



Case Report

Chilaiditi sign: why are clinical findings more important in ED?

**Abstract**

Chilaiditi sign is a radiographic term used when the hepatic flexure of the colon is seen interposed between the liver and right hemidiaphragm. When symptomatic, this is Chilaiditi syndrome. It is mostly diagnosed as an incidental finding on a chest roentgenogram or abdominal computed tomography (CT), which can be present temporarily or permanently. A 52-year-old man presented to the emergency department with abdominal pain that began abruptly 4 hours before presentation. On examination, epigastric tenderness was present, but there were no defense and rebound tenderness. In addition, abdomen was soft. Chest radiography suggested the presence of air below the right side of the diaphragm. Subsequent CT revealed the presence of subphrenic interposition of the colon above the liver. These findings suggested Chilaiditi syndrome. The patient was managed conservatively with pain management and intravenous fluid hydration. During follow-up in hospital, his abdominal pain resolved without surgical intervention. It is important for physicians to be able to distinguish pneumoperitoneum and pseudopneumoperitoneum to allow proper diagnosis and treatment. Emergent laparotomy should be delayed, and a CT scan should be done first.

Hepatodiaphragmatic interposition of a bowel segment, also known as Chilaiditi sign, is an uncommon and typically asymptomatic anatomical abnormality. It can be either congenital or acquired [1]. Chilaiditi sign is a radiographic term that becomes known as Chilaiditi syndrome when symptoms present such as abdominal pain, distention, nausea, vomiting, constipation, and even cardiac arrhythmias or respiratory distress. [2]. It is estimated to occur in 0.25% to 0.28% of the general population with a slight increase in individuals older than 60 years, being most frequently found in men than in women at a 4:1 ratio [3,4].

We present a rare case of a 52-year-old man who presented with abdominal pain. Initially believed to be gastric perforation, the patient was found to have Chilaiditi syndrome diagnosed by computed tomographic (CT) scan.

A 52-year-old man presented to the emergency department (ED) with abdominal pain that began abruptly 4 hours before presentation. The pain, which was located in the epigastric and periumbilical area, was initially mild but progressed in severity. Nausea, vomiting, anorexia, and constipation were present but no weight loss with abdominal pain. There was no tachypnea or tachycardia. He denied having any other systemic diseases. The patient was hemodynamically stable and afebrile. On examination, epigastric tenderness was present, but there were no defense and rebound tenderness. Serial electrocardiograms were normal. No abnormalities were detected on various screening blood tests within the reference range. A posteroanterior chest radiograph revealed an elevation of the right part of the diaphragm with abdominal gas interposition between the liver and the diaphragm (Fig. 1).

Because of current symptoms and radiologic images, gastric perforation was considered. The patient was consulted on the surgery. The patient did not exhibit signs of peritoneal irritation on physical examination. Therefore, surgical intervention was not considered. A CT scan showed that the transverse colon was interposed between the liver and right diaphragm, mimicking free air (Fig. 2). These findings suggested Chilaiditi syndrome. The patient was managed conservatively with pain management and intravenous fluid hydration. During follow-up in hospital, his abdominal pain resolved without surgical intervention. After 3 days, the patient had no symptoms and was discharged.

