

Case Report

Chilaiditi's Sign in a Silicosis Patient

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Abstract

Chilaiditi's sign is a rare radiological phenomenon where the transverse colon interposes between the liver and the right hemidiaphragm. Described in 1910, this is typically asymptomatic but can mimic conditions like pneumoperitoneum. Diagnosis is made through imaging, with CT being the gold standard. While asymptomatic cases require no treatment, symptomatic cases may need conservative care or, rarely, surgery. This communication describes incidental findings of Chilaiditi's sign on a chest x-ray in a patient having a prolonged history of occupational exposure to silica dust. The diagnosis was further confirmed by the CT scan examination. The importance of this phenomenon and awareness of this finding is also stressed among clinicians in their routine practice.

Keywords: Chilaiditi sign, Chest radiology, Gas under diaphragm, Silicosis

INTRODUCTION

Chilaiditi's sign, first described by Demetrius Chilaiditi in 1910, involves the interposition of the transverse colon between the liver and the right hemidiaphragm. It is often found incidentally during imaging for unrelated conditions. While most cases are asymptomatic, its potential to mimic serious conditions like pneumoperitoneum makes it clinically relevant. When symptomatic, it is termed Chilaiditi syndrome.¹

Chilaiditi's sign is typically detected through imaging studies. Chest or abdominal X-rays often show a gas-filled structure beneath the right hemidiaphragm, with colonic haustral markings helping confirm its origin.² CT imaging offers enhanced diagnostic accuracy, providing clear differentiation from other pathologies like subphrenic abscesses or perforations by outlining the anatomical relationship between the colon, liver, and diaphragm.³

Case report

A 45-year-old male presented with complaints of cough and breathlessness for the last year. For the last two months, he also had dull chest pain at the back. There were no non-respiratory complaints. He denied a history of smoking and

other addictions. He had worked at a stone powder factory for about ten years. He used to work at that place for six hours daily on all days of the week without any protective measures. His past history was not significant for any medical illness, surgical procedure, or drug therapy.

On examinations, he was averagely built and nourished. Oxygen saturation on digital pulse oximetry was 95% on room air. His vital parameters were within normal limits. Clinical examination was normal except for occasional crackles on the right side. Routine blood investigations including blood counts and organ functions were within normal limits.

His chest x-ray showed bilateral nodular shadows with a conglomeration of nodular shadows forming irregular marginated rounded shadows on right lung fields. Gaseous shadows were seen beneath the right hemidiaphragm also (Figure 1). CT scan chest revealed bilateral nodular shadows with the formation of progressive massive fibrosis and gaseous shadow below the right diaphragm (Figures 2a and b). In both the chest x-ray and CT scan images, the air shadows below

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the right diaphragm showed typical colonic haustrations suggestive of hepato-diaphragmatic interposition of a large colon. The diagnosis of Chilaiditi's sign on radiological findings was made. Since there were no abdominal symptoms, Chilaiditi's syndrome was ruled out.

His induced sputum was negative for acid-fast bacilli on smear microscopy. Bronchoscopy did not reveal any endoscopic abnormality and bronchial wash cytology revealed chronic inflammatory cells. Bronchial aspirates were negative for *Mycobacterium tuberculosis* on CBNAAT and were found sterile on culture for bacterial and fungal organisms. His spirometry revealed mixed obstructive and restrictive types of ventilatory defect. The patient was managed by symptomatic treatment and advised to come in for regular follow-up.

DISCUSSION

Chilaiditi's sign is an unusual radiological sign with an estimated incidence of 0.025 to 0.28% worldwide. This is more commonly seen among males and typically among the elderly.⁴ The condition arises from a variety of anatomical variations, including a redundant or elongated colon and laxity of the liver's suspensory ligaments.³ Factors such as chronic constipation and diaphragmatic elevation (common in COPD) increase the likelihood of colonic displacement. Demographic factors, including male sex, advanced age, and lean body habitus, also predispose individuals to Chilaiditi's sign.⁵

Chilaiditi's sign occurs when the transverse colon is displaced into the subdiaphragmatic space due to congenital or acquired anatomical variations or physiological changes like diaphragmatic elevation. The gas-filled loops beneath the diaphragm mimic pneumoperitoneum, but the presence of haustral markings confirms the colonic origin. Factors such as increased intra-abdominal pressure, chronic constipation, or previous abdominal surgery can exacerbate colonic displacement, increasing the risk of this abnormal anatomical positioning.⁶

