

A Very Rare Case of Isolated Spontaneous Pneumopericardium Secondary to COVID-19

Behnam Shakerian^{1,2} , Mohammad Jebelli¹ and Mohammad Hossein Mandegar¹

¹Department of Cardiovascular Surgery, Tehran University of Medical Sciences, Tehran, Iran.

²Department of Cardiovascular Surgery, Shahrekord University of Medical Sciences, Shahrekord, Iran.

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ABSTRACT: Coronavirus disease 2019 (COVID-19) is currently a pandemic. In addition to respiratory symptoms, involvement of other organs such as the pericardium is also seen. Pneumomediastinum in COVID-19 patients has rarely been reported. Isolated pneumopericardium without pneumomediastinum is even more uncommon. We described a case of COVID-19 in association with pneumopericardium. To the best of our knowledge, no case with isolated pneumopericardium has been reported thus far.

KEYWORDS: COVID-19, pneumopericardium, pneumomediastinum

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CORRESPONDING AUTHOR: Behnam Shakerian, Kashani Hospital, Shahrekord 8816758915, Iran. Email: behshakerian@yahoo.com

Introduction

During the COVID-19 pandemic, new and atypical clinical manifestations and complications of this disease continue to emerge. One of these rare complications is spontaneous pneumopericardium. The reason for the isolated pneumopericardium remains unclear and our report attempts to explore this. In the context of elevated intrathoracic pressures, spontaneous pneumopericardium can still be observed. After alveolar rupture air can enter the pericardium along venous sheaths which have lower collagenous support, creating a pneumopericardium.¹ While pneumopericardium is often self-limiting, fatal complications can occur. We describe a case of COVID-19 pneumonia complicated by pneumopericardium without prior positive pressure ventilation.

Case Report

A 75-year-old male presented to our hospital with fever, productive cough, and fatigue for 3 days. His medical history was significant for hypertension and hyperlipidemia. In the emergency department, he was found to be hypoxic to 78% on room air. He was also tachypneic at 26 respirations per minute and tachycardic at 110 beats per minute. His temperature was 38.8°C. Physical exam demonstrated crackles at the right and left lung bases. His laboratory tests revealed a C-reactive protein concentration of 88 mg/L (normal range 0.00–4.9 mg/L), D-dimer value 1.60 mg/L (normal range <0.5 mg/L, serum ferritin 1300 ng/mL (normal range 30–400), Complete blood count 9500 cells per μ L (normal range 3900–11 000), lymphocyte count 950 (normal range 700–4500) and interleukin-6 (IL-6) 226 pg/mL (normal range 5–15 pg./mL). Nasopharyngeal severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) reverse transcriptase-polymerase chain reaction was positive. Chest computed tomography (CT) scan revealed bilateral patchy consolidations (Figure 1). Echocardiography was normal. He was

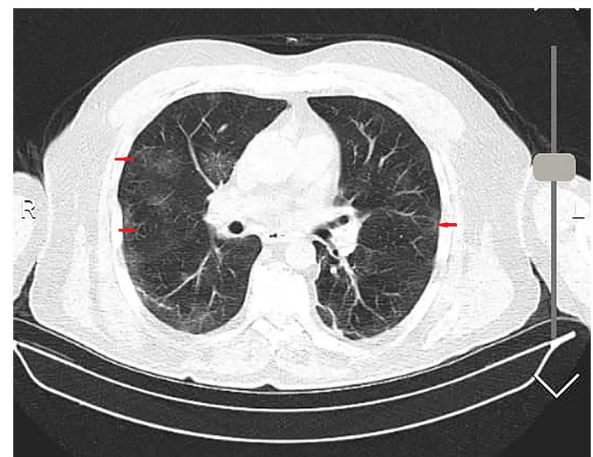


Figure 1. Chest CT showed bilateral lung consolidation with ground-glass opacities suggestive of COVID-19 (Red arrows).

