Two uncommon complications of COVID-19 in same patient: MINOCA and pneumothorax

Ramazan Gunduz[a], Bekir Serhat Yildiz[b], İbrahim Halil Ozdemir[a], Mehmet Burak Ozen[a], Serpil Canan Erbuyun[c]

[a] *Department of Cardiology, Manisa City Hospital, Manisa, Turkey*
[b] *Department of Cardiology, Faculty of Medicine, Manisa Celal Bayar University, Manisa, Turkey*
[c] *Department of Anesthesiology, Manisa City Hospital, Manisa, Turkey*

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SOUHRN

Onemocnění COVID-19 je spojeno s několika klinickými projevy postihujícími dýchací a kardiovaskulární systém. Dvěma různými klinickými komplikacemi onemocnění COVID-19 jsou pneumotorax a infarkt myokardu bez obstrukce koronárních tepen (non-obstructive coronary arteries, MINOCA). Dosud však nebyly popsány pneumotorax a MINOCA u jednoho a téhož pacienta.
Pro dechovou tíseň byl do nemocnice přijat pacient s onemocněním COVID-19. Byla u něj stanovena diagnóza pneumotoraxu a syndromu MINOCA. V tomto článku popisujeme náš postup v diagnostice a léčbě pneumotoraxu a syndromu MINOCA.
U pacientů s onemocněním covid-19 se lze setkat s nejrůznějšími účinky na dýchací a kardiovaskulární systém. Syndrom MINOCA a pneumotorax se sice současně vyskytují vzácně, nicméně tuto kombinaci nelze – jak dokazuje naše kasuistika – u pacientů s onemocněním COVID-19 zcela vyloučit.

Keywords:
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ABSTRACT

COVID-19 has several clinical manifestations in the respiratory system and the cardiovascular system. Pneumothorax and myocardial infarction with nonobstructive coronary arteries (MINOCA) are two different clinical complications in COVID-19. However, pneumothorax and MINOCA have not been described yet in the same patient until now.
A COVID-19 patient was admitted due to respiratory distress. He had pneumothorax and MINOCA. We report how we proceeded with diagnosis and treatment of pneumothorax and MINOCA.
Respiratory and cardiovascular system manifestations of COVID-19 have made numerous clinical appearances. MINOCA and pneumothorax are rare clinical appearances, but they can be seen in COVID-19 as shown in our case.

Introduction

After first being diagnosed in December 2019 in Wuhan, China, coronavirus disease (COVID-19) was declared a pandemic on 11th March 2020 by the World Health Organization and has since spread around the world.[1]

COVID-19 is a multisystem viral disease that mostly affects the respiratory and cardiovascular systems. Whereas respiratory system manifestations include pneumonia, acute respiratory distress syndrome, pulmonary embolism and, much more rarely, pneumothorax. There are a lot of cardiovascular system manifestations including myocardial ischemia and acute cor-pulmonale in COVID-19.[2] But myocardial infarction with non-obstructive coronary arteries (MINOCA) and pneumothorax have not been described yet as complications of COVID-19 in same patient.

Here, we describe how both MINOCA and pneumothorax presented in the same COVID-19 patient.

Address: Ramazan Gunduz, MD, Department of Cardiology, Manisa City Hospital, Manisa, Turkey, e-mail: ramazankard@yahoo.com
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Case presentation

A 67-year-old male patient presenting with fever, a cough, shortness of breath for the past five days was accepted by emergency services. He had had hypertension for approximately 10 years but no other medical problems. A computed tomography (CT) scan obtained from emergency services exhibited bilateral and peripheral ground-glass and opacities (Fig. 1A). He was given oxygen supplementation with a Venturi mask. Nasopharyngeal swabs analysed by real-time reverse-transcriptase polymerase chain reaction (RT-PCR) were positive for COVID-19.

A CT scan was obtained on the third day of hospitalization due to respiratory distress and arterial blood gases showing an oxygen saturation decrease under 90% despite oxygen supplementation with a Venturi mask. The CT scan showed more frequent consolidations, bilateral and peripheral disease, greater lung involvement and impairment (Fig. 1B). He was transferred to an intensive care unit (ICU). Nasal continuous positive airway pressure (CPAP) due to lower oxygen saturation and lower molecular weight heparin was started for deep vein thrombosis prophylaxis. The patient did not receive central line insertion in the ICU.

A basal electrocardiogram (ECG) that showed negative T wave V_4–V_6 derivation and left axis was obtained in intensive care unit (Fig. 1C). His troponin I level was 0.3 ng/mL (<0.020 ng/mL).

By his third day of hospitalization, the patient had respiratory distress, tachypnea, and restlessness on examination and vesicular murmur was diminished on the left side of the thorax. His chest radiography was obtained and revealed a massive pneumothorax of the left lung (Fig. 2A). A chest drain was inserted. Two days later, his chest radiography was obtained, which showed re-expansion of the left lung after drainage (Fig. 2B).

