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A rare complication of Covid-19: Spontaneous pneumothorax following pneumomediastinum; case report

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1. Introduction

Since the coronavirus pandemic began to shake the world in December 2019, serious and unusual complications have befallen infected patients. Among the rare COVID-19 complications, pneumothorax and pneumomediastinum have attracted clinical attention [1]. This type of complication may be difficult to diagnose immediately due to its rarity and atypical presentation in some cases. Accurate, timely diagnosis is essential to ensure adequate treatment [2].

Here, we present the case of a patient with COVID-19 pneumonia who developed pneumomediastinum after presenting with a severe cough. Subcutaneous emphysema was noted, and the pneumomediastinum evolved into spontaneous pneumothorax in the following days in the intensive care unit (ICU).

2. Case

A 23-year-old male patient with no asthma, COPD, or other lung diseases was admitted to the emergency room (ER) with a cough and increased shortness of breath. Eight days earlier, he had been admitted to the hospital with a cough, at which time a thoracic tomography without contrast had shown “multi-focal nodular-shaped infiltrations with ground-glass opacity in both lungs” (Fig. 1A and B). The patient's polymerase chain reaction (PCR) test for COVID-19 had been positive, and he had been treated with hydroxychloroquine for five days. However, upon developing shortness of breath in addition to the cough, he was admitted to the ER.

The patient's vital signs were as follows: oxygen saturation 90%, tachypnea (23 breaths/min), and increased heart rate (111 beats/min; ECG showed sinus tachycardia). His body temperature was 36.9 °C. The patient's respiratory sounds were decreased, and subcutaneous emphysema was noted. The patient's blood test results were as follows: AST: 230 U/L; ALT: 201 U/L; Hgb: 141 g/dL; Neu: 12.45 10³/uL; PLT: 314 10³/uL; WBC: 14.81 10³/uL; and Procalcitonin: 0.72 µg/L. Other values were reported as being within normal ranges.

Thoracic tomography performed without contrast revealed “diffuse emphysema appearance and diffuse crazy-paving pattern covering the

parenchyma” (Fig. 1C and D). The patient's treatment was continued in the ICU. Neither high-flow nasal cannula nor noninvasive ventilation were applied. On day 3 of the patient's hospitalization, due to his increased shortness of breath, chest radiography was performed and unilateral pneumothorax was detected (Fig. 1E). The patient underwent a tube thoracostomy (Fig. 1F). On day 7 of his ICU hospitalization, the tube was removed and his lungs were seen to be expanded. The patient again developed shortness of breath, and a second tube thoracostomy was performed. On day 10 of his hospitalization in the ICU, the patient's vitals remained stable and he was moved to a ward. On day 18 of his hospitalization, the patient was discharged with no complaints.

3. Discussion

The most common symptoms of SARS-CoV-2 infection are fever, cough, and shortness of breath. Pneumothorax has been found in only 1% of all patients [3]. However, many COVID-19 patients have been diagnosed with pneumonia and characteristic CT imaging patterns, so radiological examinations have become vital in the early detection of COVID-19 and evaluation of its course [4].

Although pneumomediastinum may occur as COVID-19 progresses, it is still rare. Its mechanism is probably the rupture of the alveolar wall due to the increased difference in pressure between the alveoli and the pulmonary interstitium; however, the mechanism has not been fully elucidated [5]. Pneumomediastinum's pathogenesis arises from alveolar rupture secondary to barotrauma associated with mechanical ventilation due to high PEEP [6].

A multicenter retrospective study in the UK found that only six patients developed pneumothorax and pneumomediastinum when COVID-19 patients were screened upon admission to the hospital in March to June. However, some of these cases were reported as occurring after intubation and Extracorporeal Membrane Oxygenation (ECMO) during follow-up [7]. In our case, pneumothorax and pneumomediastinum occurred without any external intervention.

Many causes of recurrency have been identified [8]. In our case, recurrence of the pneumothorax may have been associated with premature removal of the thoracostomy tube or a continuous air leak.

