

Acute Pulmonary Embolism in Post COVID-19 Infection, A Case Report

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Abstract

COVID-19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Many centers have noticed a high number of venous thromboembolism (VTE) events among critically ill inpatients with COVID-19 pneumonia. COVID-19 infection is associated with high morbidity and mortality largely due to respiratory failure, with micro vascular pulmonary thrombosis or PE originating from the leg veins playing an additional important pathophysiological role. Having undiagnosed or untreated PE may worsen patient outcomes and use of empiric therapeutic anticoagulation in certain COVID patients who do not have PE/DVT has been advocated. Here, we report a cases of COVID-19, in which massive pulmonary thromboembolism (PTE) occurred a few days after discharge?

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Introduction

Coronavirus disease 2019 (COVID-19) is a global pandemic disease caused by the SARS-CoV-2 virus. As of today, healthcare practitioners and researchers have made great effort to understand the characteristics and clinical presentations of the disease. Incubation period time is 4 to 5 days and 97.5% of patients will exert symptoms within 11.5 days (1) Surface spike protein of virus binding to the human angiotensin-converting enzyme 2 (ACE2) receptor, which is expressed in the lung (type 2 alveolar cells), heart, intestinal epithelium, vascular endothelium, and kidneys, providing a mechanism for multi-organ dysfunction. A growing body of evidence indicates that coagulopathies and thromboembolic events are of utmost

importance in COVID-19 patients and are related to poor prognosis (2). Many centers have noticed a high number of venous thromboembolism (VTE) events among critically ill inpatients with COVID-19 pneumonia (3). A number of studies have shown that coagulation dysfunction exists in patients with severe novel coronavirus pneumonia (4, 5).

In one study the incidence of VTE in patients with severe NCP (severe novel coronavirus pneumonia) is 25% which may be related to poor prognosis (6). The significant increase of D-dimer in severe NCP patients is a good index for identifying high-risk groups of VTE (7).

In this case report, we report a patient with a recent hospitalization history of COVID-19

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who developed symptoms of chest pain after discharge which eventually diagnosed pulmonary embolism.

Case report

A 68-year-old man with a recent hospitalization in intensive care unit (ICU) due to covid-19 infection for 14 days without outpatient thromboprophylaxis, present to the emergency department of Farschian Heart Center (Hamedan, Iran) with symptoms of pleural chest pain two days after discharge. He mentions chest pain in the right hemithorax from yesterday, which gets worse with breathing. He reports no cough or dyspnea. Past medical and drug history was negative. On examination, the patient was a 68 years old man, who seemed to be in discomfort. Blood pressure on admission was 110/70 mmHg, heart rate was 120 beats/minute and the patient had a regular body temperature of 37°C and SpO₂=95% in room air. Auscultation of lung revealed no pathologic sound, heart auscultation revealed tachycardia and no murmur.

His ECG revealed a sinus tachycardia without ST/T changes or axis deviation. In lab tests, WBC=14400 (PMN=%75, Lymphocyte=%22), Hb=14.4, HCT=57%, Plt=146000, BUN=18, Cr=1.3, Na=132, K=3.8, LDH=669, CRP=69, ESR=28, CKMB=18, Troponin=Negative, BS=157, D-Dimer =4809. The patient was admitted and underwent CT pulmonary angiography. CT pulmonary angiography showed a thrombosis in right lobar and segmental branch and left segmental and subsegmental branch thrombosis (Figure 1).

He managed successfully with subcutaneous Enoxaparin 1 mg/kg subcutaneous twice daily during hospitalization and discharged after 5 days with Rivaroxaban 15 mg twice daily until 21 day then 20 mg daily.



Figure 1. CT pulmonary angiography. The arrows shows clot in pulmonary artery branches.

