



## Case Report

## Ischemic stroke revealing COVID-19 infection: Case report

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## ABSTRACT

**Introduction:** SARS-COV-2 viral infection primarily targets the respiratory system with a clinical picture that varies from simple symptoms to respiratory distress syndrome requiring hospitalization in the intensive care unit; SARS-CoV-2 also has neuro-invasive capabilities and could spread from the respiratory system to the central nervous system. Recently, some patients with COVID-19 have been shown to have neurological symptoms such as headache, anosmia, dysgeusia, dizziness, impaired consciousness, and ischemic stroke.

**Case presentation:** we describe a case of ischemic stroke as the main presentation of COVID-19 in a 68 years old man with no previous history, without any associated respiratory signs; clinical examination revealed left hemiparesis with dysarthria and left facial paralysis, NIHSS score was at 11, the brain CT scan performed 1h30min later, completed by a brain MRI that came back in favor of right frontal, temporal and parietal ischemic stroke. The decision of thrombolysis was indicated in urgency, and the patient benefited from thrombolysis, which proceeded without incidents; the outcome was favorable with regression of symptoms.

Ischemic stroke has been widely described among the thromboembolic complications of COVID-19, but only a few papers have reported it as a primary manifestation of COVID-19.

**Conclusion:** SARS-COV 2 infection can spread from the respiratory system to the central nervous system, resulting in an inflammatory response and excessive secretion of inflammatory markers, leading to ischemic stroke.

## 1. Introduction

SARS COV 2 viral infection may manifest by respiratory symptoms or other symptoms, such as cardiovascular manifestations. In addition, SARS COV 2 also has neurological invasive capabilities and could spread from the respiratory system to the central nervous system [1,2]. A paper published in New York reports 5 cases of ischemic stroke in a young age population with no apparent risk factors [3]; theory suggests that SARS COV 2 facilitates the recruitment of inflammatory cells into blood vessels, which leads to the release of inflammatory markers and cytokines that subsequently activate coagulation.

In this article, we will represent a case of a 68 years old patient admitted to the emergency department in the setting of a thrombolysis alert for left hemiparesis with dysarthria and left facial paralysis whose

explorations revealed a right frontal temporal and parietal ischemic stroke with SARS COV 2 infection.

Case interest: ischemic stroke is a rare clinical presentation revealing SARS COV 2 infection.

## 2. Case presentation

Here we report the case of a 68 years old patient without any notable pathological history, admitted to the emergency department of Mohammed VI university hospital in Oujda with sudden onset of hemiparesis, dysarthria, and left facial paralysis.

On arrival, the patient was unconscious (Eye opening:3/4, Motor response:5/6, Verbal response:4/5), he was hemodynamically stable with a blood pressure of 130/80 mmHg, heart rate of 84 bpm, eupneic

**Abbreviations:** sars-cov-2, severe acute respiratory syndrome coronavirus 2; covid-19, 2019 coronavirus infection disease; nihss, national institute of health stroke scale; ct, computed tomography; mri, magnetic resonance imaging.

