

COVID-19 and Ischemic Stroke

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Case Report

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Abstract

Background: SARS-CoV-2 causes COVID-19 disease. It was identified in December 2019 and rapidly evolved into a pandemic. During the outbreak of COVID-19, researches demonstrated its effect on many systems, including the nervous system. In our clinic, we have reported an impact of SARS-CoV-2, causing the ischaemic stroke.

Case Report: A 62-year-old Sudanese male with some comorbidities brought to the A&E with fever, chest symptoms, and acute evolving left-sided hemiplegia power grade 0/5 MRCS with left upper motor neuron facial palsy. Investigations: CT brain: right middle cerebral artery MCA infarction. CT- chest: bilateral ground-glass appearance. COVID-19 Test was positive. elevated D-dimer and C-reactive protein.

Discussion: A retrospective study of data from the COVID-19 outbreak in China showed that the incidence of stroke among hospitalized patients was approximately 5%. The fact that COVID-19 is an acute inflammatory condition associated with an increased incidence of fatty plaques formation, injury of the vascular wall, and hypercoagulability, causing brain infarct can be a reasonable hypothesis.

Conclusion

Patients with COVID-19 are at increased risk of thrombo-embolization, leading to arterial and venous cerebrovascular accident. This case report enhances the importance of further studies to clarify the relationship between stroke and COVID-19.

Introduction

Coronaviruses are a gaggle of related viruses that cause diseases in mammals and avian species. In December 2019, the world encountered the birth of A novel coronavirus that rapidly evolved into a pandemic. The World Health Organization WHO has designated the disease caused by the virus (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) as coronavirus disease 2019 (COVID-19). Human to human transmission of coronaviruses occurs primarily among direct contacts via respiratory droplets generated by sneezing and coughing attached to another person's mucous membranes such as the nose, mouth, and eyes. Alternatively, to the surfaces. (1) Common symptoms are fever, sore throat, cough, shortness of breath, diarrhea, and generalized fatigue. Complications of COVID-19 include Acute distress respiratory syndrome, myocarditis, heart failure, renal failure, and recurrent attacks of pulmonary embolism. COVID-19 can present with neurological manifestations such as loss of taste and smell, headache, dizziness, peripheral neuropathy, encephalitis, convulsions, and stroke. (2-3), as well as Guillain-Barre syndrome. (4) Cerebrovascular disease (stroke) caused by one of several pathophysiologic disorders involving the brain's blood vessels, where the two broad categories are hemorrhage (constitute 15%) and ischemia (constitute 85%). Stroke is the most common neurological disorders. It is the third killer worldwide and the most frequent cause of disability. (5). The clinical manifestations of a stroke depend on what part of the Circle of Willis is affected. (6) The history and physical examination should be made by neurologists to assess the vital stability, neurological deficit, and distinguish between other

disorders in the differential diagnosis of stroke. Non-contrast computed tomography (CT) is typically the first essential diagnostic study in patients with a suspected stroke. There are many modifiable and non-modifiable risk factors such as diabetes, hypertension, dyslipidemia. The clinical features of brain ischemia may be transient, lasting seconds to minutes, or may persist for a longer time. The neurological deficit remains indefinitely if the brain becomes irreversibly damaged, and infarction occurs (7). During the outbreak of COVID-19, it has found that COVID-19 can cause a stroke. (8)

Case Report

History.

A 62-year-old Sudanese male was known to have diabetes mellitus, hypertension, and dyslipidemia. He presented to the casualty with left-sided weakness. The condition started suddenly. Both left upper and lower limbs were affected at the same time. He became utterly paralyzed within less than six hours. No headache, convulsions, or loss of consciousness preceding the condition. There were no symptoms of cranial neuropathy apart from deviation of his mouth to the right side. No symptoms of hypoglycemia. No chest pain, palpitations, or dyspnea. He had no cough, nausea, vomiting, abdominal pain, or urinary incontinence. His wife mentioned those two days before admission; he started to complain of loss of taste, sore throat, and intermittent high-grade fever and for which he was given antimalarial without response. He used to take Lisinopril 10mg per day for hypertension, Glimepiride 4mg per day plus Metformin 500mg bid for diabetes, and Atorvastatin 40mg for dyslipidemia. Another history of the synopsis was not significant.