Chilaiditi's sign is typically asymptomatic, but its radiological appearance can lead to diagnostic confusion, often mimicking pneumoperitoneum and prompting unnecessary surgical interventions.⁵ In symptomatic cases (Chilaiditi syndrome), patients may experience abdominal pain, nausea, vomiting, or altered bowel habits. Rare complications, such as volvulus or bowel ischemia, can occur but are uncommon.³

The diagnosis of Chilaiditi's sign begins with radiographic imaging. Plain X-rays showing air beneath the diaphragm with haustral markings are indicative. CT scans confirm the diagnosis and exclude differential diagnoses, such as perforated viscus or subphrenic abscess.² Careful imaging is crucial to avoid misinterpretation and unnecessary interventions.⁶

Chilaiditi's sign can be mistaken for several conditions on imaging. Pneumoperitoneum is a key differential, as both present with air beneath the diaphragm; however,



Figure 1: X-ray chest PA view showing gaseous shadow beneath the right hemidiaphragm

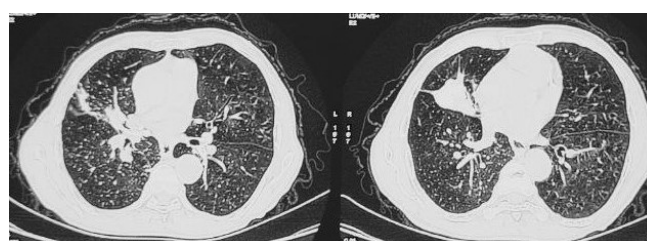


Figure 2a: CT scan images showing bilateral predominant nodular shadows of high density along with linear shadows and progressive massive fibrosis formation in right lung

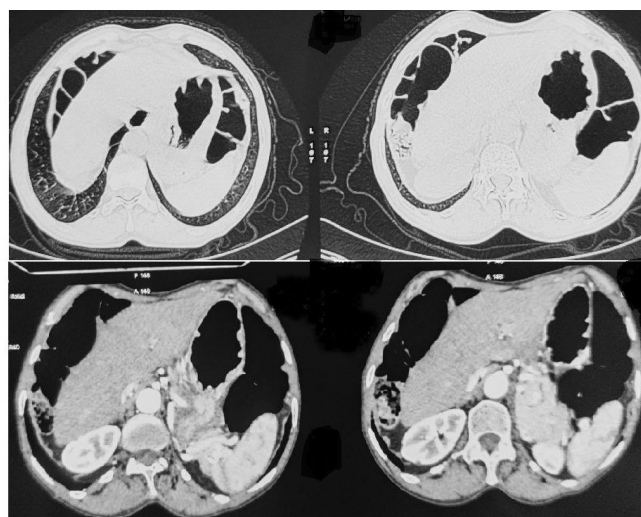


Figure 2b: CT scan images showing colonic shadows beneath the right hemidiaphragm

pneumoperitoneum lacks colonic haustral markings and is associated with peritonitis.² Subphrenic abscesses and visceral perforation can also appear similar, but abscesses do not show haustral markings, and perforation typically involves free fluid or absent colonic features on CT. Diaphragmatic hernias and hepatomegaly may displace the colon under the diaphragm, but in these cases, the bowel wall continuity and liver relationship are distinct from Chilaiditi's sign.

Finally, colon malrotation or volvulus may mimic colonic displacement, but they are usually associated with more severe symptoms like obstruction.² CT imaging is essential to distinguish these conditions from Chilaiditi's signs and avoid unnecessary interventions.

Asymptomatic cases typically require no intervention beyond patient education. In symptomatic cases, management is conservative, including bowel rest, nasogastric decompression, and treatment of underlying conditions like constipation. Surgical intervention is reserved for complications, such as volvulus or bowel ischemia, where conservative measures fail.⁴

In conclusion, Chilaiditi's sign is a benign but clinically significant condition, often presenting with no symptoms but capable of mimicking more severe conditions. Accurate diagnosis through imaging is essential to avoid unnecessary surgeries. With appropriate clinical evaluation and

management, most cases can be managed conservatively, minimizing the risk of complications.⁶

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