Bowel in Chest: Type IV Hiatal Hernia

William Krause, MD; Jennifer Roberts, MD; and Romel J. Garcia-Montilla, MD

A man, age 81 years, presented with frequent nausea and non-bloody vomiting for the past week, and a 3-day history of worsening epigastric abdominal pain with no flatus or bowel movements. He was tachycardic (120 bpm) and hypotensive (86/40 mm Hg). Upper abdomen was profoundly tender and distended. Laboratory results were significant for leukocytosis ($20 \times 10^3/\mu\text{L}$; normals 4.1–10.9 $\times 10^3/\mu\text{L}$), acute kidney injury (creatinine 1.8 mg/dL; normals 0.6–1.3 mg/dL), and lactic acidosis (lactate 6.0 mmol/L; normals 0.5–2.1 mmol/L). Chest radiograph demonstrated air-filled loops of the colon over the midline of

the lower thorax (figure 1). Abdominal computed tomography confirmed type IV hiatal hernia (figures 2 and 3). The patient received aggressive hemodynamic resuscitation in the intensive care unit. Exploratory laparotomy with hernia reduction and extended right hemicolectomy, due to extensive colonic necrosis, was performed. Gastrostomy tube was placed.

Four types of hiatal hernias have been described (Table 1), with type IV being the least common. The combination of types II, III, and IV account for around 5% of all hiatal hernias, but type IV represents only 2–5% of those.¹ Type IV are

Figure 1. Portable upright chest radiograph showing loops of colon in the thoracic cavity.

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Figure 2. Computed tomography imaging of the thorax showing a large hiatal hernia containing essentially all the transverse colon (TC) which is distended with air fluid levels and thickening of its wall, indicating incarceration.

associated with a large defect in the phrenoesophageal membrane and abnormal laxity of the gastrosplenic and gastrocolic ligaments, which allows parts of the stomach and other intra-abdominal organs to enter the hernia sac.^{2,3} It is unknown if these predisposing abnormalities are acquired, congenital, or a combination of both.³ In our case, the defect allowed migration of, not only part of the stomach, but almost all the entire transverse colon into the hernia sac, causing ischemia and necrosis.

Clinical manifestations of large hiatal hernias are unspecific, making their clinical diagnosis challenging. Symptoms vary from minimal epigastric discomfort and fullness to progressive dysphagia, chest discomfort, dyspnea, nausea, vomiting, and severe epigastric and chest pain.⁴ Their natural course can become complicated by volvulus, incarceration, perforation, or even recurrent pneumonia due to dysphagia and frequent vomiting with aspiration.⁵ As with our patient, incarceration or strangulation of the stomach and/or bowels may present as a life threatening complication.⁵ If the large hiatal hernia is detected early in the course of the natural evolution, elective surgical repair is recommended, because emergent surgery has been associated with acute organ failure with poor outcomes and a reported mortality rate of up to 56% in some series.^{6,7} If left untreated, severe complications like outlet

gastric obstruction, severe gastroesophageal reflux, and gastric or bowel strangulation may develop in up to 45% of patients in some reports (Table 1).^{6,8}

Giant hiatal hernias are very infrequent, and their spectrum of clinical manifestations is large. Patients can present with minimal signs and symptoms or, as in this case, in extremis. The astute clinician must be aware of the existence of these oddities, including them in the differential diagnosis workup of patients with chest and/or upper abdominal pain, to implement in a timely manner the most appropriate intervention, which can range from only medical treatment to either elective surgical repair or emergent surgical correction.

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Figure 3. Coronal computed tomography imaging showing a large hiatal hernia with incarcerated transverse colon (TC). The colonic mesenterium (m) and a dilated cecum (C) are observed. Dilated stomach (S) due to gastric outlet obstruction is also observed.

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Table 1. Types of Hiatal Hernias

	Type/Illustration	Description	Incidence	Management ⁷
Sliding Hernia	Type I	Gastroesophageal (GE) junction migrates above the diaphragm.	95%	<ul style="list-style-type: none"> • These are usually asymptomatic and inconsequential. • If gastroesophageal reflux disease is unable to be managed medically, fundoplication surgery is indicated.
	Type II	GE junction in normal position, but a portion of the gastric fundus herniates through the diaphragmatic hiatus adjacent to esophagus. Real paraesophageal hernia.	0.4%	<ul style="list-style-type: none"> • Only hernias with real risk for obstruction. • If symptomatic should be rapidly repaired surgically, particularly those with obstructive symptoms or which have undergone volvulus. • Routine elective repair of completely asymptomatic paraesophageal hernias, although recommended by some experts, is debated and may not always be indicated. • If surgery is considered in asymptomatic or minimally symptomatic patients, the patient's age (favoring younger) and co-morbidities must be considered.
Paraesophageal Hernias	Type III	Combination of Types I and II. Both GE junction and fundus herniate.	4.5%	
	Type IV	Characterized by the presence of a structure other than stomach, such as the omentum, colon or small bowel within the hernia sac. Also known as Giant Hiatal Hernia.	0.1%	

Table adapted from Kohn et al.(2015)⁷ Incidence adapted from Maish & DeMeester (2004)⁹

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