Discussion

We reported a case of COVID-19 infection who did not receive thromboprophylaxis after discharge from the hospital. He had been referred again and hospitalized with the pleuritic chest pain and finally, a pulmonary embolism was diagnosed. The association of severe COVID-19 with an increased risk of venous thromboembolism (VTE) has resulted in specific guidelines for its prevention and management. The VTE risk appears highest in those with critical care admission. The need for post discharge thromboprophylaxis remains controversial, which is reflected in conflicting expert guideline recommendations (8). Following discharge, some COVID-19 patients may require VTE prophylaxis. A multidisciplinary approach involving the patient and health care team should be implemented (9). Some of the indications for outpatient VTE prophylaxis include patients who required intensive care unit (ICU) management, were mechanically ventilated, and were paralyzed for a prolonged period or those with VTE risk factors identified on discharge (10). In light of increasing evidence of a significantly prothrombotic state in patients diagnosed with COVID-19 (11,12), Journal of the American College of Cardiology (JACC) guidance (13), and the American Venous Forum white paper (The COVID-19 Sub-Committee of the American Venous Forum,

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2020) (13) covering, among other issues, inpatient and post discharge thromboprophylaxis. In one study 41 out of 119 patients (34.5%) with confirmed SARS-CoV-2 infection who had computed tomography pulmonary angiogram imaging were diagnosed with pulmonary thromboembolism (Barnet Hospital, unpublished data, 2020) (14), alongside an increasing number of discharged patients being readmitted with thrombosis. While a number of studies advocate inpatient thromboprophylaxis (11), until now, apart from these documents (The COVID-19 Sub-Committee of the American Venous Forum, 2020) (13), no recommendations have been made for discharged patients. The National Institute for Health and Care Excellence guidance NG89 for venous thromboembolism in over 16-year-olds (National Institute for Health and Care Excellence, 2018) recommends thromboprophylaxis, after risk assessment, for acutely ill medical patients for at least 7 days. The primary agent of choice is low molecular weight heparin with fondaparinux as a second choice. A maximum duration of anticoagulation was not delineated in this group of patients. The time to recovery in patients discharged from the hospital setting after treatment for SARS-CoV-2 infection is often significantly longer than initially might have been expected (14). Additionally, these patients have been on bed rest and are at risk of dehydration for considerable periods during their hospital stay, and social distancing while both recuperating and rehabilitating will dramatically reduce their mobility (7). Extrapolating from the National Institute for Health and Care Excellence guidance and in line with both the JACC guidance (12), and the The COVID-19 Sub-Committee of the American Venous Forum's (2020) white paper, strategy is to initiate chemical thromboprophylaxis in risk-assessed patients for 2–6 weeks post discharge. As the pandemic has impacted on the availability of district nurses to attend to patients who cannot self-

treat or receive low molecular weight heparin injections from family members, the recommendation is that patients are treated with a direct oral anticoagulant (10). The primary agents of choice are either apixaban 2.5 mg twice daily or rivaroxaban 10 mg once daily, together with a proton pump inhibitor to reduce the risk of clinically relevant non-major gastrointestinal bleeding. If a direct oral anticoagulant is unsuitable, or if injection of low molecular weight heparin is preferred, then thromboprophylactic dose low molecular weight heparin is advised (14). Where the risk of bleeding is significant, mechanical thromboprophylaxis with anti-embolism stockings is recommended. (13) Thus, extended thromboprophylaxis (2–6 weeks) should be considered to reduce the risk of venous thromboembolism caused by the hypercoagulable state and reduced mobility during the prolonged convalescent period, after a risk assessment is undertaken. Chemical thromboprophylaxis with a direct oral anticoagulant (such as rivaroxaban or apixaban), although outside of licensing, is easier to administer than injecting low molecular weight heparin in the community setting(7). If chemical thromboprophylaxis is contraindicated, mechanical thromboprophylaxis with anti-embolism stockings should be considered (14).

Conclusions

Based on the findings, it seems that thromboembolic events should be considered as a potential cause of clinical deterioration in COVID-19 cases and in-charge physicians should consider PTE as a differential diagnosis for new cardiopulmonary of symptoms in these cases during hospital admission and post discharge period.

We believe that thromboprophylaxis after discharge in patients with covid-19 infection is necessary based on the above report and our experience as well as recent studies.

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Conflicts of Interest

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