

Answer

Chilaiditi Sign or Syndrome

Chilaiditi sign refers to the usually asymptomatic interposition of the bowel (usually the hepatic flexure of the colon) between the liver and the right hemidiaphragm. It was first described by a Viennese radiologist, Demetrius Chilaiditi, in 1910.¹ This phenomenon is seen in 0.025% to 0.28% of the general population.² The findings are most often incidental; the condition is slightly more common in males, adults, and individuals with cognitive impairment; and symptoms may present intermittently.³ The term *sign* refers to the asymptomatic presence of the interposed bowel, whereas the term *syndrome* includes abdominal pain, constipation, vomiting, respiratory distress, anorexia, and rarely, volvulus or obstruction.

Colonic fixation and suspensory ligaments, coupled with the normal anatomy of the diaphragm and the liver, normally inhibit this potential interposition.^{2,4-7} Predisposing factors to its occurrence include absence of the normal suspensory ligaments of the transverse colon, abnormality or absence of the falciform ligament, redundant colon (as might be seen with chronic constipation or bedridden individuals), excessive aerophagia in children (secondary to increased colonic air), right hemidiaphragm elevation (paralysis or eventration), an enlarged thoracic cage in emphysema (leaving extra space for potential colon migration), congenital malposition or malrotation (leading to increased colonic mobility), ascites (the "floating liver" of ascites can be more easily displaced by the adjacent hepatic flexure), or multiple pregnancies.^{5,6,8,9}

Treatment of Chilaiditi syndrome includes nonoperative approaches (bed rest, fluid supplementation, nasogastric decompression, enemas, cathartics, high-fiber diets, and stool softeners). However, 26% of patients may require colectomy.^{3,10,11} Alternatively, laparoscopic colopexy has been described.¹²

In conclusion, recognition of Chilaiditi syndrome and its spectrum is important because if this entity is mistaken for a more serious abnormality (pneumoperitoneum, subphrenic abscess, ruptured abdominal viscus, posterior hepatic lesions, or retroperitoneal masses), unnecessary surgical intervention may result.

Accepted for Publication: August 26, 2007.

Correspondence: Walter E. Longo, MD, Department of Surgery, Yale University School of Medicine, PO Box

208062, New Haven, CT 06520-8062 (walter.longo@yale.edu).

Author Contributions: *Acquisition of data:* Shetty-Alva. *Analysis and interpretation of data:* Alva and Longo. *Drafting of the manuscript:* Alva. *Critical revision of the manuscript for important intellectual content:* Longo. *Administrative, technical, and material support:* Alva and Shetty-Alva. *Study supervision:* Longo.

Financial Disclosure: None reported.

REFERENCES

1. Chilaiditi D. *Zur Frage der Hapatoptose und Ptose in allemeinen im Auschluss an drei Falle von temporaerer partiellaer Leberverlagerung.* Munich, Germany: Fortschritte auf dem Gebiete der Roentgenstrahlen; 1910:173-208.
2. Orangio GR, Fazio VW, Winkelman E, McGonagle BA. The Chilaiditi syndrome and associated volvulus of the transverse colon: an indication for surgical therapy. *Dis Colon Rectum.* 1986;29(10):653-656.
3. Saber AA, Boros MJ. Chilaiditi's syndrome: what should every surgeon know? *Am Surg.* 2005;71(3):261-263.
4. Isbister WH, Bellamy P. Hepato-diaphragmatic interposition of the intestine (Chilaiditi's syndrome): a case report. *Aust N Z J Surg.* 1991;61(6):462-464.
5. Walsh SD, Cruikshank JG. Chilaiditi syndrome. *Age Ageing.* 1977;6(1):51-57.
6. Vessal K, Borhanmanesh F. Hepatodiaphragmatic interposition of the intestine (Chilaiditi's syndrome). *Clin Radiol.* 1976;27(1):113-116.
7. Risaliti A, De Anna D, Terrosu G, Uzzau A, Carcoforo P, Bresadola F. Chilaiditi's syndrome as a surgical and nonsurgical problem. *Surg Gynecol Obstet.* 1993;176(1):55-58.
8. Javors BR, Sorkin NS, Flint GW. Transverse colon volvulus: a case report. *Am J Gastroenterol.* 1986;81(8):708-710.
9. Gumbs MA, Kashan F, Shumofsky E, Yerubandi SR. Volvulus of the transverse colon: reports of cases and review of the literature. *Dis Colon Rectum.* 1983;26(12):825-828.
10. Siraj QH, McGlone BS. Chilaiditi's syndrome on Tc-99m hexamethylpropylene amineoxime imaging. *Clin Nucl Med.* 1999;24(9):699-700.
11. Rompen JC, Zeebregts CJ, Prevo RL, Klaase JM. Incarcerated transdiaphragmatic intercostal hernia preceded by Chilaiditi's syndrome. *Hernia.* 2005;9(2):198-200.
12. Lohr CE, Nuss MA, McFadden DW, Hogg JP. Laparoscopic management of Chilaiditi's syndrome. *Surg Endosc.* 2004;18(2):348.

Submissions

Due to the overwhelmingly positive response to the Image of the Month, the *Archives of Surgery* has temporarily discontinued accepting submissions for this feature. It is anticipated that requests for submissions will resume in mid-2008. Thank you.