Spontaneous Pneumomediastinum as Uncommon Complications of COVID-19 Pneumonia: 2 case reports and review of literature

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Abstract

Spontaneous pneumomediastinum is a rare clinical finding and is a significant concern for clinicians. These are two cases of fatal spontaneous pneumomediastinum among COVID-19 patients. The first patient was an 84-year-old woman who developed COVID-19 pneumonia. Her clinical course was complicated by pneumomediastinum, and, unfortunately, she died 12 days following the admission. The second patient was a 63-year-old man who developed a severe pneumomediastinum and extensive subcutaneous emphysema and died 10 days after hospitalization.

Thus, paying attention to these complications as a severity marker of COVID-19 pneumonia is necessary.

Keywords: Spontaneous, Pneumomediastinum, COVID-19, Complication

INTRODUCTION

As the COVID-19 pandemic progresses, clinicians should be aware of the uncommon presentations of the disease, such as the case of pneumomediastinum. Recent evidence suggested that these can occur in the context of COVID-19 pneumonia, even in the absence of mechanical ventilation–related barotrauma (1)

We report 2 cases of spontaneous pneumomediastinum among 2 COVID-19 patients with fatal evolution.

CASE REPORTS

Case 1: The first case was an 84-year-old woman with a past medical history of hypertension. She presented to the emergency department (ED) with 7 days of marked chest pain, and dry cough with progressive dyspnea. On admission, her vital signs showed tachypnea at 22 breaths per minute, high temperature at 38.2°C, increased heart rate at 110 beats per minute, and pulse oximetry at 85%. On physical examination, she had bilateral basal crackles and peripheral

cyanosis. Laboratory results showed an elevated C-reactive protein (CRP) of 181 mg/L (normal range 0–6 mg/L). The suspicion of COVID-19 was confirmed by real-time reverse transcription polymerase chain reaction (RT-PCR) analysis of nasopharyngeal swab samples. Non-contrast chest computed tomography (CT) showed some ground-glass opacities of peripheral subpleural location, associated with multiple areas of consolidation in posterior segments of both lower lobes, with a pneumomediastinum measuring 7mm. (Figure 1).

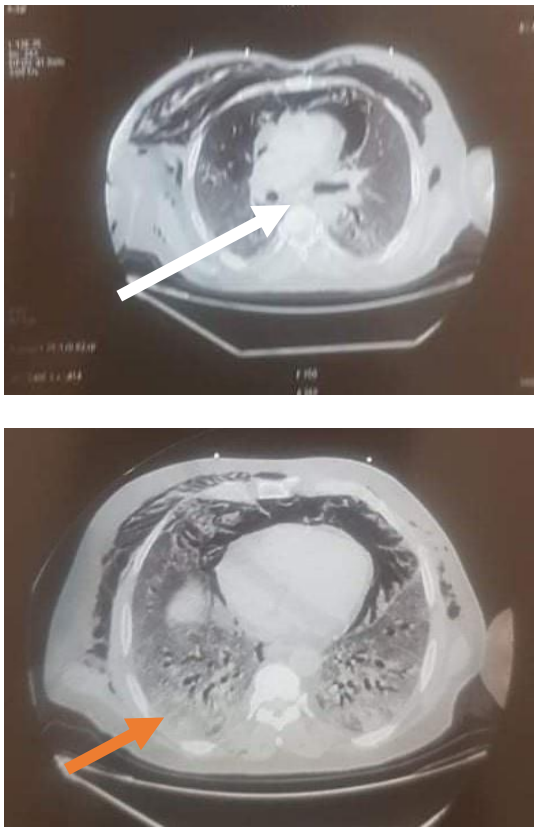

Figure 1: *Non-contrast chest computed tomography (CT) showing some ground-glass opacities of peripheral subpleural location, associated with multiple areas of consolidation in posterior segments of both lower lobes (red arrow), with a pneumomediastinum measuring 7mm (white arrow).*

The therapeutic protocol consisted of antibiotics, steroids, and oxygen supplementation with a reservoir mask. She did not receive non-invasive positive pressure ventilation.

After 10 days, she developed a septic choc and received nosocomial antibiotics with noradrenaline. However, despite the support measures, the patient died from respiratory failure 12 days after admission.

Case 2: The second case was a 63-year-old man who was admitted to the ED for fever, cough that lasted for 6 days, chest tightness, and shortness of breath that developed a day ago. He had no history of any specific diseases such as hypertension, diabetes, or heart disease nor had any traumatic injuries. The patient exhibited a clear consciousness, with a blood pressure of 130/62 mm Hg, and a pulse rate of 83 beats per minute. His oxygen saturation was only 80%, and 90% after applying an oxygen mask. His blood count showed leukocytosis at 12700 cells/µL. There were elevated blood levels for C-reactive protein at 188 mg/L. His RT-PCR was positive for SARSCoV-2 infection. Management included pharmacological treatment with azithromycin, ceftriaxone, levofloxacin, hydrocortisone, and oxygen supplementation.

During his hospitalization, he presented progressive deterioration of respiratory function with dyspnea despite oxygen therapy. A chest CT scan was performed and has shown bilateral ground-glass opacities (90%), severe pneumomediastinum measuring 40mm with

extensive subcutaneous emphysema mainly extending superiorly in the thorax and into the neck.

Unfortunately, his respiratory state worsened, and the patient was intubated and put on regular prone positioning. Despite prompt management, the patient died 10 days after hospitalization.

DISCUSSION

Pneumomediastinum in COVID-19 patients is most often caused by increased airway pressures, secondary to mechanical ventilation or airway obstruction (2). While not commonly seen in viral pneumonias, Spontaneous pneumomediastinum (SPM) has been described in patients with COVID-19 pneumonia, despite no history of mechanical ventilation. SPM is an uncommon presentation of COVID-19. Data on the incidence, pathogenesis, and outcomes of SPM during the recent SARS-CoV-2 pandemic are limited and are confined to a few isolated case reports (3–5). SPM is defined by the presence of air in the mediastinum without evident causes - traumatic, iatrogenic, organ perforation, or surgery (6). Although SPM is generally considered a benign and self-limiting condition, its appearance in viral pneumonia may be of clinical significance.

In the case of pulmonary infections due to SARS-COV-2, the virus causes a breakdown of the alveolar membrane integrity as it infects both type I and II pneumocytes (7). Therefore, the damage of the alveolar membrane in coronavirus infections can be one of the mechanisms leading to alveolar rupture thus the occurrence of SPM.

Most commonly patients present with shortness of breath, cough, and/or chest or neck pain. Our patients have almost the same symptoms. Physical signs can include tachycardia, tachypnoea, hypotension, and subcutaneous emphysema (8). Pneumomediastinum may be visible on a plain chest X-ray; however, it may only be detected on CT of the chest. In our cases, the CT scan led us to the diagnosis.

The treatment approach is based on rest, oxygen therapy, and analgesia (9). The association of pneumomediastinum with COVID-19 does not imply a specific treatment but should be feared as a potential aggravating factor specifically in case of extensive pulmonary lesions.

In fact, a recent case series described three cases of COVID-19 pneumonia complicated by SPM and pneumothorax, all of which were followed by a severe course of disease with fatal outcomes (10). The two patients we report had the same evolution after a few days. So the spontaneous pneumomediastinum may be considered a severity predictor in pulmonary infection by SARS-CoV-2 2.

CONCLUSION

SPM is a rare complication of COVID-19 pneumonia and was associated with a severe course of disease in our patient. Future studies are warranted to assess whether SPM severity predictor of COVID-19 pneumonia.

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