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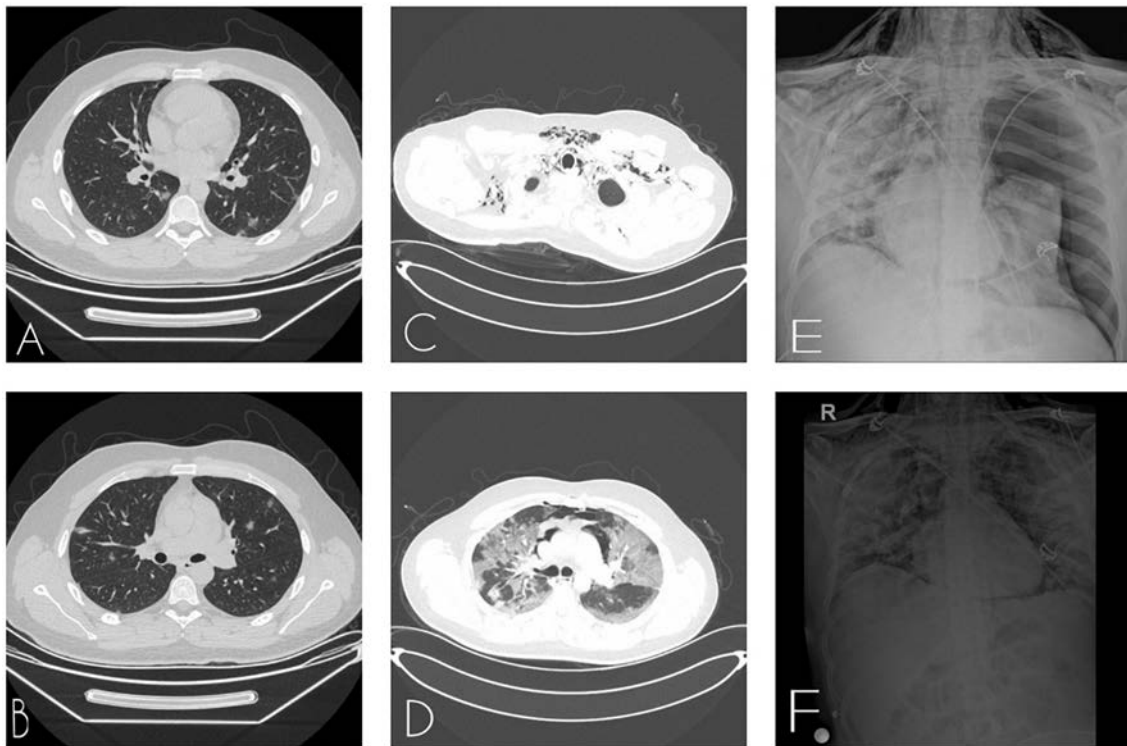


Fig. 1. A-B: In the middle and lower zones of both lungs, multi-focal nodular-shaped infiltrations with ground-glass opacity were observed, and the appearance was consistent with viral pneumonia. **C-D:** Diffuse emphysema appearance extending to the paravertebral area and the spinal adjacency of the medulla in the cervical level soft tissues, also continuing on the thoracic wall at the inferior along the parasternal area, also in the pericardial area and mediastinum, was observed. An infiltrative appearance was observed in both lungs, which was evaluated in favor of specific viral pneumonia forming a diffuse crazy-paving pattern appearance covering almost the entire parenchyma. A loculated pleural effusion with a depth of 6 mm was observed in the middle part medial of the right hemithorax. **E:** Total pneumothorax on left in lung x-ray. **F:** Expansion of the left lung after tube thoracostomy intervention.

4. Conclusions

This case demonstrates that pneumothorax and pneumomediastinum can be COVID-19 complications. Both these complications should come to mind when COVID-19 patients develop shortness of breath suddenly.

Declaration of Competing Interest

None.

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