

SPONTANEOUS PNEUMOMEDIASTINUM IN COVID-19 PATIENTS

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ABSTRACT

Introduction: COVID-19 disease, thought to originate from China, is now a global pandemic. It shows a variety of pulmonary manifestations, mostly in the form of ground-glass opacities with a peripheral distribution. Less common manifestations such as pneumomediastinum have also been reported. The aim of this study is to make a contribution to the literature to be familiar with uncommon symptoms and presentations and highlight the importance of early diagnosis.

Materials and methods: Patients with pneumomediastinum on computed tomography (CT) and COVID-19, which was confirmed by positive real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) test result included in the study. Patient data were collected retrospectively from medical records.

Results: In 7 patients, pneumomediastinum was the initial presentation, while two were diagnosed with CT Pneumomediastinum after the COVID-19 diagnosis. All patients had mild disease, underwent conservative therapy, and no complication was observed during the follow-up period.

Conclusion: In the second year of the pandemic, the disease still manifests itself with some rare pulmonary and extrapulmonary symptoms. It is crucial to be familiar with these uncommon presentations and diagnose patients at early stages.

Keywords: COVID-19, SARS-CoV-2, Spontaneous pneumomediastinum, radiology.

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Introduction

Coronavirus disease 2019 (COVID-19) is a new pandemic infection whose first case is thought to have been detected in December 2019 in Wuhan, Hubei Province of China. The disease has spread globally in a short period of time and was declared a global pandemic by World Health Organization (WHO) in March 2020. To date (June 25, 2021), the number of confirmed cases has nearly reached 180 million, and the number of deaths has exceeded

3.5 million, which continues to increase⁽¹⁾. Many different clinical and radiological manifestations due to COVID-19 have been described. Radiology plays a major role in the management of the disease, especially in the diagnostic process. The most common radiological findings are bilateral-multifocal, peripherally dispersed ground-glass opacities (GGOs) and inter- or intralobular septal thickening^(2,3). Spontaneous pneumomediastinum (SPM) is a rare presentation of the disease (4). Here we present nine patients admitted to our hospital with

chest pain and diagnosed with pneumomediastinum and COVID-19.

Materials and methods

This study is a retrospective review of data collected from COVID-19 patients. The study was approved by the local ethics committee (Prof. Dr. Cemil Taşcıoğlu City Hospital, Approval date, and number: 23.02.2021/67) and the Republic of Turkey, Ministry of Health, COVID-19 Scientific Research Committee. Nine patients with pneumomediastinum on computed tomography (CT) and COVID-19, which was confirmed by positive real-time reverse transcriptase- polymerase chain reaction (rRT-PCR) test result between March 1 and December 1, 2020, included in the study. A combined oronasopharyngeal swab sample was obtained from all patients. Bio-Speedy® test kit was used to detect SARS-CoV-2 in the samples (Bio-Rad CFX Connect Real-Time PCR Detection System).

Results

In seven out of nine patients, pneumomediastinum was the initial presentation which COVID-19 diagnosis was confirmed by RT-PCR afterward. Two patients were diagnosed with CT pneumomediastinum, which was taken because of sudden chest pain after antiviral therapy (Fig.1.). All of our patients were male. The average age and BMI of patients were 23.6 years and 24 kg/m², respectively. All of them had complaints of chest pain, cough, and fever. All of our patients were treated with oxygen nasal cannula supplement at 4-6 liters per minute, azithromycin, favipiravir, enoxaparin, and corticosteroid (1 mg/kg methylprednisolone). Oxygen saturation (SpO₂) of the patients was greater than 92% at room air. None of them had a history of high-flow nasal cannula supplementation or continuous positive airway pressure (CPAP) therapy or intubation during hospitalization. Minimal subcutaneous emphysema was found in a physical examination in only one of the patients. The average length of stay of patients in the hospital was 6.6 days. Follow-up imaging showed resolution of pneumomediastinum, the general condition of patients was good, and the symptoms improved. No complication was observed during their hospitalization and 6 months of outpatient follow-up. Patient characteristics are summarized in Table 1.

