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Case Report

Abdominal pain in a patient with COVID-19 infection: A case of multiple thromboemboli

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ABSTRACT

The novel coronavirus SARS-CoV-2 (COVID-19) pandemic has created diagnostic uncertainty with regards to distinguishing this infection from pulmonary embolism (PE). Although there appears to be an increased incidence of thromboembolic disease in patients with COVID-19 infection, recommendations regarding anticoagulation are lacking. We present the case of a 61-year-old woman with clinically significant venous and arterial thromboemboli in the setting of COVID-19 infection requiring tissue plasminogen activator (tPA).

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1. Introduction

The novel coronavirus (COVID-19) pandemic has had widespread global impact with over 3.3 million cases and 238,000 deaths as of early May [1]. Many COVID-19 patients requiring hospitalization have symptoms indistinguishable from conditions such as pulmonary embolism (PE) [2,3]. To further complicate the clinical situation, many patients have D-dimer elevations and are at increased risk of thromboembolic complications [4–12]. Given the virulence of COVID-19, further radiological testing beyond chest radiography (CXR) is debated. In addition, there is no clear guidance as to whether anticoagulation should be initiated for emergency department (ED) patients with presumed COVID-19 and elevated D-dimer. We thereby present a patient who was found to have significant venous and arterial thromboembolic disease in the setting of COVID-19 infection.

2. Case report

A 61-year-old woman with a pertinent medical history of type II diabetes mellitus presented to the ED with three days of dry cough and one day of non-radiating abdominal pain. She reported sharp, severe, periumbilical pain which began acutely that morning. On review of symptoms she denied nausea, vomiting, diarrhea as well as fevers, shortness of breath and chest pain. Of note, her husband was diagnosed with COVID-19 the day before.

In the ED, her initial vital signs were notable for tachypnea at 34 respirations per minute, hypoxemia to 87% on room air, tachycardia to 112 beats per minute, and a blood pressure of 144/83. Her hypoxemia improved to 96% with 4 L/min of supplemental oxygen via nasal cannula. On exam, the patient was speaking in full sentences and had periumbilical tenderness without rebound or guarding. Based on her symptoms we ordered laboratory work, a chest X-ray (CXR), a COVID-19 reverse transcription polymerase chain reaction (RT-PCR) test, and a computerized tomography (CT) scan of the abdomen and pelvis.

The patient's CXR demonstrated bilateral peripheral opacities consistent with COVID-19 infection (Fig. 1) and her D-dimer returned elevated at 8264 ng/mL. Based on the patient's hypoxemia, persistent tachycardia, and marked D-dimer elevation, we ordered a CT pulmonary angiogram which revealed multiple filling defects in the thoracic and abdominal aorta representing thromboemboli as well as diffuse bilateral ground glass opacities in the lungs (Fig. 2). The CT scan also revealed a right ventricular (RV) filling defect concerning for thrombus, which was later confirmed on transthoracic echocardiogram (Fig. 3). Her CT abdomen/pelvis revealed no additional acute pathology. We initiated therapeutic unfractionated heparin and admitted the patient. Within 24 h, she developed worsening dyspnea and hypoxemia and received tissue plasminogen activator to treat her RV clot-in-transit and presumed PE. The COVID-19 RT-PCR returned positive the same day.

3. Discussion

In our patient, an elevated D-dimer led us to order a CT pulmonary angiogram that found multiple venous and aortic thromboemboli. In COVID-19, elevated D-dimer levels are common and thought to be secondary to the inflammatory response causing a hypercoagulable state

