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Case Report

Chilaiditi syndrome in COPD patient: A case report ☆,☆☆

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ABSTRACT

Chilaiditi syndrome is defined as the interposition of the colon between the liver and the diaphragm or abdominal wall and is known as Chilaiditi's sign on X-rays. Although rare, this procedure can lead to serious complications. Due to its infrequency and propensity for severe complications, diagnosing and differentiating this syndrome from other acute abdominal emergencies are very important for preventing unnecessary treatment or surgical procedures. We present a 72-year-old male with a history of chronic obstructive pulmonary disease (COPD) who presented to the emergency department with persistent shortness of breath, abdominal discomfort, and vomiting. Physical examination revealed chest crepitation, tenderness in the left iliac fossa, and high blood pressure. Laboratory tests revealed a positive COVID-19 status, elevated C-reactive protein level, and respiratory alkalosis. Imaging, including a chest X-ray and CT scan, confirmed the presence of bowel loops under the diaphragm, confirming the diagnosis of Chilaiditi syndrome. Collaborative management by surgical and medical teams was essential in navigating this complex condition. This case highlights the complexity of chilaiditi syndrome, which can be episodic and intermittent, in addition to the importance of recognizing Chilaiditi's sign on imaging, particularly on CT scans, to differentiate it from pneumoperitoneum. Vigilance is crucial in identifying potential complications and guiding appropriate treatment to prevent adverse outcomes.

List of abbreviations: COPD, Chronic obstructive pulmonary disease; CT Scan, Computed tomography; HFPEF, Heart failure with preserved ejection fraction; TWBCs, total white blood cell count; CRP, C-reactive protein; PCO2, partial pressure of carbon dioxide; PO2, partial pressure of oxygen; ALK, alkaline phosphatase.

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Introduction

Chilaiditi syndrome, initially described by the Greek radiologist Demetrious Chilaiditi in 1910 [1], represents a rare medical phenomenon characterized by radiographic observation of the colonic interposition between the liver and the diaphragm or abdominal wall and is often accompanied by clinical manifestations [2]. The diagnosis of this syndrome is frequently incidental on radiographic images and can be confounded by other conditions, such as diaphragmatic hernia, pneumoperitoneum, or subdiaphragmatic abscess [3].

The appearance of radiolucency in the subdiaphragmatic space due to colonic interposition is commonly termed Chilaiditi's sign when detected via X-ray [4]. The syndrome itself may give rise to potentially severe complications [5]. While the hepatic flexure of the colon is most commonly implicated, instances involving the small bowel have been documented in a minority of cases [2]. The estimated incidence of Chilaiditi syndrome ranges from 0.025% to 0.28% [6]. Notably, Chilaiditi syndrome predominantly affects males and typically presents with a median onset age of 60 years [7].

Clinical manifestations of Chilaiditi syndrome include abdominal pain, bloating or flatulence, nausea and vomiting, abdominal distention, and alterations in bowel habits [8]. These symptoms are frequently accompanied by respiratory symptoms and, less commonly, cardiac manifestations. Furthermore, these presentations are often exacerbated in the supine position, particularly at night [9]. This case report describes the clinical setting of a 72-year-old male with chronic obstructive pulmonary disease (COPD) who was diagnosed with Chilaiditi syndrome, thus underscoring the importance of identifying and managing this rare condition amidst intricate clinical presentations.

Case presentation

Chief complaints

A 72-year-old known COPD Sudanese male was brought to the emergency department by an ambulance as he collapsed at home.

History of the present illness

He presented with shortness of breath that was not exacerbated by activities, left iliac fossa abdominal discomfort, or vomiting (once). He denied a history of fever, nausea and vomiting, diarrhea, or constipation.