	Patient 1	Patient 2	Patient 3	Patient 4
Age (years)/Sex	25 / M	18 / M	28 / M	29 / M
BMI (kg/m ²)	25	26	23	24
Days from admission to event	12	0	0	0
Cough	Mild cough	Mild cough	Mild cough	Mild cough
Smoking status	Active	Never	Active	Active
History of pulmonary disease	None	None	None	None
CT findings	Diffuse Airspace Disease with GGOs	Diffuse Airspace Disease with GGOs	Diffuse Airspace Disease with GGOs	Diffuse Airspace Disease with GGOs
Length of stay (days)	7	5	5	8

Table 1: (A) Chest CT showing pneumomediastinum in the upper mediastinum in the middle mediastinum (arrow) in patient 3. (C) Chest CT showing pneumomediastinum in the lower mediastinum in patient 5.

GGOs: Ground Glass Opacities, RLL: Right Lower Lobe, M: Male, CT: Computed Tomography

Discussion

SPM is a rare complication of viral pneumonia. It has also been reported in bacterial and fungal pneumonia in immunocompromised patients^(5,6).

Although SPM is generally considered a benign and self-limiting condition, it may be a potential indicator of disease severity during the course of viral pneumonia. Chu et al. reported significantly higher intubation and mortality rates in SARS patients who developed SPM⁽⁶⁾. In another report, López et al. described three COVID-19 cases complicated by spontaneous pneumomediastinum and pneumothorax, and all followed by a serious course of disease with fatal outcomes⁽⁷⁾. On the contrary, all of our patients, both clinically and radiologically, had mild disease, and no complication was observed during the follow-up period. Patients were diagnosed at early stages, and supportive treatment was started.

Spontaneous pneumomediastinum has been reported more frequently in young males than in females. Underlying lung diseases, drug use, history of smoking, forceful cough, trauma have been considered as other risk factors⁽⁸⁾. All patients were male in our study. Two of them had no risk factor, while others either were active smokers or had asthma or both.

SPM was also reported in SARS patients in literature⁽⁹⁾. The exact mechanism of SMP due to COVID-19 is still unknown, but it is likely to be similar to that in SARS since the viruses belong to the same Coronaviridae family and they may have similar pathogenesis.

Steroid use in COVID-19 pneumonia is generally preferred in the patient group with desaturated and/or severe pneumonia and symptoms suggestive of

	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9
	20 / M	29 / M	22 / M	18 / M	25 / M
	22	24	25	23	24
	0	0	15	0	0
	Forceful	Forceful	Mild cough	Mild cough	Mild cough
	Active	Never	Active	Active	Active
	None	None	Asthma	None	None
	Diffuse Airspace Disease with GGOs and RLL consolidation	Diffuse Airspace Disease with GGOs	Diffuse Airspace Disease with GGOs	Diffuse Airspace Disease with GGOs	Diffuse Airspace Disease with GGOs
	5	5	10	7	8

mediastinum (arrow) in patient 1. (B) Chest CT showing pneumomediastinum in the lower mediastinum (arrow)

Computed tomography

ARDS. Pneumomediastinum/pneumothorax cases have been reported in the literature, mostly with severe cases of COVID-19^(10,11). Although all of our patients progressed with mild disease because complications such as pneumomediastinum were observed, and this was generally associated with the course of severe disease, oxygen, and low-dose steroid treatments were used.

In conclusion, COVID-19 infection may demonstrate a variety of radiological findings, most commonly in the form of GGOs mainly in the lower lobes, which can be super-infected due to bacterial infections. However, other radiological features such as pneumothorax, tension pneumothorax, and rarer and more life-threatening pneumomediastinum can be seen during the course of the disease. In the second year of the COVID-19 pandemic, we still encounter rare pulmonary and extrapulmonary symptoms and findings. Since such rare symptoms and radiological features may then appear as an initial presentation and can worsen the prognosis, it is crucial to be familiar with these symptoms and diagnose patients at early stages.

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