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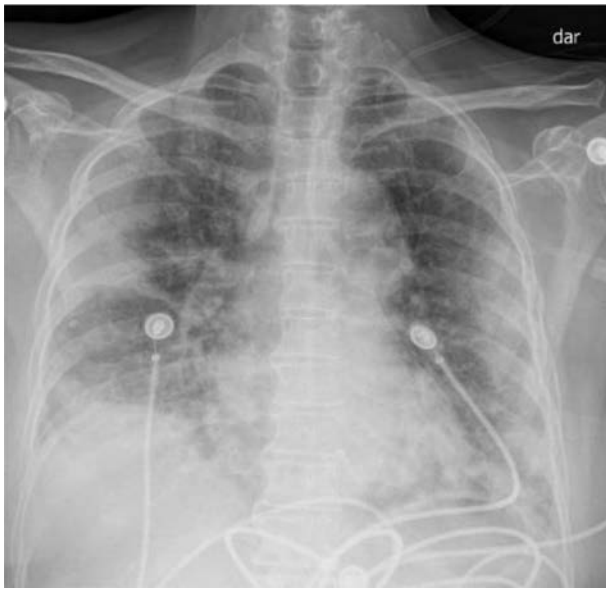


Fig. 1. Chest radiograph featuring diffuse bilateral peripheral infiltrates consistent with COVID-19 pneumonia.

[3,10,13]. Studies suggest D-dimer levels $>5\times$ normal are associated with poor outcomes, including thromboembolic complications [4,6–8,14,15]. However, no guidance regarding further imaging and anticoagulation is provided.

Our patient's D-dimer level was $>16\times$ normal, which raised suspicion for thromboembolism that was ultimately confirmed. While robust data are not available, and no formal guidelines exist, our case suggests markedly elevated D-dimer levels should raise suspicion for thromboembolism in patients with presumptive COVID-19. Studies show COVID-19-associated thromboemboli may develop in situ without distal thromboembolic origin [11,12]. This implies our patient's aortic thromboemboli, and possibly RV thrombus, formed in situ and underscores the increased risk of ischemic stroke in COVID-19 patients [11]. The International Society on Thrombosis and Haemostasis (ISTH) recommends prophylactic anticoagulation for inpatients with COVID-19 based on a study showing inpatients with moderate to severe COVID-19 infection (i.e., respiratory rate ≥ 30 , arterial oxygen saturation $\leq 93\%$ at rest, and/or $\text{PaO}_2:\text{FiO}_2$ of ≤ 300 mm Hg) along with a D-dimer of at least $6\times$ the upper limit of normal benefitted from low-molecular-weight heparin (LMWH) [16–18].

While the ISTH recommends prophylactic anticoagulation in inpatients with moderate to severe COVID-19 infection, there is likely a subset of patients with clinically significant thromboembolic disease such as PE, proximal DVT, and arterial thrombus who would benefit from therapeutic anticoagulation.

Routine CT scans have not been advocated for patients with COVID-19 and elevated D-dimers. If it was not for the patient's atypical presentation, further imaging may not have been sought. This is because increased radiological testing of COVID-19 can lead to increased exposure to healthcare workers. Because usual testing for thromboembolism may be difficult to obtain for COVID-19 patients, other diagnostic approaches may be necessary such as point-of-care ultrasound (POCUS). A balance is needed as patients with COVID-19 may have findings that require a change in management as in our patient.

Our patient did not undergo POCUS in the ED due to concern for fomite transmission of COVID-19 [19]. When indicated and carefully performed, POCUS can provide evidence of PE or other significant thromboembolism [20]. Point-of-care ultrasound may aid in the diagnosis of thromboembolism in COVID-19 patients, but further research is needed to support this. Recommendations are needed regarding empiric therapeutic anticoagulation in COVID-19 patients presenting to the ED with moderate to severe respiratory symptoms.

4. Conclusion

Presentations of COVID-19 often mimic findings of PE. Emergency physicians should judiciously interpret D-dimer levels and pursue thromboembolic workup in patients with marked D-dimer elevation. Further recommendations are needed regarding anticoagulation in patients with moderate to severe symptoms of COVID-19.

Presentations

None.

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Author contributions

KM: Drafted the manuscript. CK: Provided mentorship, edited manuscript, and assisted in final draft. AJG: Provided mentorship, edited manuscript, and assisted in final draft.

