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## Case Report

# Cavernous sinus thrombosis in a COVID-19 patient: A case report <sup>☆</sup>

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## ABSTRACT

Coronavirus disease 2019 (COVID-19) is an emerged pandemic disease caused by a new coronavirus known as SARS-CoV-2 (severe acute respiratory syndrome-coronavirus-2). Initially the mortality of this infection are related to severe acute respiratory distress syndrome, but several publications also showed that this infection caused an inflammatory response with severe systemic complications [1]. Venous thromboembolism has been shown to be an important cause of morbidity and mortality in patients with COVID-19, both in the general inpatient and in the intensive care unit (ICU) setting, and even in patients receiving therapeutic anticoagulation [2].

We report the case of an adult patient who presented a cavernous sinus thrombosis during his hospitalization for COVID-19.

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## Introduction

The world is facing a major health crisis due to the pandemic infection by the novel Coronavirus SRAS-COV-2, since December 2019 when the outbreak began in Wuhan China.

By the beginning of May 2020, more than 3 million persons have been infected and more than 200,000 have died. Radiology, and especially the chest CT scanner stands as a cornerstone in the diagnosis and complications of COVID-19 infection.

<sup>☆</sup> We unfortunately lost contact with the patient.

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## Case report

A 55-year-old man with no significant medical history, presented to the hospital owing to shortness of breath and fever. Physical examination showed the signs of dehydration, blood pressure of 120/60 mm Hg, and temperature of 38.5°. Respiratory frequency was as 15 cycles/min and saturation measured a 96%.

The patient was fully conscious with normal neurological examination.

Polymerase chain reaction on a nasal swab confirmed COVID-19 diagnosis.

Biological analysis showed a high D-DIMER levels and leucopenia.

The patient received oral macrolides, multivitamins, and zinc with oral rehydration, nonantibiotics were prescribed.

In the following days, he presented acute frontal headache with horizontal diplopia. Neurological examination revealed left exophthalmia with ophthalmoplegia with extraocular movements limited in all directions of gaze, fixed, and dilated left pupil.

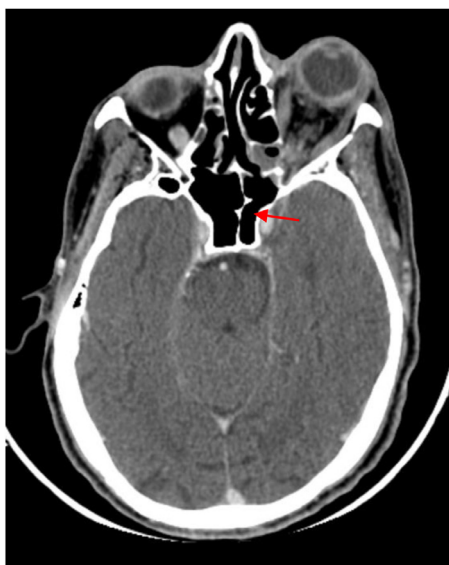
CT of the brain revealed a filling defect of the cavernous sinus and the left opthalmic vein, intra- and extra-conal spaces infiltration, and grade III exophthalmia. These findings were suggestive of a cavernous sinus thrombosis [Figs. 1–3](#).

The patient was treated with infused curative heparin.

One week after the onset of the treatment headaches started to fadeaway so as exophthalmia.

## Discussion

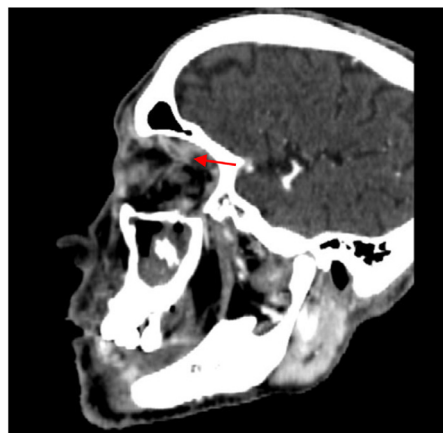
In December 2019, a severe acute respiratory syndrome coronavirus 2 (SARSCoV-2), was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei province



**Fig. 1** – post contrast head CT scan image showing a filling defect of the left lateral cavernous sinus associated with homolateral exophthalmia.



