

## CASE IMAGE

# Coronavirus disease 2019 with Chilaiditi sign

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**Abstract**

In patients with the Chilaiditi sign, pulmonary lower lobes collapse occurs because of interposition of the bowel between diaphragm and liver. When such patients suffer from COVID-19 pneumonia, clinicians should carefully monitor respiratory status.

**KEYWORDS**

atelectasis, Chilaiditi, COVID-19, dyspnea

## 1 | INTRODUCTION

Chilaiditi sign refers to an incidental finding of bowel positioned between the liver and the diaphragm.<sup>1</sup> In patients with Chilaiditi sign, their intestinal tract pushes up against the diaphragm and causes atelectasis of pulmonary lower lobes, similar to cephalic displacement of the diaphragm caused by the enlarged uterus in a late stage of pregnancy.<sup>2</sup>

Herein, we report a case of pneumonia due to coronavirus disease 2019 (COVID-19) complicated with Chilaiditi sign, which resulted in worsening of the respiratory condition.

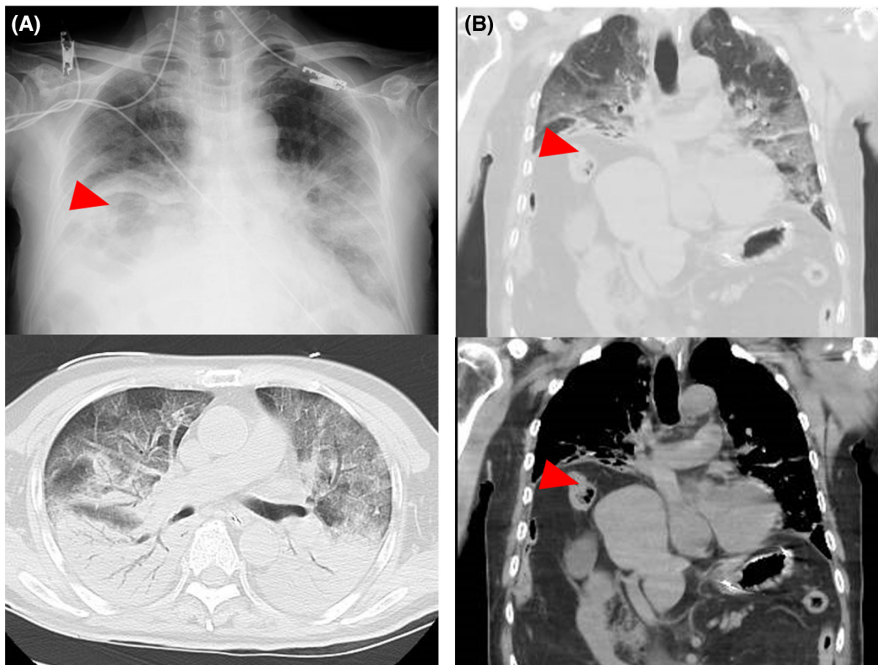
## 2 | CASE PRESENTATION

A 76-year-old man presented with a one-day history of a rapidly worsening cough and was admitted to the intensive care unit because of respiratory failure. His vital signs on arrival were as follows: blood pressure, 152/74 mmHg; pulse, 150 beats/minute; regular respiration rate, 30 breaths/minute; blood oxygen saturation of 75%, 15 L/minute; and body temperature, 37.9°C. His Glasgow Coma Scale score was eye opening 4, verbal response 4,

and motor response 6. Physical examination revealed bilateral moist rales. Chest radiography and computed tomography (CT) revealed bilateral pulmonary infiltrative shadows (Figure 1A). Additionally, the intestinal tract was pushed up against the diaphragm, causing atelectasis of the lower pulmonary lobes (Figure 1B). The polymerase chain reaction assay for COVID-19 was positive. Chest CT score in COVID-19 patients was 20. He was treated with anticoagulants therapy with heparin and administered remdesivir for 10 days and tocilizumab for 2 days. In addition, he received pulse methylprednisolone therapy of 500 mg/day for 3 days followed by administration of gradual dose tapering from 2 mg/kg/day. He was extubated on Day 15. He underwent physical therapy before gradually increasing his dietary intake. He was transferred to rehabilitation on Day 65. Twenty weeks after he was admitted to our hospital, he had no disorders and threw back into normal life without oxygen administration. He was able to return to work.

## 3 | DISCUSSION

Chilaiditi sign is detected in 1.18%–2.4% of abdominal CT scans and has a marked male predominance (male:



**FIGURE 1** (A) Colon gas was positioned under the right diaphragm in chest radiography. Atelectasis of pulmonary lower lobes was revealed in computed tomography (CT) scans (axial view). (B) Interposition of the bowel between diaphragm and liver (Chilaiditi sign) was revealed CT scans (coronal view).

female, 4:1).<sup>1</sup> It may be caused by the following factors: (1) the rise of the right hemidiaphragm by phrenic nerve injury (diaphragmatic factors), (2) atrophy of the liver due to cirrhosis or congenital etiology (hepatic factors), (3) chronic obstructive pulmonary disease, obesity, intraperitoneal adhesion, and endoscopic procedures (other factors).<sup>1</sup> Obstructive lung disease caused by Chilaiditi sign may increase the severity of chest infections.<sup>3</sup> A previous report has documented a case with Chilaiditi sign wherein atypical pneumonitis became severe.<sup>3</sup> Once Chilaiditi sign develops, dyspnea increases further due to reduced lung capacity. In patients with Chilaiditi sign, atelectasis of the pulmonary lower lobes develops, similar to cephalic displacement of the diaphragm by the enlarged uterus during the late stage of pregnancy.<sup>2</sup> Patients with COVID-19 complicated by Chilaiditi sign should be closely monitored to ensure that their condition does not worsen.

## 4 | CONCLUSION

Patients with Chilaiditi sign present with atelectasis of the pulmonary lower lobes. In such cases, COVID-19 pneumonia could become potentially severe. Therefore, clinicians should carefully monitor the respiratory status of the patients with COVID-19 pneumonia complicated by Chilaiditi sign.

### AUTHOR CONTRIBUTIONS

**Yoshiteru Tominaga:** Writing – original draft. **Ichiro Hirayama:** Conceptualization; writing – review and editing. **Minaho Nonaka:** Visualization. **Tetsuhiro Yano:**

Supervision. **Kazuto Kurihara:** Resources. **Mitsuru Ishii:** Project administration.

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### CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest in this article.

### DATA AVAILABILITY STATEMENT

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

### ETHICS STATEMENT

Our institution does not require ethical approval for reporting individual cases.

### CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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