



Acute Pulmonary Embolism in COVID-19 Disease: Case Report

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ABSTRACT

Inflammation, cytokine storm and lung damage associated with COVID-19 can cause the initiation of the thromboembolic process in patients. The 73-year-old male patient applied with sudden-onset shortness of breath to the emergency department of our hospital. Physical examination revealed an SpO₂ of 80% in room air, respiratory rate of 27/min. As the chest CT scan was compatible with COVID-19, the patient was admitted to the hospital and empirical treatment for COVID-19 was started, comprising of favipiravir and dexamethasone. The RT-PCR of SARS-CoV-2 test resulted positive one day later. Due to the D-dimer value that was higher than expected in COVID-19, arterial blood gas compatible with thromboembolism, and the accompanying high lactate level, a CT angiogram was ordered and was compatible with pulmonary embolism, showing partial embolic filling defects in the lobar branches in the inferior lobes, and the lingular branch of the left lung. A closer investigation of pulmonary embolism in high-risk patients during the pandemics, and prescribing anticoagulant therapy starting on especially the first day of symptoms are vital to prevent potential complications of possible thromboembolism.

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Introduction

The recent novel coronavirus disease (COVID-19) is a complicated disease that can have a mild course or be accompanied by complications such as acute respiratory distress syndrome, shock, and multisystem organ failure that can result in death. It has been shown that venous thromboembolism may occur in the course of COVID-19. Disorders studied under that title include deep vein thrombosis, pulmonary embolism, ischemic cerebrovascular accident, and myocardial infarction.¹ The tendency for thrombosis have been related to prominent inflammation, hypoxia, immobilization, and disseminated intravascular coagulation.² The anticoagulant regime, which plays a key role in the treatment of COVID-19, can be vital should the differential diagnosis of dyspnea be skipped and pulmonary embolism missed.³ We wanted to present a case that emphasizes the need to keep pulmonary embolism in mind when investigating the etiology of dyspnea in COVID-19.

Case Report

The 73-year-old male patient applied with sudden-onset shortness of breath to the accident and emergency department of our hospital. The patient stated that he had been treated for chronic obstructive pulmonary disease (COPD) for fifteen years and frequently suffered from shortness of breath especially in autumn and winter. The patient specified that he had no fever, malaise, or joint or muscle pain. Physical examination revealed an SpO₂ of 80% in room air, respiratory rate of 27/min, rhythmic pulse of 120/min, blood pressure of 160/80 mmHg, body temperature of 36.7 °C, and crackles in basal lobes and diffuse rhonchi in both lungs upon auscultation. Further laboratory investigations showed white blood cell (WBC) count of 16,180/mm³, neutrophil ratio of 89.3%, lymphocyte ratio of 5.1%, C-reactive protein (CRP) of 15.73 mg/L, PT of 13.1 secs, INR 1.1, D-dimer >35.2 ug/mL, ferritin 315 ng/mL, albumin 2.50 g/dL, lactate dehydrogenase 340 IU/L, total bilirubin 1.42 mg/dL, direct bilirubin 0.67 mg/dL, troponin I 0.303 ng/mL, B-natriuretic peptide (NT-proBNP) 4,442 pg/mL, and Ca²⁺ of 8.10

mg/dL. Arterial blood gas values were pH of 7.352, pCO₂ 32.8 mmHg, PaO₂ of 74.0 mmHg, HCO₃ act of 17.8 mmol/L, HCO₃ std of 19.1 mmol/L, Na⁺ 134 mEq/L, K⁺ 4.52 mEq/L, Ca²⁺ 1.16 mg/dL, glucose of 273 mg/dL, and lactate 7.13. A chest computed tomography (CT) scan was ordered so that the patient could be evaluated for COVID-19 and COPD. Moreover, a nasopharyngeal swab was performed for a COVID-19 real-time reverse transcription polymerase chain reaction (RT-PCR) of SARS-CoV-2 test. As the chest CT scan was compatible with COVID-19 (*Figure 1*), the patient was admitted to the hospital and empirical treatment for COVID-19 was started, comprising of favipiravir and dexamethasone. The RT-PCR of SARS-CoV-2 test resulted positive one day later.

Due to the D-dimer value that was higher than expected in COVID-19 (>35.2 ug/mL), arterial blood gas compatible with thromboembolism, and the accompanying high lactate level (7.13), a CT angiogram was ordered and was compatible with pulmonary embolism, showing partial embolic filling defects in the lobar branches in the inferior lobes, and the lingular branch of the left lung (*Figure 2*). Echocardiography was normal. When the patient and his relatives were investigated further for the etiology of pulmonary embolism, the information received was that the patient suffered only from COPD, hypercholesterolemia, and inguinal hernia, that he had neither self nor family history of any coagulation disorders, that only his father had a history of cancer (prostate cancer), that coronary angiography had been performed twice on the patient but that he had not suffered from MI, that he had no history of trauma, and that he is mobilized during his daily life. Abdominal ultrasonography (USG) and bilateral lower extremity colour doppler USG were ordered to investigate the presence of any malignancy or deep vein thrombosis. Colour doppler USG showed a thrombus in the crural branches of the right popliteal vein. The repeated RT-PCR of SARS-CoV-2 test was negative on the 6th day of hospitalization. The patient was discharged with 0.6 mg of enoxaparin bid once he had no need of oxygen support on his 17th day of hospitalization.