One day later, he had chest pain and hypotension (80/60 mmHg), and his ECG showed derivation D2, D3, AVF, V_4–V_6 concave ST segment elevation (Fig. 1D). He underwent coronary angiography within one hour. There was no coronary obstruction, vasospasm, dissection, or thrombus in the coronary angiography (Figs 2C–2D). After the coronary angiography, his ECG showed pathological q waves, which were in derivation D2, D3, AVF, V_4–V_6 (Fig. 1E). Level of troponin I rised to 5.2 ng/mL (<0.020 ng/mL). There was a minimal ventricular wall motion abnormality in the inferior segment at the apical two-chamber view on echocardiography. His cardiac magnetic resonance imaging (MRI) was obtained, which showed an inferior wall scar (Fig. 2E).

Two days later, he was intubated because of respiratory distress and received mechanical ventilation. After that, he died due to acute respiratory disease syndrome from COVID-19.

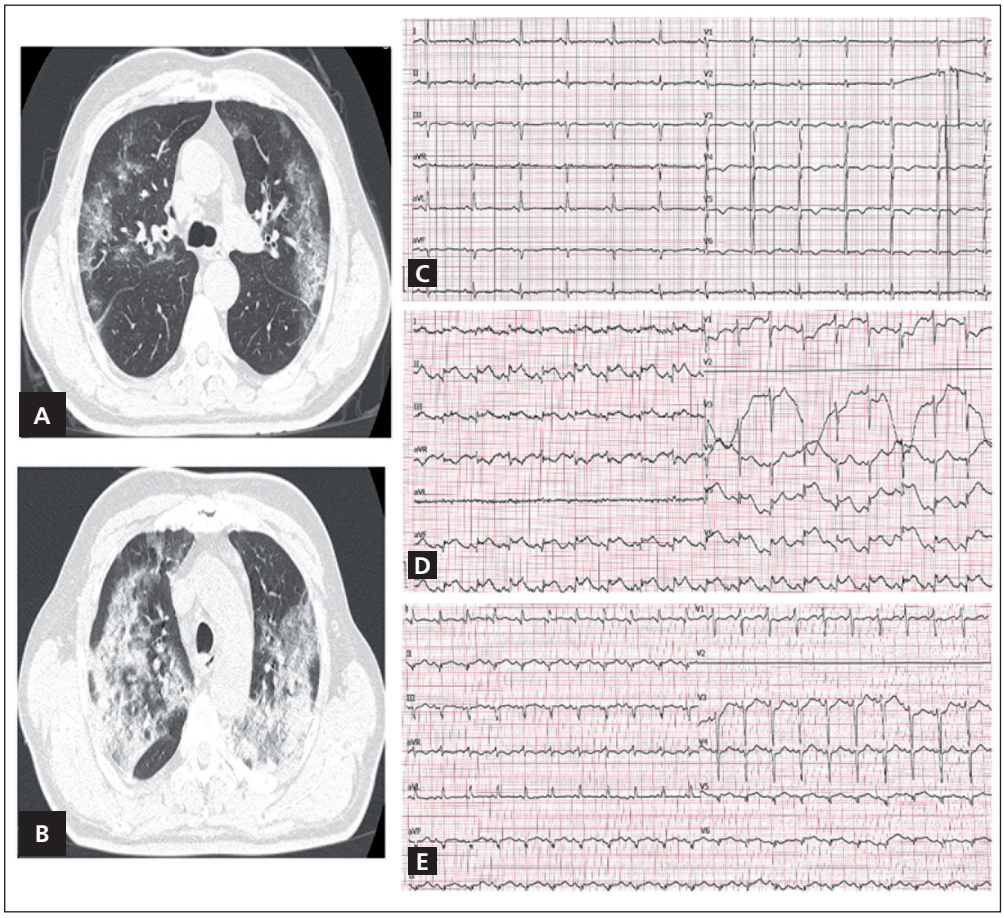

Fig. 1 – Computed tomography (CT). (A) CT obtained in emergency service shows bilateral and peripheral ground-glass and opacities. (B) After three days, CT shows more frequent consolidations, more than 50% greater lung involvement. Electrocardiogram (ECG). (C) During admitted general medical care ECG shows left axis. (D) During clinical findings hypotension and chest pain were deteriorated, ECG shows inferior-lateral ST elevation myocardial infarction. (E) After coronary angiography ECG shows Q waves inferior-lateral derivations.