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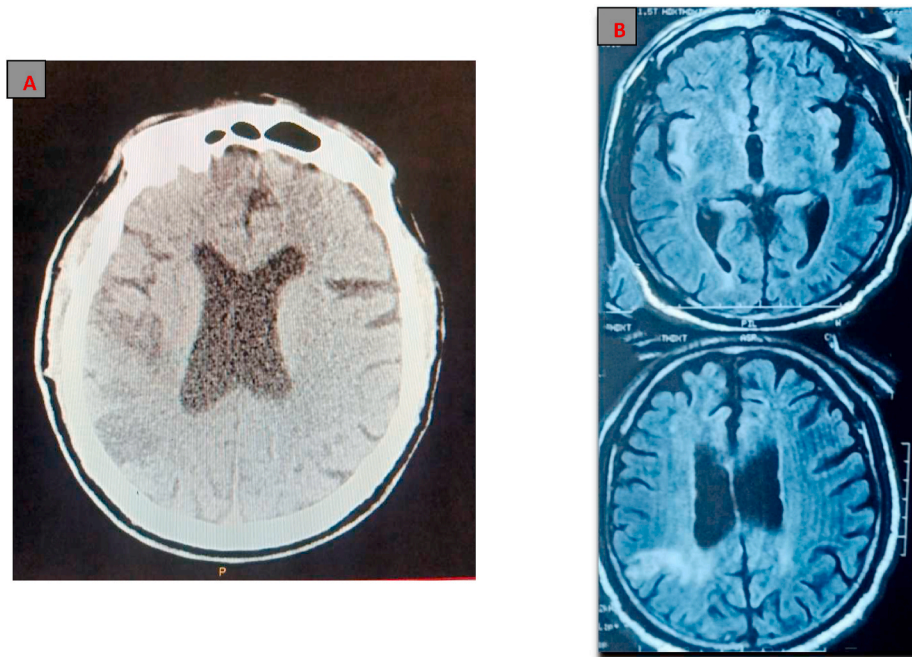
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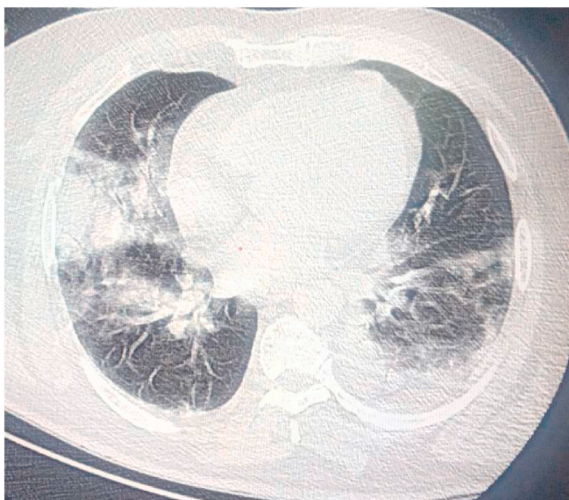
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**Fig. 1. B:** MRI Transversale plane revealing right frontal temporal and parietal ischemic stroke

**Fig. 1. A:** CT scan Transversale plane revealing right frontal temporal and parietal ischemic stroke.



**Fig. 2.** CT scan Transversale plane showing bilateral alveolar-interstitial pneumopathy with ground glass and nodular opacities in favor of SARS COV 2.

with a respiratory rate of 14 breaths/min, and oxygen saturation of 90% on room air, the temperature was at 37.2 °C, neurological examination showed the weakness of the left half body and muscle strength of the limb was grade 2/5, In addition, he has a difficulty of spelling words with a deviation of the tongue, tendon reflexes were symmetrically normal.

A cerebral CT scan with complementary cerebral MRI came back in favor of a right frontal temporal and parietal ischemic stroke (Fig. 1:A, B); the decision of thrombolysis was urgently indicated with 90 mg of actilyse for a weight of 96 Kg (9mg loading dose, 81 mg maintenance dose) without any incident, then the patient was transferred to the neurology department, at day 2 of his hospitalization, he had effort dyspnea with dry cough and desaturation at 70%, so it was decided to transfer the patient in ICU with the realization of chest CT scan for suspicion of pneumonia, the results showed bilateral alveolar-interstitial

pneumopathy with ground glass and nodular opacities in favor of SARS COV 2, the damage was estimated between 50 and 75% (Fig. 2), polymerase chain reaction (PCR) for SARS COV 2 infection was positive.

Laboratory tests showed signs of the inflammatory response, white blood cells counted 12490/ $\mu$ l, C-reactive protein (CRP) at 223 mg/l, lymphopenia at 980/ $\mu$  ferritin was elevated at 6017.55  $\mu$ g/, procalcitonin (PCT) at 1.89 ng/ml, interleukin-6(IL-6) at 213 pg/ml, D-Dimer at 2.3, fibrinogen 5.4 g/l, the result of laboratory test for cardiac, renal, liver functions were normal. As part of the etiological workup, the transthoracic echocardiography (TTE) was normal with preserved global Left ventricle systolic function (visual FE: 50%), arteriography also showed no abnormalities anticoagulation was interrupted at this stage because of the risk of hemorrhagic transformation. The patient received COVID-19 national protocol treatment: Vitamin C 1g twice a day, zinc 45mg twice a day, azithromycin 500mg on the first day, then 250mg for four days, vitamin D 25,000 IU/week, proton pump inhibitor (PPI) 40mg a day, Dexamethason 16mg a day for ten days.

