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.

[c]Faculté de Médecine de Sorbonne Université, Institut National de la Santé et de la Recherche Médicale, U 1127, CNRS, Unité Mixte de Recherche (UMR) 7225, Institut du Cerveau et de la Moelle épinière, ICM, Paris, France
[d]Centre Hospitalier Universitaire de la Guadeloupe, Unité d'Hospitalisation de Courte Durée, Pointe-à-Pitre/Abymes, France
[e]AP–HP, Hôpital de la Pitié-Salpêtrière, Département de Neurologie, Paris, France
[f]Centre Hospitalier Universitaire de la Guadeloupe, Service d'Infectiologie, Pointe-à-Pitre/Abymes, France
[g]Centre d'investigation Clinique Antilles Guyane, Inserm CIC 1424, Pointe-à-Pitre, France

*Corresponding author at: Department of Neurology, University Hospital of Guadeloupe, 97139 Pointe-à-Pitre/Abymes, French West Indies, France.
E-mail address: hugo.chaumont@chu-guadeloupe.fr (H. Chaumont)

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First case of Covid-19 presented with cerebral venous thrombosis: A rare and dreaded case

1. Background

The corona virus disease 2019 (COVID-19) is a newly recognized infection which is pandemic [1], Patients with COVID-19 commonly have neurological manifestations [2]. COVID-19 presents with a variety of phenotypes range from asymptomatic to severe, rapid multiorgan dysfunction and death. The mechanisms are multifactorial but may include a hypercoagulable state with micro- and macro-circulatory thrombosis. The virus can bind to endothelial cells, damage the vessels and lead to platelet aggregation. The coagulation function is deranged [3]. Clots in the small vessels of all organs were described [4]. In this study we report an unusual presentation of COVID-19 with cerebral venous thrombosis (CVT).

2. Case report

A 65-year-old previously healthy male was admitted to the emergency department in ALzahra hospital, Isfahan, Iran with complaint of loss of consciousness, upward gaze and tongue biting. Upon arrival, he was drowsy .He had no focal neurological sign. Vital signs were remarkable for oxygen saturation of 90% on room air but otherwise stable. He didn't have any complain of respiratory symptom. Blood investigation showed an increased white cell count with 6% lymphocytes, normal CRP and ESR but increased CPK and LDH. Brain imaging demonstrated hemorrhagic infarct in right temporal and right sigmoid and transverse sinus thrombosis (Fig. 1).

Screening tests for a thrombophilic state were within normal amounts. Given that the patient had lymphopenia and low oxygen saturation, the chest CT was done which showed ground glass opacity (Fig. 2), also the real time PCR-test for COVID-19 was positive. Considering the diagnosis, he underwent anticoagulant, Levetiracetam, hydroxychloroquine and Co-amoxiclav. At day 10, he was discharged with good health. Patient's written consent was obtained for publication.

3. Discussion

Coronaviridae members can cause neurological disease [5] but there are few studies about neurologic complications of COVID_19.ACE2 was identified as the receptor for COVID-19, which is present in nervous system and skeletal muscles so this virus infect these systems as well as the respiratory tract

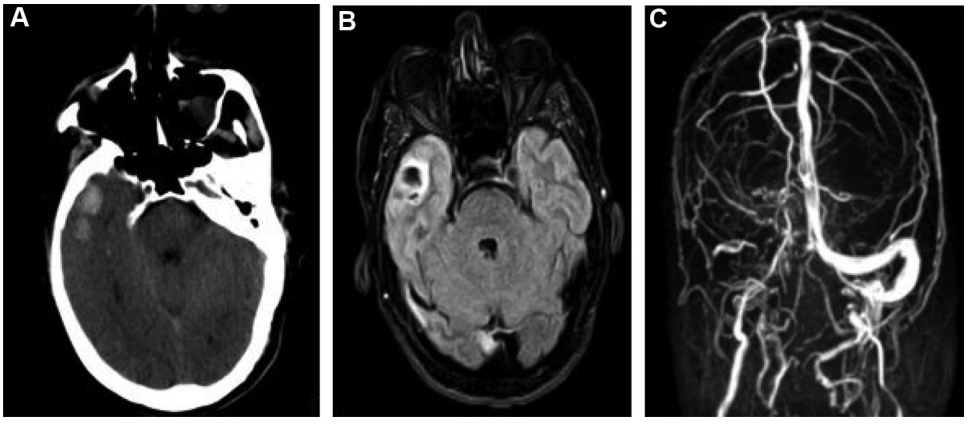

Fig. 1 – A.computed tomography (CT) image showed hemorrhage in right temporal lobe B. Fluid-attenuated inversion recovery images showed hemorrhagic infarct. C. Magnetic resonance venography demonstrates right sigmoid and transverse sinus thrombosis.