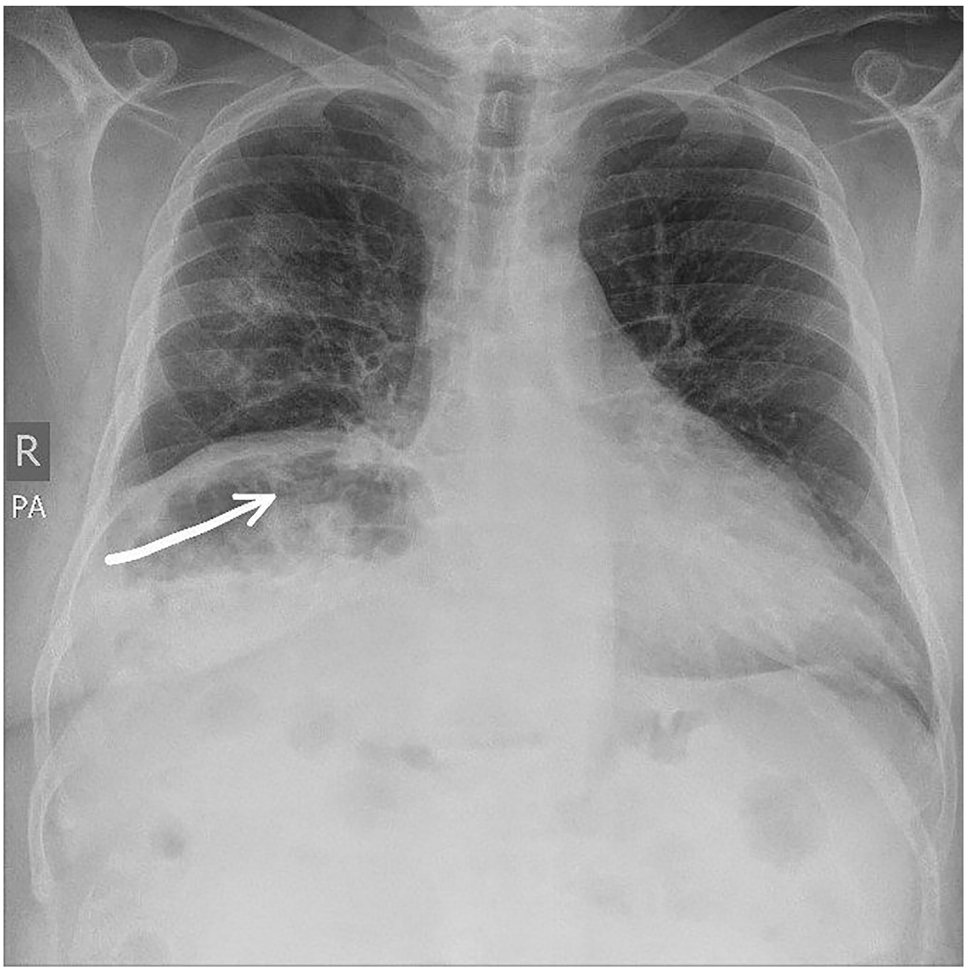

Fig. 1 – Chest X-ray showing air under the right copula of the right diaphragm.

Past medical history

The patient had a past medical history of COPD, type 2 diabetes mellitus, osteoarthritis, HFPEF, arthritis, atrial fibrillation, and polymyalgia rheumatica. He had a history of on-and-off mild abdominal pain for the past few years.

Family history

His family history was negative for any gastrointestinal conditions, such as irritable bowel disease or cancer.

Social history

The respondent's social history was only remarkable for tobacco use.

Drug history

His current medication regimens included an anticoagulant (apixaban), a calcium channel blocker (lercanidipine), a serotonin-noradrenaline reuptake inhibitor (duloxetine), a proton pump inhibitor (omeprazole), a bumetanide diuretic (burinex senna), a xanthine oxidase inhibitor (allopurinol), no rapid insulin, oral hypoglycemic agents (empaglifozin and linagliptin), and an alpha blocker for BPH (burinex urorec). It is important to note that he had a known allergy to opioids and NSAIDs (Voltarol).

Physical examination

The patient was conscious, alert, and well oriented with regard to time, place, and person at the time of presentation and was not experiencing respiratory distress. He was vitally stable except for hypertension (170/90 mm Hg), and he was afebrile with a temperature of 36.9°C. A chest examination revealed bilateral crepitation in the chest.

Abdominal examinationally, the abdomen was not distended or soft. Mild tenderness was present in the right iliac fossa. Bowel sounds were heard. Rebound tenderness and guarding were absent.

Investigations

The results revealed a positive COVID-19 status, indicating active infection. The total white blood cell count (TWBCs) was $8.2 \times 10^{\wedge}9$/L, with a neutrophil predominance of $6.38 \times 10^{\wedge}9$/L. The inflammatory marker level was an elevated C-reactive protein (CRP) level of 47 mg/dL, suggesting an ongoing inflammatory response. Respiratory alkalosis was confirmed by arterial blood gas analysis, which revealed a marginally alkalotic pH of 7.47 and a reduced partial pressure of carbon dioxide (PCO2) of 3.4 kPa. Lactate levels were elevated at 1.9 mmol/L, potentially indicating tissue hypoperfusion or impaired oxygen utilization. The partial pressure of oxygen (PO2) was within the normal limits at 10.2 kPa. The platelet count was 67, possibly suggestive of thrombocytopenia. Other parameters included a normal serum ALB concentration of 37 g/dL and an alkaline phosphatase (ALK) concentration of 70 U/L.

