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PUBLISHED ABSTRACT

COVID-19 and Spontaneous Pneumopericardium: A Case Report

Huili Zhu[1] and Joseph J. Lieber[1,2]

[1] Department of Medicine, Icahn School of Medicine at Mount Sinai, New York, NY, US

[2] Department of Medicine, Icahn School of Medicine at Mount Sinai (Elmhurst), Elmhurst, NY, US

Corresponding author: Huili Zhu (Huili.Zhu@mountsinai.org)

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Background

SARS-CoV-2 is a member of the coronavirus family, and the clinical disease COVID-19 has made global impact with more than 5 million cases to date [1]. Our understanding and management of COVID-19 are rapidly evolving. Here, we present a case of spontaneous pneumopericardium during COVID-19 infection.

Case Presentation

A 39-year-old man with no medical history presented to Elmhurst Hospital because of two weeks of progressive shortness of breath, fever, and cough. He was admitted for COVID-19, which was confirmed by polymerase-chain-reaction. COVID-19 was managed with oxygen therapy, hydroxychloroquine, azithromycin, therapeutic lovenox, and sarilumab for presumed cytokine release syndrome (**Table 1**). He also received a five-day course of antibiotics for presumed superimposed bacterial pneumonia. CT chest on the day of admission showed extensive pneumopericardium, pneumomediastinum with severe subcutaneous emphysema, small bilateral pneumothoraces, as well as bilateral diffuse ground glass opacities (GGOs) and consolidation in the lower lobes (**Figure 1**). There was no reported history of trauma. Barium

Table 1: Demographic Characteristics and Laboratory Findings.

Demographic Characteristic	
Age (Year)	39
Sex	Male
Ethnicity	Hispanic
Medical History	None
Symptoms at disease onset	Cough, dyspnea, fever
Treatment	Hydroxychloroquine, azithromycin, sarilumab, anticoagulation
Laboratory Findings at Time of COVID-19 Diagnosis	
White-cell count ($\times 10^3$/uL)	10.1
Lymphocyte absolute count ($\times 10^3$/uL)	0.54
Platelet (10^3/uL)	333
Procalcitonin (ng/mL)	0.76
D Dimer (ng/mL)	409
IL6 (pg/mL)	203
LDH (U/L)	418
CRP (mg/L)	>300
ALT (U/L)	251
AST (U/L)	335
Creatinine (mg/dL)	0.88
Ferritin (ng/mL)	9393

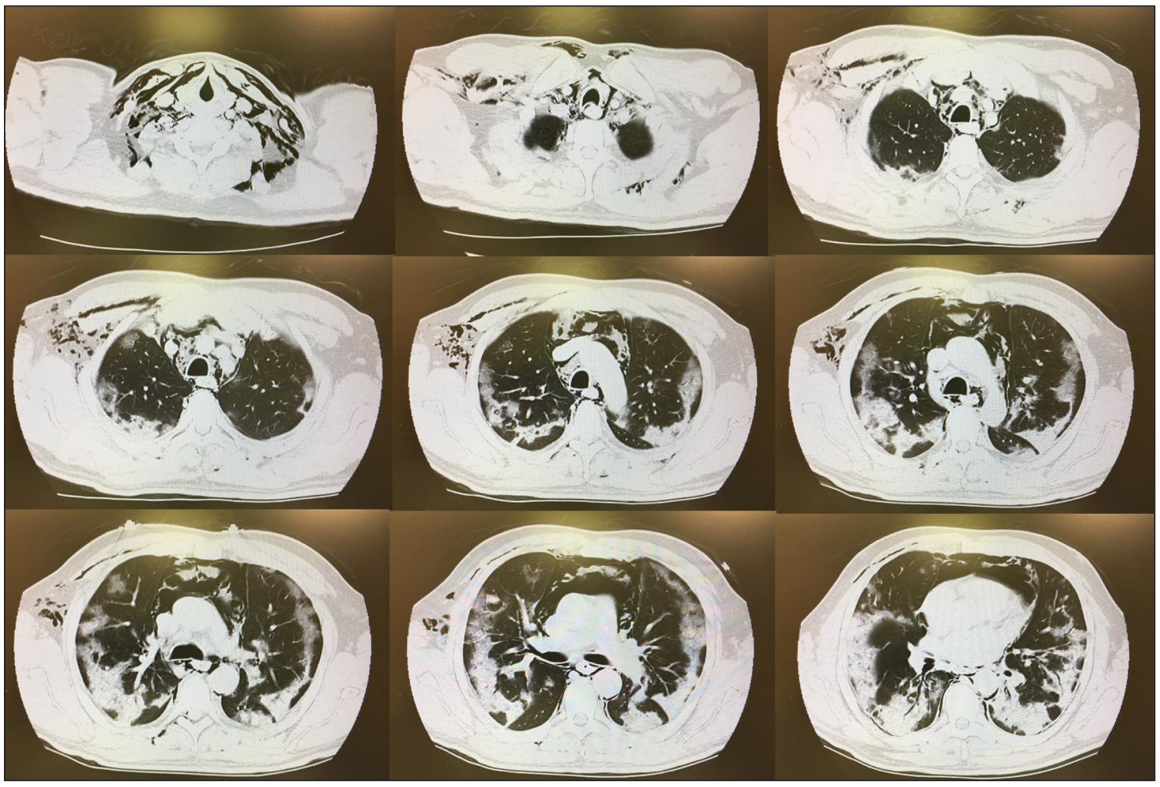

Figure 1: Axial chest CT images, presented here from left to right then up to down, were obtained on hospital day 1 (or illness day 14) demonstrating extensive pneumopericardium, pneumomediastinum, subcutaneous emphysema, and small bilateral pneumothoraces. There were bibasilar ground glass opacities and consolidations.

swallow was obtained and negative for esophageal perforation. He did not need a chest tube and never developed any clinical symptoms concerning for tamponade physiology. Chest X-Ray on hospital day 5 showed resolution of pneumomediastinum and subcutaneous emphysema. His maximum supplemental oxygen requirement was 10 liters on non-rebreather, and he was gradually weaned to room air. On hospital day 13, he had complete symptom resolution and was discharged home.

Conclusions

There are currently no radiographic findings that can completely rule in or rule out the possibility of COVID-19 [2]. Some typical CT chest features include bilateral GGOs and consolidations in lower lung zones. There have been many case reports of COVID-19 and spontaneous pneumothorax and pneumomediastinum [3–8], particularly in the setting of intubation [9]. However, few have reported pneumopericardium [9] and none has reported spontaneous pneumopericardium. In SARS, spontaneous pneumomediastinum occurs most frequently when GGOs and consolidations begin the resolve [10]. Peribronchiolar abscess formation then leads to interstitial emphysema, which tracks along the bronchovascular sheath and reaches the mediastinum. A similar mechanism is proposed in COVID-19. Increased intrathoracic pressure leads to alveolar injury and rupture, releasing air that tracks along the mediastinum and causes pneumomediastinum [8, 9]. Then the air leaks into the pericardial space causing pneumopericardium. This case highlights the potential severity of COVID-19. While the prognostic significance of such a rare finding is not known, pneumopericardium in COVID-19 infection should be considered in the appropriate clinical contexts and remains an area to be further elucidated.

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