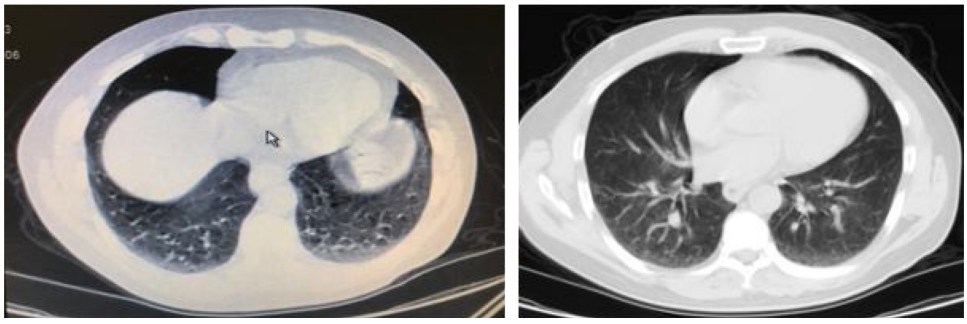

Fig. 2 – Chest computed tomography.

[2]. COVID-19 wildly reported to cause cytokine storm syndromes, which may cause acute cerebral disease. According to Mao et al., 36.4% of COVID-19 infected cases showed neurological manifestations. Acute cerebrovascular disease was reported in 5.7%. To our knowledge our patient is the first case of CVT associated with COVID-19.Our patient was a healthy male without any CVT susceptible conditions. He did not have common COVID-19 infection's symptoms. Considering lymphopenia and low oxygen saturation, evaluation of COVID-19 was done. Mao et al found that the lymphocyte count were lower for patients with CNS symptoms as described in our patient, this finding may be indicate of the immunosuppression in this group [2]. Elevated CPK and LDH was reported due to muscle injury in COVID-19, [2], but we do not know elevated CPK in our patient is resulting the seizure or muscle involvement. Our case highlights the importance of identifying CVT as a presenting sign of COVID-19.

Disclosure of interest

The authors declare that they have no competing interest.

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H. Hemasian
B. Ansari*
Isfahan neuroscience research center, ALzahra research Institute, Isfahan University of medical science, Department of neurology, Isfahan University of medical science, Isfahan, Iran

**Corresponding author.*
E-mail address: ansaribehnaz@yahoo.com (B. Ansari)

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Patients with MS treated with immunosuppressive agents: Across the COVID-19 spectrum

Multiple sclerosis (MS) related infections are frequent: urinary tract infections due to bladder and sphincter disorders, pulmonary infections linked to swallowing disorders or respiratory dysfunction. Currently, 15 immunomodulatory or immunosuppressive molecules are approved for MS treatment, some of them being associated with an increased infectious risk particularly progressive multifocal leukoencephalitis, herpes infections and pneumonia.

There is currently no data on the consequences of COVID-19 in patients with MS. Experts have proposed a stratification of the risk of MS treatments on COVID-19 [1,2].

We report here 2 patients with MS hospitalised, because of MS and diagnosed with COVID-19 (Fig. 1).

1. Case 1

A 53-year old woman was followed for secondary progressive MS with disease activity. Her past medical history