Examinations:

He looked ill, febrile (38°C), not pale, jaundiced, or cyanosed. Pulse 100/minute and regular. Blood pressure was 130/80 mmHg. Neurological examination showed intact higher mental functions. Cranial nerves examination revealed left-sided upper motor neuron facial palsy. The fundal examination was consistent with bilateral simple background diabetic retinopathy. The rest of the abnormalities confined to the left side of the body (left upper and lower limbs), where the power was grade 0/5 MRCS in both limbs plus hypotonia and areflexia with intact all modalities of sensation. Cardiovascular examination revealed no abnormalities. Chest examination: the respiratory rate was 16/minute. The trachea was central. No abnormal percussion notes. Auscultation revealed bilateral harsh vesicular breathing and mainly over the mid zones. An abdominal examination revealed no abnormality. Another Systemic examination was regular.

Investigations:

CT brain showed evidence of right MCA Cerebral infarction. Evidence of bilateral ground-glass appearance. The test for COVID-19 was positive.

Urinalysis was clear with no sugar and or acetone.

Blood urea and serum Creatinine was normal. Sodium and potassium were normal. Complete haemogram revealed mild lymphopenia others were normal.

The liver function test was regular. The lipid profile was standard.

ECG: left ventricular hypertrophy plus Left Axis Deviation.

Chest X-ray showed evidence of cardiac enlargement and mid zonal pneumonia. Echocardiography: Evidence of ischemic heart disease.

Elevated D-dimer. Elevated C-reactive protein: 16.2mg/dl.

Discussion

Stroke is a medical emergency associated with high mortality and morbidity based on the etiology and stroke type (7). Stroke is one of the most prevalent causes of disability, especially among the elderly. It was becoming clear that COVID-19 is not just a respiratory disease (2,3,4). In addition to severe respiratory and cardiovascular complications. COVID-19 can present with neurological manifestations like loss of taste and smell, epilepsy, encephalitis, myopathies, peripheral neuropathies, and stroke. A retrospective study of knowledge from the COVID-19 outbreak in China showed that the incidence of stroke among hospitalized patients with COVID-19 was approximately 5%.(9). Stroke among patients with COVID-19 can affect any age although the incidence of stroke increase among patients with severe diseases like hypertension, diabetes, coronary artery diseases, and previous attack of cerebrovascular accident. (10) so far, there is no established possible link between COVID-19 and Stroke; nevertheless, there are many hypotheses to explain stroke occurrence among patients with COVID-19. One of these hypotheses is that: COVID-19 is an acute inflammatory condition associated with an increased incidence of fatty plaques formation and injury of endothelial cells of the vascular wall. (11). Coagulopathy and vascular endothelial dysfunction have been proposed as complications of COVID-19, High level of C-reactive protein and D-dimer indicating the active inflammatory process and hypercoagulability, respectively coexistence of inflammation, hypoxia, and hypercoagulability can lead to the formation of micro and macro thrombi in the vessels. Hence, patients with COVID-19 are at increased risk of Thromboembolism, leading to cerebrovascular accidents. (12) COVID-19 can attach to angiotensin-converting enzyme-2 receptors, and this can explain the entry of the virus into the nervous system causing direct damage to the blood vessels. (13) Further studies are needed to clarify the relationship between stroke and COVID-19.

Declarations

Ethical approval: Ethical approval was taken from Sudan national health research ethics committee.

Consent: The authors certify that the patient consented to publish their case and clinical data.

Conflict of Interest: There are no competing interests.

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