Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Rule out differentials before blaming SARS-CoV-2

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Letter to the editor

We eagerly read the article by Lopez-Hortua et al. about three patients with neuro-COVID requiring neurosurgical intervention [1]. Patient-1 was a 79yo male who had undergone resection of a right frontal tumour and postoperatively developed an acute epidural hematoma, mild COVID-19, pulmonary embolism requiring anticoagulation, intracerebral hemorrhage (ICH) requiring evacuation, ischemic stroke, and venous sinus thrombosis (VST) [1]. Patient-2 was a 62yo female with ICH and SARS-CoV-2 associated meningo-encephalitis and a brain abscess [1]. Patient-3 was a 59yo male with COVID-19 who experienced aneurysmatic subarachnoid bleeding (SAB), underwent embolization but experienced a post-interventional ischemic stroke with a fatal outcome. [1]. The study is appealing but brings attention to the issue of true relation vs. mere co-incidence of COVID-19 and many of the neurological and neurosurgical scenarios we observe in the light of the current pandemic.

There is doubt that there was a causal relation between the neurological abnormalities and SARS-CoV-2 in patient-1. Though ICH [2], ischemic stroke stroke [3], and VST [4] have been reported as manifestations of neuro-COVID, a clear-cut causal relation between the virus and the various neurological diseases was not unequivocally provided: the cardiovascular risk factors and the pertinent medication in patient-1should be provided. The sequence of events is unclear in patient-1. We should know how many days prior to admission the right frontal brain tumour was resected. Of particular interest is the histological diagnosis of the brain tumour and if the patient required treatment in addition to surgery. Furthermore, it is unclear when and whether anticoagulation for pulmonary embolism was started and when it was discontinued. The right frontal hematoma could have been an effect of the anticoaguölation or other surgical factors. We should know when the patient got infected with SARS-CoV-2 and the cardiovascular risk profile, and the treatment applied for VST.

Concerning patient-2, there might have been risk factors for ICH. A causal link between meningo-encephalitis and the bleeding can be considered, i.e. a cerebral vasculitis.

Unclear remains the severity of the SARS-CoV-2 infections in the three patients. Obviously, patient-1 had a non-symptomatic infection. We should know if the SARS-CoV-2 infection in patient-2 manifested in organs other than the brain. Patient-3 obviously had SARS-CoV-2 pneumonia, Missing is the therapeutic regimen for COVID-19 in all three patients. A shortcoming is that VST was not confirmed by MR-venography.

We question the “hypoxia hypothesis” of brain damage, particularly in the absence of typical stigmata of hypoxic encephalopathy on MRI. COVID-19 patients requiring hospitalisation are usually well monitored for blood oxygen saturation. If it declines, these patients receive oxygen or even mechanical ventilation. In all three patients, the cardiac status should be provided. We should know who had congestive heart failure, atrial fibrillation, arterial hypertension, Takotsubo, or left ventricular hypertrabeculation.

Studies of a causal relation between SARS-CoV-2 and neurological compromise are an important task but in the light of cardiac, pulmonary and pharmacological co-morbidities a challenge. In our opinion, this article raises the need for more rigorous studies on this subject, but we dare to question that in the three reported cases COVID-19 is the true differential.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Abbreviations: COVID-19, coronavirus disease-19; ICH, intracerebral hemorrhaghe; MRI, magnetic resonance imaging; SARS-CoV-2, severe, acute respiratory syndrome-coronavirus-2; VST, venous sinus thrombosis.

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