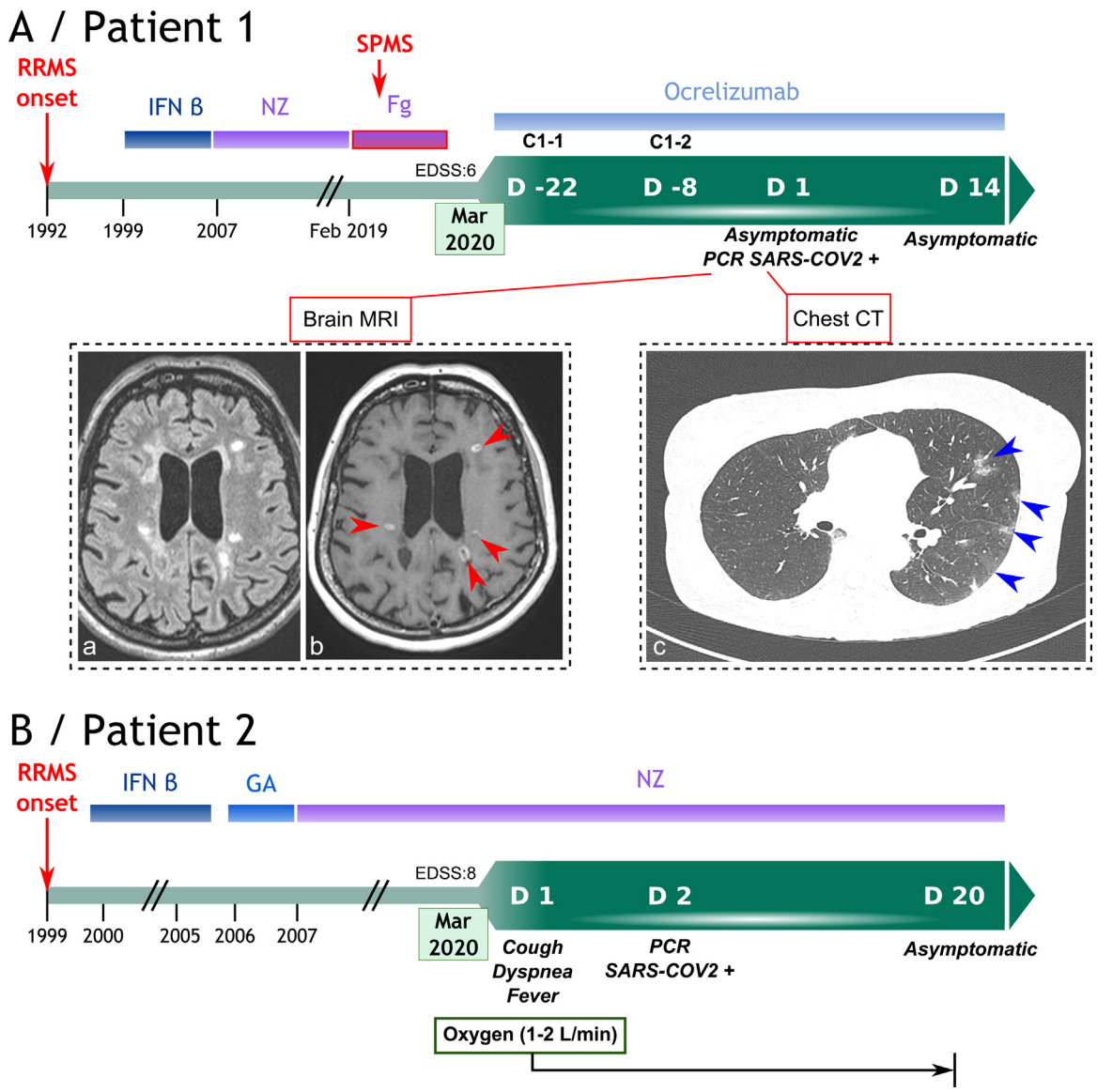

Fig. 1 – Timeline for both patients: multiple sclerosis onset and succession of disease modifying therapies, followed by COVID-19 diagnosis in March 2020. Days are noted from the diagnosis of COVID-19 (patient 1) or the first symptoms of COVID-19 (patient 2) (ex: D–22 corresponds to 22 days before COVID-19 diagnosis). (a) Fluid attenuation inversion recovery (FLAIR) sequence showing hyperintense MS lesions. (b) Post gadolinium T1 sequence showing gadolinium-enhanced lesions (red arrowheads) among a total of 16 supra- and infra-tentorial gadolinium-enhanced lesions. (c) Ground glass opacities (blues arrowheads) mainly located in lower lobes with moderate extent (10–25% of parenchyma). C1-1: First infusion of cycle 1 of ocrelizumab; C1-2: Second infusion of cycle 1 of ocrelizumab; EDSS: Expanded Disability Status Scale; RRMS: Relapsing remitting multiple sclerosis; SPMS: Secondary progressive multiple sclerosis; IFNß: Interferon beta; GA: Glatiramer acetate; NZ: Natalizumab; Fg: Fingolimod.

included hypertension, acute pancreatitis and cholecystectomy. Body mass index was normal (20.8 kg/m^2). She was treated with natalizumab from 2007, switched by fingolimod in February 2019 after JC virus seroconversion. Despite fingolimod, the patient reported a progressive clinical worsening of the lower limb paresis, and cerebral MRI revealed several gadolinium enhanced-T1 lesions. This led to a switch for ocrelizumab. Before fingolimod discontinuation, the absolute lymphocyte count was 0.29 G/L (N: 1.0–4.0), raising up to 1.02 G/L at ocrelizumab initiation. EDSS was 6 on the day of the first ocrelizumab infusion. Two weeks after the first cycle of infusions (300 mg on March 5 and March 19 2020), in the middle of COVID-19 outbreak in France, the patient was referred to the hospital after a traumatic fall without loss of consciousness. Due to a mild inflammatory syndrome with elevation of C-reactive protein (19 mg/L, N < 5), a PCR for SARS-CoV-2 was performed and revealed the presence of the virus on March 27 2020. Thoracic CT