Radiology* 1934, 23:651–662
7. BALTHAZAR EJ. Intestinal malrotation in adults. Roentgenographic assessment with emphasis on isolated complete and partial nonrotations. *AJR Am J Roentgenol* 1976, 126:358–367
8. VON FLÜE M, HERZOG U, ACKERMANN C, TONDELLI P, HARDER F. Acute and chronic presentation of intestinal nonrotation in adults. *Dis Colon Rectum* 1994, 37:192–198
9. GILBERT HW, ARMSTRONG CP, THOMPSON MH. The presentation of malrotation of the intestine in adults. *Ann R Coll Surg Engl* 1990, 72:239–242
10. DEVLIN HB, WILLIAMS RS, PIERCE JW. Presentation of midgut malrotation in adults. *Br Med J* 1968, 1:803–807
11. BERTI A. Singolare attorcigliamento dell'esofago col duodeno seguita da rapida morte. *Gazz Med Ital* 1866, 9:139–141
12. BERG J. Zwei Fälle von Axendrehung des Magens; Operation; Heilung. *Nord Med Arkiv* 1897, 30:1
13. BORCHARDT M. Aus Pathologie und Therapie des Magenvolvulus. *Arch Klin Chir* 1904, 74:243–260
14. HARFORD WV, McARTHUR KE. Diverticula, hernias, volvulus, and rupture. In: Sleisenger MH, Fordtran JS (eds) *Gastrointestinal disease: Pathophysiology, diagnosis, management*. 5th ed. Saunders, Philadelphia, Pa, 1993:481–483
15. OLTMANN H. *Inaugural discussion*. Kiel, 1899
16. MILLER DL, PASQUALE MD, SENECA RP, HODIN E. Gastric volvulus in the pediatric population. *Arch Surg* 1991, 126:1146–1149

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