**Fig. 2** – Postcontrast head CT-scan image showing, intra- and extra-conal spaces infiltration associated with exophthalmia.



**Fig. 3** – Postcontrast head CT-scan image showing a filling defect of the left opthalmic vein.

of China. In the first few months of 2020, infection with this novel coronavirus led to a global pandemic that has now affected almost every country in the world, and, by August 2020, over 21 million cases had been documented [\[3\]](#).

Although coronavirus disease 2019 (COVID-19) primarily manifests as a lung infection, with symptoms ranging from those of a mild upper respiratory infection to severe pneumonia and acute respiratory distress syndrome, other multi-systemic manifestations of this disease and related complications are becoming more commonly recognized [\[4\]](#).

COVID-19 is generally diagnosed with the results of a real-time reverse transcription–polymerase chain reaction test of a nasopharyngeal specimen obtained with a swab. However, this test may obtain false-negative results owing to a variety of factors, including insufficient viral load, improper collection of viral samples, and technical errors during the swabbing procedure. Thoracic CT scan plays a major role in the diagnosis

and prognosis of COVID-19 infection showing several patterns as basal ground glass opacities, crazy paving and in the later phases consolidation.

It has been described that cerebral venous thrombosis (CVT) can reveal COVID-19 in some cases [5]. Indeed, several recent studies have explored the link between COVID-19 and venous thrombotic events. Initially, this association have demonstrated in histologic abnormalities with diffuse alveolar damage, microthrombi formation, and occlusion of small pulmonary vessels [6]. Hypercoagulability of SARS-CoV2, manifesting as increase in D-dimer, mild thrombocytopenia prolonged thrombin time, and prothrombin time (PT) or a shortened activated partial thromboplastin time [7]. These findings were correlated with a parallel rise in inflammatory marker levels, including but not limited to levels of C-reactive protein, tumor necrosis factor- $\alpha$  and various interleukins [8].

Older age and comorbidities such as thrombophilia and lack of anticoagulation factors increase the risk of venous thrombotic events, particularly those with severe disease requiring intensive care support [12]. But in our observation, the patient had no medical history what makes the particularity of the case.

Several cases of CVT with different localization were diagnosed in patient with COVID-19 infection such as the superior sagittal sinus, left transverse sinus, and left sigmoid sinus down to the level of the jugular foramen. The inferior anastomotic vein (of Labbe) was also thrombosed in some cases [9].

New York Grossman School of Medicine published a paper showing other locations of CVT associated with COVID-19 in relatively younger patients with age ranging from 21 to 43 years old such as torcular and deep cortical veins, internal cerebral veins, some of these patients presented complications related to CVT such as haemorrhage and cerebral oedema [10].

However, the superior sagittal sinus is the more frequently reported CVT structure involved in different series [11]. The deep venous system is an independent predictor of death in the International Study on Cerebral Vein and Dural Sinus Thrombosis (odds ratio, 8.5; 95% confidence interval [12],

At our knowledge, our case is the first case of cavernous cerebral thrombosis

The optimal choice of anticoagulant and duration of treatment for CVT associated with COVID-19 is not known [13]. We elected to use infused curative heparine for our patient and then switching to acenocoumarl for three months.

## Conclusion

Unusual presentations with CVT patients infected with SARS-CoV-2 have been increasingly reported.

They approved that COVID-19 is a serious contributor to hypercoagulation state, increasing the fatality of the disease. Heightened awareness of this atypical but potentially treatable complication of the COVID-19 disease spectrum should be encouraged even in patients without associated comorbidities as in our observation.

It is still also to evaluate the risk of this serious complication for to propose an anticoagulation prophylaxis.

## Patient consent statement

We unfortunately lost contact with the patient.

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