

CASE REPORT

An unexpected case of Pulmonary Embolism in a post-COVID-19 patient

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Abstract

Though it has been two years since the beginning of the coronavirus disease 2019 (COVID-19) pandemic, we still facing challenges in cases management at emergency department. As a result, major concern regarding long-term complications due to COVID-19 is still rising. Besides respiratory manifestations, we also have to face hypercoagulation conditions, leading to thromboembolic events. Extensive studies, highlight the presence of pulmonary embolism (PE) during COVID-19, especially in critical ill patients, who need hospitalization in Intensive Care Unit (ICU). Only a few

dozen case reports have been published, mainly in gray literature, reporting that PE can also manifest in post-COVID-19 patients. We aim to present a case report concerning a patient, who develops acute PE after discharge from his first hospitalization for mild COVID-19 pneumonia, under prophylactic anticoagulant treatment. These findings must encourage physicians to consider whether the severe acute respiratory syndrome coronavirus 2 (Sars-COV-2) acts as a precipitant factor for thromboembolic events and define the time frame in which the post-COVID-19 patients are more vulnerable to developing PE.

Keywords: case report, post-COVID-19, hypercoagulopathy, thromboembolism, pulmonary embolism

Introduction

In late 2019, the first cases of novel coronavirus first emerged in Wuhan, China and rapidly spread around the world. As a result, the World Health Organization declared COVID-19 a global pandemic in March 2020.⁽¹⁾ While it was primarily considered as a respiratory disease, accumulating data suggest that COVID-19 results in a profoundly prothrombotic state.⁽²⁾ Hypercoagulation is one of the striking features of COVID-19 and may correlate with the increased risk of both, arterial and venous

thromboembolic events^(3,4)VTE appears to be a frequent complication particularly in hospitalized patients with severe acute respiratory distress syndrome. ⁽⁴⁾ This case report describes a patient who developed acute PE on several days after hospitalization for mild COVID-19.

Case Presentation

A 44-year-old man, smoker, without any known comorbidities, sought emergency department on the 15th of August, nine days after being discharged for mild COVID-19 pneumonia under prophylactic dose of enoxaparin. He was readmitted due to sudden onset dyspnea and right-sided pleurodynia. On admission, his vital signs revealed: Oxygen saturation: 92% in ambient air, arterial blood pressure: 100/60 mmHg, heart rate: 110 beats/min, respiratory rate: 30 cycle/min, temperature: 36,7 degrees Celsius. The physical examination and laboratory blood tests were normal beyond an elevation of d-dimers, 2500µg/L. The ECG revealed sinus tachycardia, without right heart strain. Chest X-Ray and transthoracic echocardiogram with normal findings. Computed tomography pulmonary angiography was performed and showed filling defects in segmental and sub-segmental branches of right pulmonary artery, consistent with PE (Figure). Furthermore, it showed bilateral multifocal opacities in the lung that could

match with prior COVID-19. Surprisingly the screening test regarding thrombophilia and antiphospholipid syndrome was normal. So, the patient received therapeutic-dose anticoagulation with enoxaparin and transitioned to direct oral anticoagulants (DOACs) therapy after the discharge

Discussion

The case report refers to a patient, presented with PE four weeks after the initial diagnosis of COVID-19. According to the patient, he was receiving his prophylactic anticoagulation treatment as instructed after his discharge. Categorizing this patient, based on clinical judgment and prediction rules (Well's or Geneva criteria), classified in PE-unlikely category. Identifiable risk factors for provoked PE, other than history of COVID-19 and short-term immobilization, have been excluded, such as medical history of neoplasia, coagulation disorders, prior deep vein thrombosis (DVT) or PE, recent trauma or surgery. Undoubtedly, the novel coronavirus constitutes a potential risk factor for PE, even late in the disease course. Hence, it is important for physicians to be aware of late hypercoagulable complications in these patients.

By comparing the yearly number of published scientific papers on PubMed related to PE, we have perceived a

substantial and steep increase of them since the COVID-19 pandemic began. Comprehensive studies have been already performed, reassuring the high incidence of PE in COVID-19 patients, especially in severe cases that needed hospitalization or even worse, admission to the ICU. A systemic review and meta-analysis evaluate an average incidence of PE in these patients after admission to the ICU to be 11.1%.⁽⁵⁾ Particularly, the risk for PE seemed to be 2-fold increase in ICU patients, compared with hospitalized patients in wards.⁽⁹⁾ Only a few case reports indicate that PE is also a potential complication of mild COVID-19 and can manifest later in the disease course, when the infection is over.

Unfortunately, the duration of VTE risk during and after hospitalization is not well understood in medical patients, particularly in the context of short hospital stays.⁽¹⁰⁾ A study conducted before the COVID-19 pandemic, regarding the time course of hospitalization associated VTE, shows that the risk is highest during the first 19 days after hospital admission, and extends into the period after discharge.⁽⁶⁾ Considering the case reports to date, about PE in post-COVID-19 patients, we notice a wide range in the time frame between COVID-19 diagnosis and PE manifestation, with a maximum of 180 days.⁽⁷⁾ A recent, but small sample size study (n=98) aiming to assess serious pulmonary complications requiring

hospital readmission, at least 29 days from a first positive PCR test for SARS-CoV-2, revealed PE in 8.2% of patients. Particularly, 10.2% of them, presented PE during the 5th to 11th week (ongoing COVID-19) and 4.8% after the 12th week (post-COVID-19).⁽⁸⁾ The latest, nationwide self-controlled case series and matched cohort study reported that the incidence rate ratio was significantly increased, 70 days after COVID-19 for VTE and 110 days for PE.⁽⁹⁾ Although, more studies are needed in order to outline the high-risk period for PE, after COVID-19 convalescence phase.

Conclusion

According to the literature so far, there are only a few references regarding thromboembolic events in post-COVID-19 patients, especially in mild cases. Even in ambulatory cases. This case report raises the following questions: Should SARS-CoV-2 infection be considered a potent, independent long-term risk factor for PE? How long does this risk last? Considering this viral infection as a risk factor for PE, may help in faster and more accurate management of subsequent post-COVID-19 cases in the emergency department. Further research studies needed to answer these questions and clinical trials to test the necessity and efficacy of extended post-discharge thromboprophylaxis, as well as the kind of thromboprophylaxis.

Figure: Presence of filling defects in segmental and sub-segmental branches of the right pulmonary artery, consistent with right-sided PE.



Declarations

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6.2. Authors' contributions

All authors passed four criteria for authorship contribution based on recommendations of the International Committee of Medical Journal Editors.

6.3. Funding and support

None.

6.4. Conflicts of interest

Authors have no conflict of interest.

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