Imaging: A radiological examination of the patient via Chest X-ray showing air under the right copula of the right diaphragm (Fig. 1), routine breathing revealed heavily T2-weighted axial (Fig. 2) and coronal noncontrast series and revealed a chronically elevated right hemidiaphragm, and

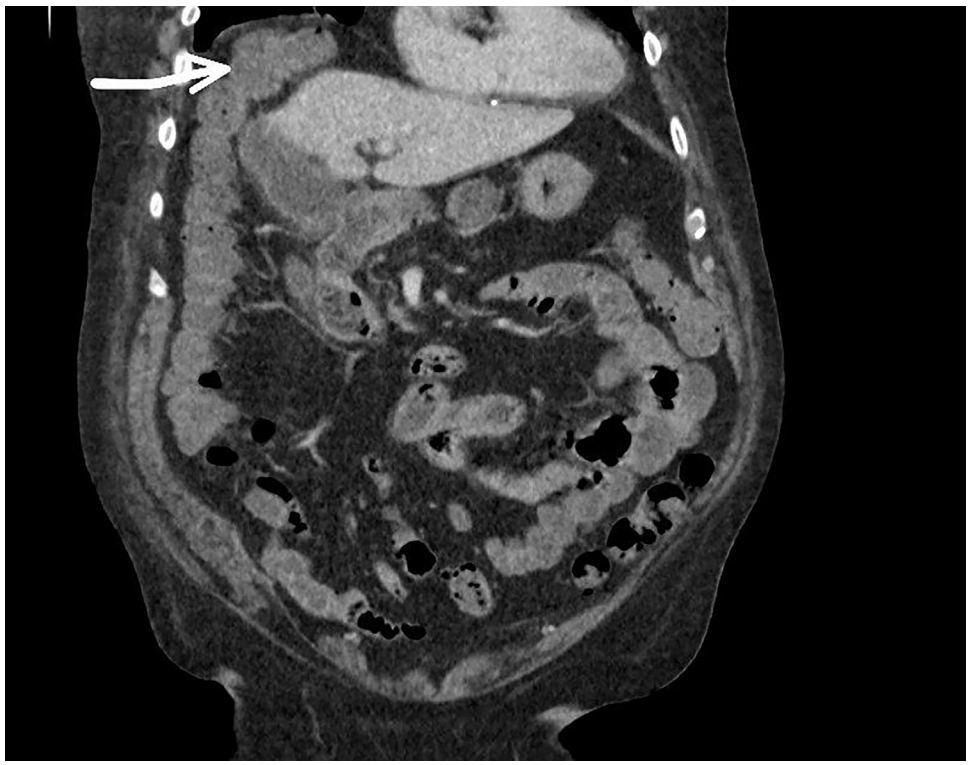

Fig. 2 – Routine breath-hold, heavily T2-weighted axial CT scan of the abdomen and pelvis identified a bowl loop under the right hemidiaphragm anterior to the liver.