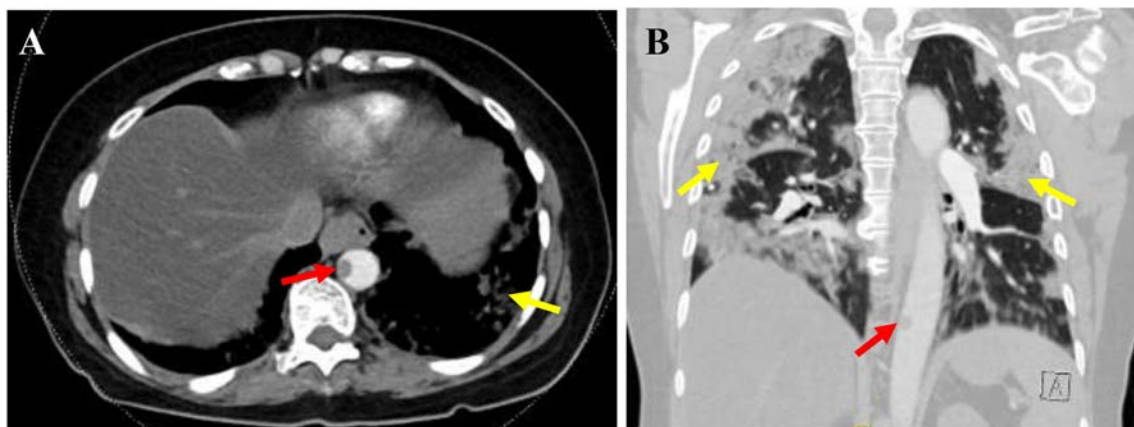


Fig. 2. (A) Computerized tomography with angiography revealing a filling defect consistent with thromboembolism in the thoracic aorta (red arrows) and (B) bilateral ground glass opacities (yellow arrows) consistent with COVID-19 infection. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

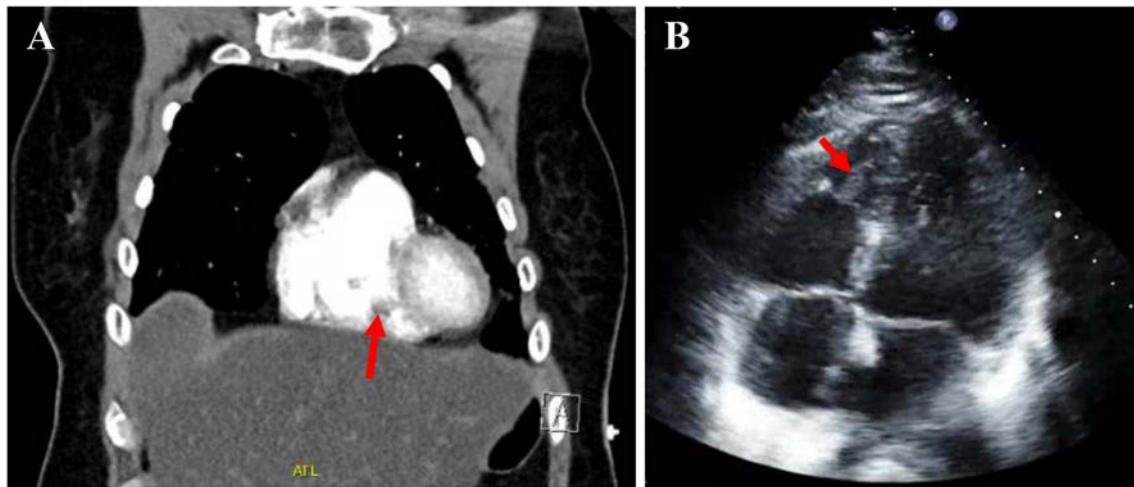


Fig. 3. (A) Computerized tomography with angiography showing a filling defect in the right ventricle consistent with thrombus (red arrow). (B) A transthoracic echocardiogram showed a mobile echogenic structure in the right ventricle consistent with thrombus (red arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Declaration of competing interest

The authors report no conflict of interest.

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