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Case report

D-dimer level elevation can aid in detection of asymptomatic COVID-19 presenting with acute cerebral infarction

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ABSTRACT

Coronavirus disease 2019 (COVID-19) mainly manifests as a respiratory syndrome, besides causing other complications. Severe COVID-19 may also present with coagulopathy, leading to venous thrombosis and cerebral infarction. Generally, acute stroke is a secondary complication in patients displaying respiratory syndromes. Here, we present a case of acute stroke in an 84-year-old female patient who did not manifest any respiratory symptoms. The patient had no cough or fever before the stroke onset; nevertheless, COVID-19 PCR test was positive. The patient also had markedly elevated serum D-dimer levels. Our findings suggest that coagulopathy can occur even in a patient with asymptomatic COVID-19 infection, and to our knowledge, this is the first report of such a case. We concluded that elevated D-dimer levels can serve as an additional COVID-19 screening tool in stroke patients.

1. Introduction

Although COVID-19 most commonly manifests as a respiratory syndrome, with symptoms such as cough and shortness of breath and/or fever, severe COVID-19 may also induce coagulopathy, leading to venous thrombosis and cerebral infarction [1,2]. However most such COVID-19 cases initially present with respiratory symptoms, followed by stroke several days later [2,3]. Here, we present a case of asymptomatic COVID-19 in an 84-year-old woman, who presented only with stroke symptoms.

2. Case report

An 84-year-old woman with atrial fibrillation (AF) and a history of subarachnoid hemorrhage was transferred to our hospital experiencing sudden loss of consciousness and severe right hemiparesis. The patient was vomiting upon arrival. The initial National Institutes of Health stroke scale score was 28. She had not had cough or fever recently and there was no fever on presentation. Chest computed tomography (CT) was performed, which showed bronchitis and mild pneumonia, but no ground glass opacities typical of COVID-19 (Fig. 1). Brain magnetic resonance imaging revealed a large left cerebral infarction induced by left internal carotid artery occlusion (Fig. 2). Based on the chest CT results, a COVID-19 PCR test was performed by way of caution. Blood levels for various indicators were also examined, and these data are presented in Table 1. The D-dimer levels in the patient were over 60 μg/mL, and the prothrombin time-international normalized ratio (PT-INR) under warfarin was 1.47. Endovascular thrombectomy was performed 3 h after stroke onset without intravenous alteplase administration due to the history of subarachnoid hemorrhage. Recanalization treatment failed, and she was treated in an isolated room. The next day, the COVID-19 PCR was confirmed positive and only at that point was a fever detected. However, there were still no respiratory symptoms, and her percentage oxygen saturation was normal in room air. Brain stem reflexes gradually disappeared due to brain edema, and she died 7 days after admission.

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Fig. 1. A: Magnetic resonance (MR) diffusion image shows left cerebral infarction. B: MR angiography shows left internal carotid artery occlusion.

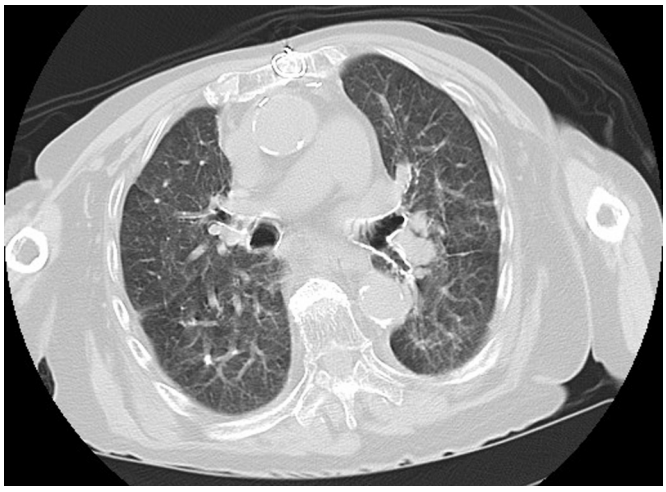

Fig. 2. Chest computed tomography shows bronchitis and mild pneumonia.

Table 1
Initial laboratory data of the patient.

Test	Score	Reference range
WBC	5800	3300–8600 /μL
Segmented cell	76%	32–73%
Lymphocyte	17%	18–59%
Platelet count	190,000	158,000–348,000 /μL
CRP	2.19	0.00–0.14 mg/dL
PT-INR	1.47	
Fibrinogen	578	200–400 mg/dL
FDP	More than 120	0.0–4.9 μg/mL
D-dimer	More than 60	0.0–0.9 μg/mL

3. Discussion

Stroke has been reported as a complication of COVID-19, with unclear cause [1,2]. However, coagulopathy with high D-dimer levels and endothelial dysfunction induced by COVID-19 may be associated with stroke [1–3]. In most cases, cerebral vascular disease occurs several days after the onset of COVID-19 [4,5].

The unique feature of our case was that stroke occurred before the presentation of any other respiratory symptoms. In the study by Fara et al. [6], coagulopathy occured even in mild COVID-19 cases. In our case, the risk of cardiogenic stroke was high because of the history of AF, and the PT-INR indicated warfarin treatment was ineffective. The patient showed no other COVID-19 symptoms at admission, and chest CT did not show ground glass opacities. In this case, the patient would normally be diagnosed with cardiogenic stroke and aspiration pneumonia. However, PCR testing indicated she was infected with COVID-19. Hence, we reached the conclusion that we have to protect ourselves with advanced personal protective equipment when we treat all emergency patients regardless of their symptoms.

The D-dimer level of our patient was extremely high. Generally, cardiogenic stroke elevates D-dimer levels, but this depends on cerebral infarction volume [7]. Even for a large infarction, D-dimer levels are usually around 10 μg/mL [7]. The patient displayed no other illnesses, such as cancer, that are known to cause elevation of D-dimer levels. Actually, an insufficient PT-INR and a large stroke can lead to elevated D-dimer levels. However, in this case, the D-dimer level was remarkably high. Therefore, we consider that coagulopathy induced by COVID-19 contributed to the D-dimer-level elevation.

In our case, Chest CT didn't show ground glass opacities, but indicated only mild pneumonia. According to the literature, chest CT findings of COVID-19 patients may change over time [8]. The CT in our case might have indicated the beginning stages of COVID-19 infection.

We determined that a high index of suspicion for COVID-19 infection is necessary in stroke patients, even when they present without fever and respiratory symptoms. In such cases, measurement of D-dimer levels is essential to diagnose suspected occult COVID-19.

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