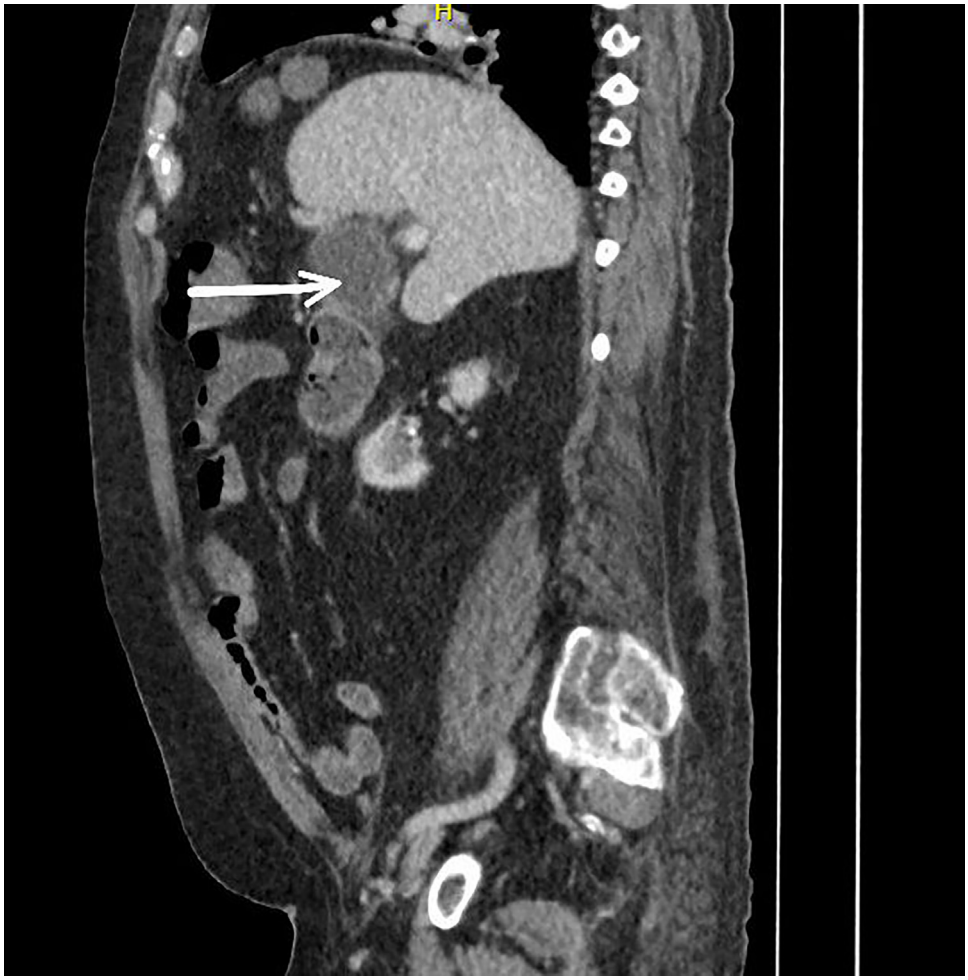

Fig. 3 – MRI scan showing the bowel loop under the right hemidiaphragm.

colonic interposition between the liver and the diaphragm was observed, confirming the diagnosis of Chilaiditi syndrom (Fig. 3). The patient also exhibited chronic atelectasis, partial lung collapse, and renal cortical loss in the small kidneys. Degenerative lumbar scoliosis and hepatic steatosis were noted without significant abnormalities in the liver, spleen, or adrenal glands. The examination also revealed normal vascular structures, with no evidence of upper abdominal adenopathy or free fluid accumulation. Chest X-ray revealed the presence of bowel loops under the diaphragm. MRI revealed a bowel loop under the right hemidiaphragm, mild proximal pancreatitis, fatty atrophy, bilateral renal cortical atrophy, and a small renal cyst in the right kidney. Both the CT and MRI findings were consistent with those of Chilaiditi syndrome, confirming colonic interposition and supporting the comprehensive assessment of the patient's abdominal and thoracic anatomy.

Management

The patient was reviewed by the surgical team, after which he was referred to the medical team for call care.

Discussion

This case report aims to present a case of Chilaiditi syndrome in a 72-year-old male patient with chronic obstructive pulmonary disease. Chilaiditi's sign is defined as the malposition of the colon between the diaphragm and the liver [2] resulting from the manipulation of any of these three organs [3]. Factors elevating the diaphragm, such as phrenic nerve palsy or congenital diaphragmatic abnormalities, contribute to organ misplacement [10].

Chilaiditi syndrome is characterized by pathological colonic interposition due to variations in anatomy, including the absence or elongation of suspensory ligaments [11]. Additional risk factors include congenital malpositioning, chronic constipation, colonic distension, ascites, liver conditions, obesity, diaphragmatic abnormalities, chronic obstructive lung disease, and multiple pregnancies [9].

Radiological imaging, particularly CT scans, is crucial for identifying the abnormal colonic position, as plain X-rays may show colonic air beneath the diaphragm [12]. Conservative management, including bed rest, intravenous fluid support,

and bowel decompression, is effective in most cases, while surgical intervention is reserved for complicated cases such as obstruction or perforation [12].

Surgical options may include right hemicolectomy or hepatopancreatic reattachment to prevent colonic displacement [13]. Understanding these risk factors, clinical manifestations, and management strategies is essential for diagnosing and treating Chilaiditi syndrome effectively.

Conclusion

This case highlights the complexity of Chilaiditi syndrome, a condition characterized by colonic interposition between the abdominal wall and liver, which can manifest with episodic and intermittent manifestations. The significance of Chilaiditi's sign lies in its ability to mimic pneumoperitoneum and obscure existing pneumoperitoneum, potentially leading to severe consequences. Therefore, a thorough radiological assessment is frequently required for an accurate diagnosis. Physicians must be prepared for potential complications and consider a wide range of differential diagnoses when faced with situations similar to those described. Preventative measures should be taken to ensure that all potential complications are thoroughly evaluated, as prompt decision-making may be required to safeguard the lives of patients.

Patient consent

As the authors of this paper, We affirm and declare that written informed consent was duly obtained from the patient for the publication of this case report, along with accompanying images. A copy of the written consent is readily available for thorough review by the Editor-in-Chief of this journal upon request.

Ethical consideration

Ethical approval for this case report was not obtained from our institutional review board, as they do not provide ethical approval for case reports. However, the informed consent form clearly stated that patient data and samples would be used for educational or research purposes. The patient provided written informed consent for the publication of this case report and the accompanying radiological images, and a copy of the written consent is available for review by the Editor-in-Chief upon request.

Registration of research studies

Name of the registry: Not applicable.

Unique Identifying number or registration ID: Not applicable.

Include the following hyperlink in your registration (it must be accessible to the public and will be reviewed)

Not relevant.

Availability of data and materials

The data of this study are available from the corresponding author upon reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed

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