The outcome was favorable, brain CT scan on the second day after stroke revealed no signs of hemorrhage, after five days, there was an improvement in respiratory and neurological symptoms, oxygen saturation was 90% using 2l of nasal cannula, the neurological examination revealed (Eye opening:4/4, Motor response:6/6, Verbal response:5/5) with the improvement of muscle strength at 4/5, also noting a regression of biological inflammation markers. The patient was very satisfied after the improvement in his clinical condition and was then transferred to the neurological department.

This case report followed care guidelines [9].

### 3. Discussion

Simple symptoms of SARS COV 2 viral infection include fever, cough, and dyspnea; in severe cases, patients develop acute respiratory distress syndrome (ARDS), acute cardiac problems, and multiple organ dysfunction [4]; in addition, SARS COV 2 also has neurological invasive capabilities and could spread from the respiratory system to the central nervous system [1,2], due to excessive inflammation, immobilization, hypoxia and diffuse intravascular coagulation [5]. In the literature, authors have described the association between COVID-19 infection and

thromboembolic complications, including ischemic stroke (3); a recent Chinese study demonstrated that acute cerebrovascular disease is not uncommon in patients with COVID-19 [6]. They reported 221 patients with COVID-19 (5%) who developed acute ischemic stroke, large artery stroke was also diagnosed in five among 206 patients with SARS in Singapore [7], in a case series, four patients with COVID-19 were reported to have ischemic stroke simultaneously [4].

Ischemic stroke as an unusual main manifestation of COVID-19 was first described in a 79 years old man with previous medical history admitted to Hubei Provincial Traditional Chinese medicine hospital for ischemic stroke and later diagnosed with COVID-19 [8], which is the case in our patient who had no comorbidities or cardiovascular risk factors, hemiparesis was the main symptom that revealed ischemic stroke in the 2 cases, and therefore should indicate possible neurological involvement of COVID 19 infection. As is well known, ischemic stroke is one of the most important causes of neurological morbidity and mortality worldwide; it can be the result of cardiac embolism, small vessel occlusion, and atherosclerosis; consequent neurological inflammation can be observed that causes ischemic brain damage [9].

Diagnosis is usually based on presenting symptoms, data from clinical examination and brain imaging, other imaging tests (CT, MRI, TTE, Doppler, Angiography), and blood tests are performed to identify the cause of stroke.

Treatment may include medications to dissolve clots or make the blood less likely to clot, as well as surgery or angioplasty to open blocked arteries; intravenous thrombolysis is the only approved systemic impact treatment for patients in acute ischemic stroke [10]. Approximately one-third of patients who have suffered an ischemic stroke recover nearly full function.

#### 4. Conclusion

Neurological involvement, including ischemic stroke, may be the primary manifestation of COVID-19 infection; clinicians should be aware of that atypical manifestation even in the absence of respiratory tract symptoms.

#### Author contribution

**ALKOUH Rajae:** study concept, Data collection; data analysis; writing review & editing. **MERBOUH Manal:** Study conception, data analysis. **EL AIDOUNI Ghizlane:** Study conception, data analysis. **BOUABDALLAOUI Amine:** contributor. **ZAID Ikram:** contributor. **AFTISS Fatima Zahra:** contributor. **BRNCHAIB Rajae:** contributor. **BKIYAR Houssam:** supervision and data validation. **MEBROUK Yasmine:** HOUSNI Brahim: supervision and data validation.

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#### Consent

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#### Registration of research studies

This is not an original research project involving human participants in an interventional or an observational study but a case report. This registration is was not required.

#### Guarantor

ALKOUH Rajae.  
MERBOUH Manal.

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#### Declaration of competing interest

None.

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