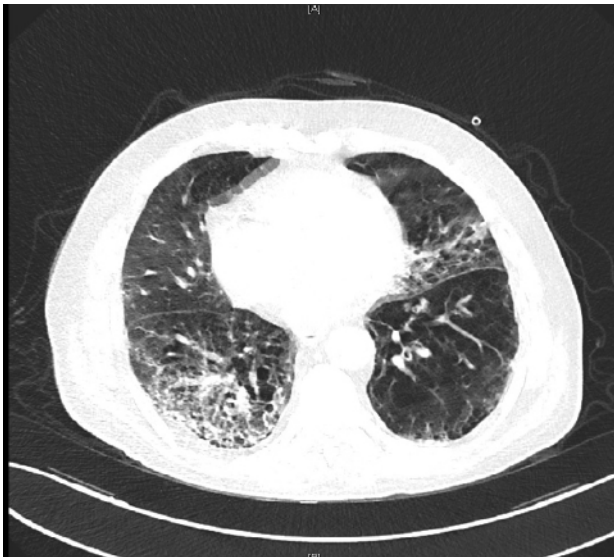


Figure 1. Chest CT scan with COVID-19.

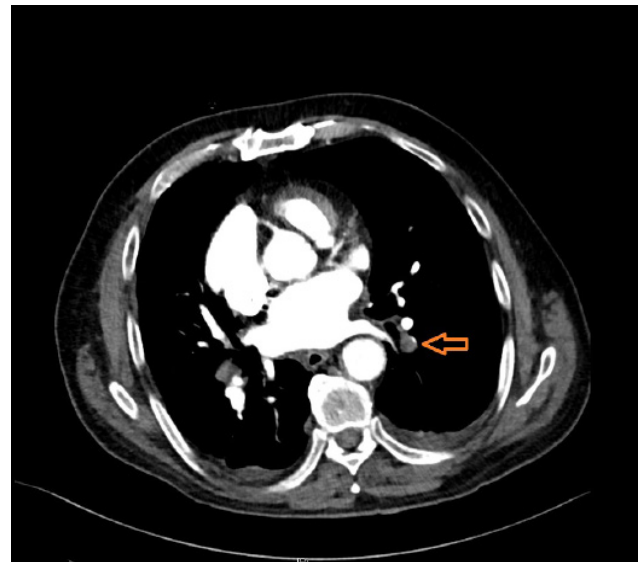


Figure 2. Partial embolic filling defects in the lobar branches in the inferior lobes (arrow).

Discussion

Recent studies have shown that pulmonary embolism was reported in 23-30% of COVID-19 patients who have undergone pulmonary CT angiography.⁴ In our case, prominent increase in D-dimer levels led us to the diagnosis of pulmonary embolism. Similarly, the study conducted by Poyiadji *et al.*⁵, showed that D-dimer levels were 9.33 µg/ml in average on patients with superimposed pulmonary embolism (n=72) as opposed to 1.33 µg/ml in those without.

In the retrospective study of Bompard *et al.*⁶ 135 hospitalized COVID-19 patients were categorized as intensive care unit or ward patients. According to these parameters, the need for mechanical ventilation and D-dimer levels, the contrast-enhanced CT results of the patients were evaluated for pulmonary embolism. As a result, 32 of these 135 patients were diagnosed with acute pulmonary embolism.⁶ They concluded that contrast-enhanced CT should be preferred in suspicious COVID-19 patients presenting with high D-dimer levels. Thus, contrast-enhanced CT scan should be the first option in patients with dyspnea and high D-dimer levels.

A closer investigation of pulmonary embolism in high-risk patients during the pandemics, and prescribing anticoagulant therapy starting on especially the first day of symptoms are vital to prevent potential complications of possible thromboembolism. The delay of anticoagulant

therapy in this patient, who resulted COVID-19 (-) on his 6th day of referral, was due to late application. Any patient older than 65 years should be investigated for D-dimer levels on their first day of symptoms and started an anticoagulant therapy accordingly.

Conflict of Interests

Authors declare that there is no conflict of interest with regard to this manuscript.

Authors' Contribution

Study Conception: YO; Study Design: YO; Supervision: YO; Data Collection: RG; Literature Review: BNC; Manuscript Preparation: NN.

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