Transposition of loop of large intestines in between diaphragm and liver surface on plain x-ray chest or abdomen is known as Chilaiditi sign. The most common cause of the condition is flaccidity and elongation of hepatic and intestinal suspensory ligaments. It was first described by Greek radiologist Demetrius Chilaiditi in 1910 [5,6]. Physical examination is usually normal except interposition of loop in Chilaiditi sign. Symptoms such as nausea, abdominal pain, vomiting, distension of abdomen, and shortness of breath in patients with this sign are termed as *Chilaiditi syndrome* [7]. Sealed bowel perforation forms an important differential diagnosis. There is a chance that a novice might interpret air under the diaphragm as a bowel perforation and the patient may be subjected to unwarranted surgery. Chilaiditi sign may be seen in cirrhosis and chronic obstructive pulmonary disease. Volvulus of the transverse colon or few malignancies (colonic, gastric, and pulmonary malignancy) may be associated with Chilaiditi syndrome. Subphrenic abscess may show similar characteristic as Chilaiditi sign or syndrome [8]. To diagnose Chilaiditi sign based upon radiologic findings, the following criteria must be met: The right hemidiaphragm must be adequately elevated above the liver by the intestine, the bowel must be distended by air to illustrate pseudopneumoperitoneum, and the superior margin of the liver must be depressed below the level of the left hemidiaphragm [3]. If a radiograph cannot clearly determine whether the subdiaphragmatic air is free or intraluminal, a CT scan is recommended to establish an accurate diagnosis [9]. Although conservative therapy is preferred for Chilaiditi syndrome, surgical treatment may be indicated for intestinal obstruction, ischemia, or perforation [2]. In our case, the patient was initially believed to have gastric perforation. However, a proper workup and keeping in mind the possibility of Chilaiditi syndrome kept the patient out of the operating room for what would have proven to be an unnecessary procedure [10].

Today, because of overcrowded EDs, clinicians cannot find enough time to examine their patients. Therefore, instead of physical examination, laboratory tests and radiographic imaging are preferred by clinicians. However, this kind of approach may lead to misdiagnosis as seen in Chilaiditi sign as a result of the wrong treatments that may affect the patient's prognosis.

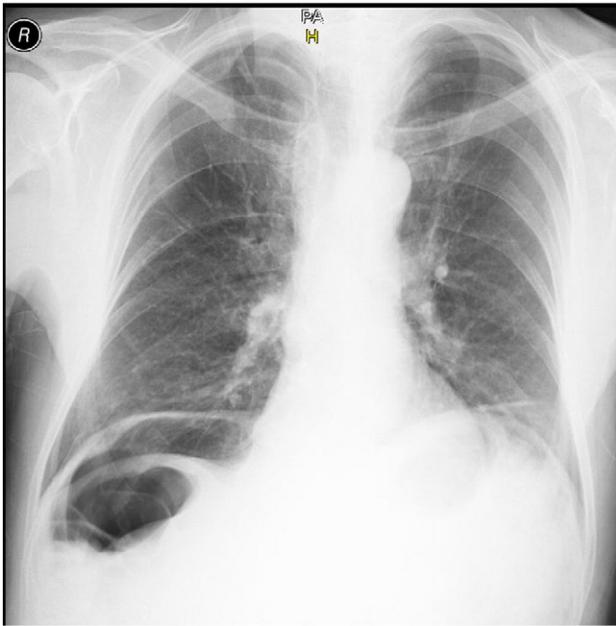


Fig. 1. A posteroanterior chest radiograph revealed an elevation of the right part of the diaphragm with abdominal gas interposition between the liver and the diaphragm.

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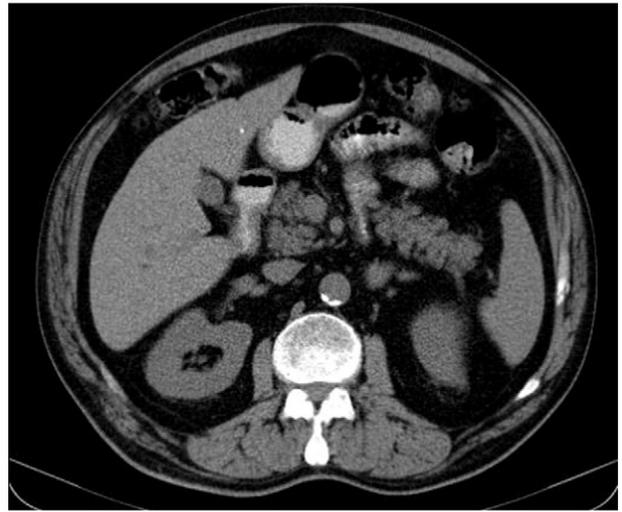


Fig. 2. A CT scan showed that the transverse colon was interposed between the liver and diaphragm.

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