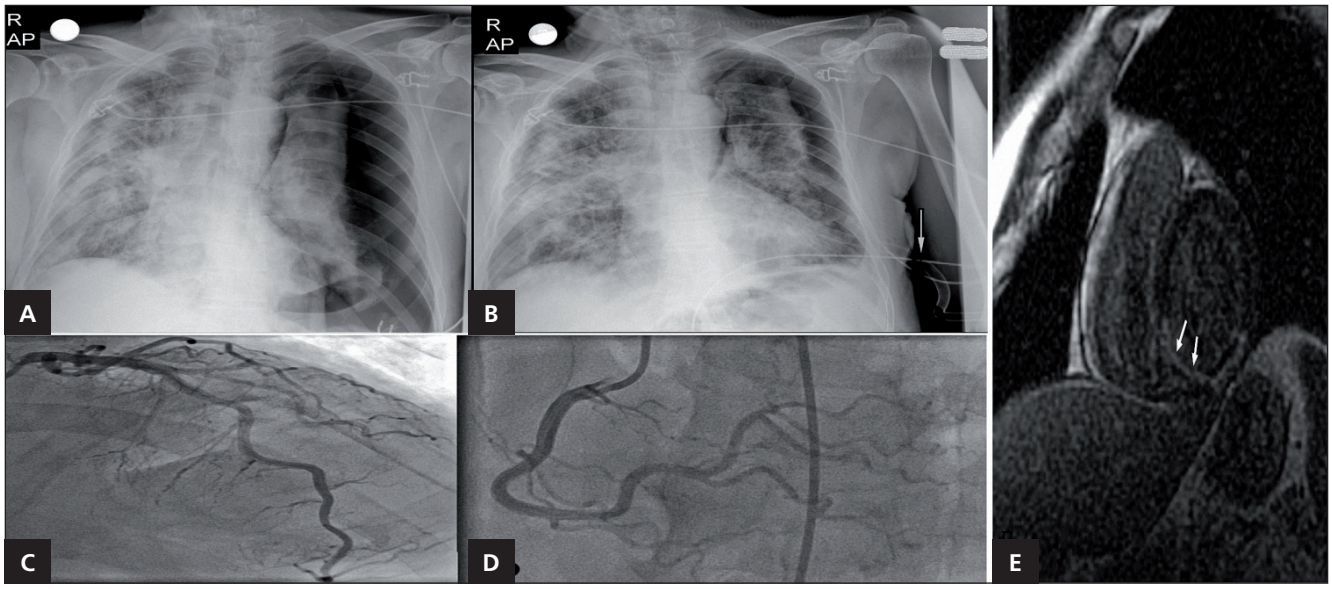

Fig. 2 – Chest radiography shows (A) massive pneumothorax of the left lung and frequent consolidations of right lung. (B) Re-expansion of the left lung with the insertion of a drain (white arrow). (C, D) Coronary angiography was normal. (E) Cardiac magnetic resonance imaging (MRI) showed inferior wall scar.

Discussion

COVID-19 rarely causes pneumothorax, which occurs in 1% of all patients with the disease, but it causes cardiovascular complications more frequently.[2,3]

Pneumothorax is defined as an accumulation of air in the pleural space between the parietal pleura and the visceral pleura. It can occur as primary or secondary pneumothorax that can be a complication of underlying lung disease, trauma, and iatrogenic (e.g. transthoracic or transbronchial biopsy, central venous catheterisation, pleural biopsy, thoracentesis, mechanical ventilation and non-invasive positive-pressure ventilation). Pneumothorax of our case might have been caused by COVID-19-triggered diffuse alveolar injury and positive pressure ventilation.[3,4]

Cardiovascular manifestations in COVID-19 can be categorised as either specific or non-specific to COVID-19. Whereas COVID-19-specific manifestations include myocarditis due to viral injury myocytes, myocardial injury due to systemic inflammatory response syndrome, thrombotic complications and vasospasm due to viral infection of the endothelium, non-specific ones include stress-mediated myocardial dysfunction (i.e. Takotsubo cardiomyopathy), tachycardia-induced cardiomyopathy, prolonged hypotension, prolonged hypoxia and myocardial stunning after resuscitation.[5,6]

Meanwhile, COVID-19's potential thrombotic complications include acute limb ischemia, stroke, pulmonary emboli, venous thromboembolism and acute myocardial infarction. Acute myocardial infarction due to thrombotic complications may occur without pre-existing coronary artery disease.[7]

The definition of MINOCA is an occurrence of acute myocardial infarction (third universal definition of myocardial infarction [MI])[8] with no obstructive coronary artery (no lesions >50% in a major epicardial vessel) and with no other diagnosis to explain clinical presentation.[9]

At first, we thought of MINOCA in this patient due to the clinical findings, biochemical parameters, coronary angiography, echocardiography, and MRI images. MINOCA might be due to temporary thrombotic occlusion in this case.

Conclusion

COVID-19 mostly affects the respiratory and cardiovascular systems, with numerous possible clinical complications in both. As our case demonstrates, MINOCA and pneumothorax are rare but possible complications of COVID-19. In response, when the clinical status of patients with COVID-19 deteriorates, chest radiography and electrocardiogram should be performed.

Authors' contribution

Ramazan Gunduz: conceptualization; data curation; formal analysis; investigation; writing – original draft.
Bekir Serhat Yildiz: methodology; supervision; writing – review and editing.
İbrahim Halil Ozdemir: data curation; formal analysis, investigation.
Mehmet Burak Ozen: data curation; formal analysis.
Serpil Canan Erbuyun: data curation; formal analysis.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding body

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Ethical statement

The case report was approved by the local ethical committee.

Informed consent

The patient's informed consent was given during admission.

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