

## CLINICAL PICTURE

# Coronavirus disease with multiple infarctions

A 64-year-old man diagnosed with coronavirus disease (COVID-19) by polymerase chain reaction test 2 days after having fever was admitted to another hospital. He had a history of gastric ulcer, duodenal ulcer and no known hypercoagulable conditions. Although the patient was treated with favipiravir and ciclesonide, he was intubated owing to the deterioration of his respiratory function on Day 10 of hospitalization. When his condition worsened, he was transferred to our hospital for extracorporeal membrane oxygenation (ECMO) on Day 15 of hospitalization. On admission, his level of consciousness was E1V<sub>TM</sub>1 on the Glasgow Coma Scale. His electrocardiographic waveform showed sinus rhythm. Fibrin degradation product level was 471.3 µg/mL, prothrombin time-international normalized ratio was 1.52, activated partial thromboplastin time was 39.4 s, and fibrinogen level was 410 mg/dL. Enhanced computed tomography (CT) findings were as follows: (i) multiple cerebral infarctions including left middle cerebral artery infarction (Figure 1a), (ii) bilateral renal infarction (Figure 1b) and (iii) splenic infarction (Figure 1b). We judged that there was no adaptation to ECMO. Favipiravir, meropenem, teicoplanin, a steroid for acute respiratory distress syndrome, and antithrombotic therapy with enoxaparin sodium were administered. Despite appropriate treatment, the patient died on Day 26 in our hospital. Written informed consent was obtained from the patient's family for publication. A copy of the written consent is available for review upon request.

Thrombosis is a serious complication of severe COVID-19 and has a high incidence rate.<sup>1–4</sup> Klok et al.<sup>2</sup> reported that pulmonary embolism was the most common thrombotic event followed by ischemic stroke among 31 thrombotic events. Conversely, no renal and splenic infarction in a COVID-19 case has been reported. Although Helms et al.<sup>3</sup> also reported 14 COVID-19 patients with thrombo-embolic complications, no cases had a thrombosis in the abdominal organs. While it is clear that COVID-19 is more likely to cause thrombosis, cases of infarction in multiple organs have not been regularly reported, and thus, our COVID-19 case with multiple infarctions is rare. Anticoagulant treatment with heparin reduces mortality in COVID-19 patients with high D-dimer or high sepsis-induced coagulopathy (SIC) score<sup>5</sup>; this suggests that infarctions may be an important factor associated with mortality in COVID-19

patients. In this case as well, it may have been possible to rescue the patient if the possibility of thrombosis was evaluated from at an early stage and if treatment for thrombosis was administered.

To our knowledge, this is a rare COVID-19 case with not only cerebral infarction but also multiple organ infarctions. Clinicians should be aware that infarction, an important life-threatening complication, may occur in any organ, and early anti-thromboembolism treatment should be considered in COVID-19 patients.


## Consent for publication

Written informed consent was obtained from the patient's family for publication of this case report and the accompanying images. A copy of the written consent is available for review upon request.

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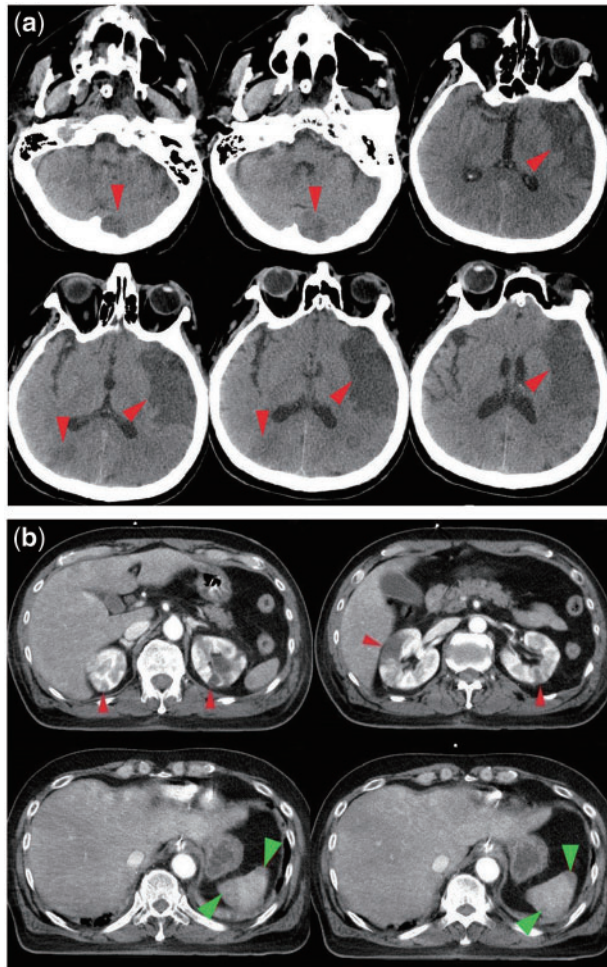
**Conflict of interest.** The authors state that they have no conflict of interest.

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**Figure 1** (a) Cerebral infarction on head CT. (b) Bilateral renal infarction (red arrow) and splenic infarction (green arrow) on enhanced abdominal CT.

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