treated with antibiotics, corticosteroids, prophylactic anticoagulation, and remdesivir. He was placed on supplemental oxygen. During his hospitalization, he continued to have an increased need for oxygen. On day 6 of his hospitalization, he developed worsening dyspnea despite maximum non-invasive oxygen support, a chest CT scan was ordered and demonstrated pneumopericardium without subcutaneous emphysema, pneumomediastinum, or pneumothorax (Figure 2). Because of an absence of pericardial compressive symptoms, a conservative approach to our patient is suggested. He continued to receive consistent respiratory therapy and daily echocardiography was performed to diagnose tension pneumopericardium. The patient did not show any signs of tension pneumopericardium during hospitalization. On day 7 of hospitalization, he had acutely increased work of breathing and had desaturations. He was intubated. Two days later the patient died of severe respiratory insufficiency secondary to the adult respiratory distress syndrome.



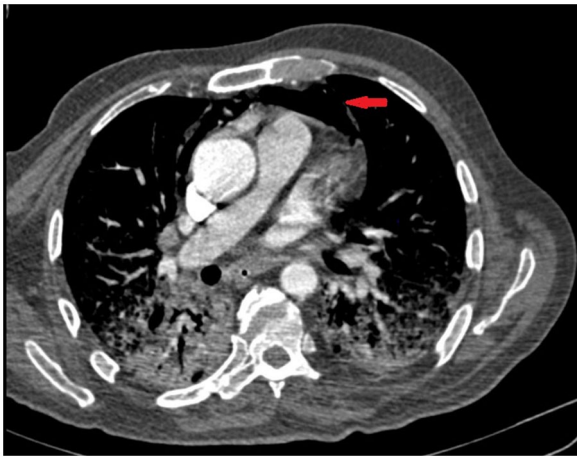


Figure 2. Chest CT scan showed diffuse bilateral ground-glass opacities with isolated pneumopericardium (Red arrow).

Discussion

Pneumopericardium is the accumulation of air in the pericardial space. The most common causes of pneumopericardium are chest trauma, mechanical ventilation, and cardiothoracic operations. After alveolar damage, air enters interstitial tissue spaces or continues dissecting along with the perivascular and peribronchial connective tissue. Afterward, the air can assemble in the mediastinum to form a pneumomediastinum, rupture the pleura to form a pneumothorax, or enter the pericardial space between the parietal and visceral layers.² In COVID-19, alveolar rupture, hyperinflammatory response, and hypercoagulability could increase the risk of pneumopericardium, and pneumomediastinum.³ However, the exact mechanism by which pneumopericardium occurs in SARS-CoV-2 pneumonia is unknown. Age-associated diminished lung function resulting in decreased lung elastic recoil may also increase the risk of alveolar rupture.⁴ Alveolar rupture and inflammation in the setting of COVID-19 could have resulted in the fistulous communication between the lung and pericardium leading to isolated pneumopericardium in this patient. The incidence of pneumopericardium in COVID-19 patients is difficult to evaluate because the disease is very rare. Spontaneous pneumopericardium is rarer than pneumomediastinum and so far, has not been reported in COVID-19.⁵ Most patients with COVID-19 have a mild clinical presentation. The mean time between the onset of symptoms and hospitalization is 7 days.⁶ Most patients with pneumopericardium remain asymptomatic but can sometimes develop the complication of tension

pneumopericardium leading to hemodynamic instability.⁷ The symptoms of pneumopericardium may easily be missed or obscured against a background constellation of symptoms in the COVID-19 patients. Echocardiography may be technically difficult due to the presence of air. Chest Computerized Tomography (CT) scan is the gold standard for diagnosing pneumopericardium. Pneumopericardium is usually a self-limiting condition and is managed conservatively. In situations such as tamponade and tension pneumopericardium, pericardial drainage should be performed.

Conclusions

Pneumopericardium is a very rare complication in the context of COVID-19, occasionally accompanied by pneumomediastinum. It is very important that clinicians must be aware of this rare but potentially fatal complication of COVID-19. Further studies are needed to establish the association between the presence of spontaneous pneumopericardium and outcomes in COVID-19.


Author Contributions

All authors reviewed and approved the final manuscript.

Informed Consent

The wife of this patient gave written consent for the publication of this report.

ORCID iD

Behnam Shakerian  <https://orcid.org/0000-0001-8514-836X>

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