



## Be aware: COVID-19 the new stroke mimicker

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### Introduction

Patients with acute neurologic symptoms with suspected acute cerebral ischemia may have other causes simulating ischemic stroke, called stroke mimics. Here, we report a novel observation of a stroke mimic in a COVID-19-infected patient.

### Case presentation

A 59-year-old man with a history of spinal disc herniation was admitted to the emergency ward of our hospital because of acute onset of left-sided weakness and sensory loss since 3 days. On examination, the patient was awake, alert, and orientated. The temperature was 37.0 °C, the blood pressure 110/89 mmHg, the respiratory rate 12 breaths per minute, and the oxygen saturation 98%. His speech was fluent and clear, but he had a left-sided upper motor neuron facial palsy, left-sided weakness and sensory loss. He was able to walk without assistance, but instable gait. The remainder of his neurologic examination was normal. The patient's National Institutes of Health Stroke Scale was 6. Blood tests revealed lowered serum leucocytes (3.87 10E9/l), C-reactive protein and D dimer levels were normal. Non-contrast CT

scan of the head revealed no intracranial hemorrhage and a CT angiography displayed no arterial occlusion. Thrombolysis was not performed because of the extended time window. The patient was admitted to the stroke unit and started with secondary prevention. At day 2, the patient developed fever without respiratory symptoms. He tested positive for COVID-19. Magnetic resonance imaging of the head was performed at day 2 and is shown in Fig. 1. There were no signs of recent ischemia. Neurological examination at day 3 showed a slightly recovered left-sided upper motor neuron facial palsy, weakness, and sensory loss.

### Discussion

Some COVID-19-infected patients may present at onset with neurological manifestations such as impaired consciousness, headache by meningitis, encephalitis, myelitis, smell/taste dysfunction, Guillain–Barre syndrome, epilepsy, and stroke [1]. Strokes in COVID-19 patients are not uncommon. The incidence of acute ischemic types of stroke in severely affected COVID-19 patients is around 3% [2]. Cardiovascular risk factors and relevant co-morbidities (e.g., diabetes mellitus and arterial hypertension) are associated with a more severe COVID-19 disease course and elevated stroke risk [1]. Severe COVID-19 cases suffer from coagulopathy, prolonged prothrombin time, decreased platelet counts, hyper-fibrinolysis, and up to disseminated intravascular coagulation [3].

The long-lasting neurological symptoms (> 72 h) during our patient's systemic viral infection and the absence of diffusion-restrictive cerebral ischemia on MRI reflect rather an underlying neuro-inflammatory encephalopathy presenting as a stroke mimicker, than a stroke/transient ischemic attack. Accumulating evidence suggests that severely affected COVID-19 patients might suffer from a cytokine storm syndrome, which has been implicated as the putative

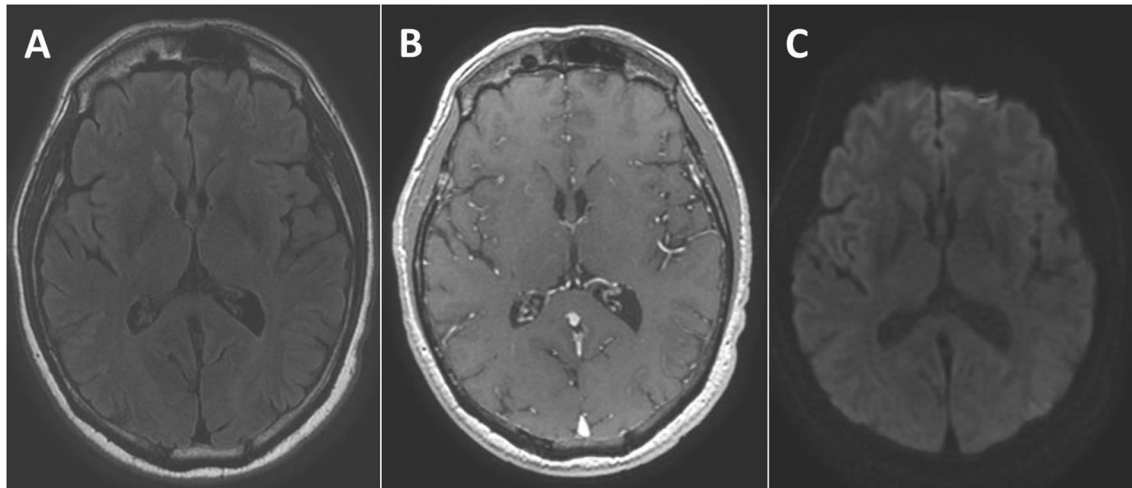
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**Fig. 1** Magnetic resonance imaging scan of the head: **a** 3 T FLAIR images, **b** 3 T T1 images with gadolinium contrast-enhancement and **c** Diffusion-Weighted Images showing no signs of cerebral ischemia, old infarctions and/or associated intracranial arterial stenosis

mechanism for necrotizing encephalopathy [1]. However, the cause of stroke like symptoms in this patient is unknown and it could be unrelated to COVID-19.

Our stroke mimic case contacted the emergency department at a late time window, excluding him for intravenous thrombolysis. In case of earlier arrival, intravenous thrombolysis could have been given, as the complication rate upon intravenous thrombolysis in stroke mimics is generally low [4]. However, in patients with underlying infection, there could be an increased risk of intracranial hemorrhage, as we have seen in patients with stroke and underlying infective endocarditis [5]. The safety profile of intravenous thrombolysis in COVID-19-infected patients is unknown.

COVID-19-infected patients can present with symptoms mimicking a stroke. However, we have to be aware of a stroke in COVID-19-infected patients because of the high incidence. Therefore, we need to pay attention to neurologic manifestations, in particular for those patients with a severe infection.

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### Compliance with ethical standards

**Conflict of interest** The authors declare no conflict of interest relevant to the manuscript.

**Ethical approval** The study was approved by the local Ethics Committee of the Antwerp University Hospital.

**Informed consent** Our patient provided written informed consent for the study participation.

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