CASE REPORT

COVID-19 ASSOCIATED SPONTANEOUS SUBDURAL HEMATOMA: A CASE REPORT

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ABSTRACT

Since March 2020, the health community, all over the world, has faced risks posed by the Coronavirus disease 2019 (COVID-19) pandemic. Worldwide, many reports show that coronavirus-related diseases bring together symptoms affecting both the brain and the vascular system. We describe a case where a young male with COVID-19 developed a spontaneous subdural hematoma 02 weeks after the infection started without having any history of cerebral or vascular injuries. The patient was admitted after testing positive for COVID-19. On the third day of isolation, the patient complained of a severe headache. On CT brain, a subdural hematoma was seen. The patient underwent an emergency craniotomy with satisfactory results. After surgery, he made smooth progress and was discharged a week later. Subdural hematoma is one of the hemorrhagic events that can occur after COVID-19 infection. Any COVID-19 patient who exhibits symptoms of altered consciousness needs to have a brain CT or MRI, and further neurological examination must be done.

Keywords: *Spontaneous Subdural Hematoma, Coronavirus, COVID-19, Subdural Hematoma, Coronavirus disease 2019.*

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INTRODUCTION

The cause of the coronavirus disease 2019 (COVID-19) is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It started in Wuhan, China, and has now affected countries around the world. The World Health Organization (WHO) classified COVID-19 as a communicable disease[1]. A patient with COVID-19 infection may present with mild breathing difficulties to severe CNS issues. Patients with COVID-19 affected brain may lead to acute ischemic stroke, intracerebral bleeding, and hemorrhagic necrotizing encephalopathy[2,3]. The primary reason for subdural hematomas is traumatic brain injury, resulting in the rupture of bridging veins, followed by bleeding in the subdural space. In this study, we report a case of spontaneous subacute subdural hematoma (SDH) in a COVID-19 patient with no cardiovascular risk factors.

CAPSULE SUMMARY

A case of spontaneous subacute subdural hematoma in a COVID-19 patient with no cardiovascular risk factors is reported. Healthcare workers should be aware of the possibility of cerebral bleeding from COVID-19 infection.

Case Report:

A 23-year-old male arrived at the emergency room in July 2024, complaining of fever, cough and breathlessness for ten days. The patient had no other disease. His vital signs were as follows: temperature 38.7°C, respiratory rate 24 breaths/min, O2 saturation of 89% (room air), heart rate 87 beats/min regular, and BP110/70 mmHg. He had no prior history of any injury, fall, or unconsciousness. He was oriented in time, place, and person. Carotid bruit was absent. The examination of cranial nerves, motor system, sensory system, heart and abdomen was unremarkable. Auscultation of the lungs revealed

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bilateral coarse crackles. The chest CT scan revealed ground-glass opacities, suggesting SARS-CoV-2 infection. Since his COVID-19 tests were positive, he was moved to the intensive care unit to be isolated, and was put on Lopinavir/Ritonavir, Hydroxychloroquine, and Dexamethasone. On the third day of admission, the patient started complaining of a severe, continuous, non-throbbing headache followed by a drop in consciousness. His Glasgow Coma Scale (GCS) was 5; the

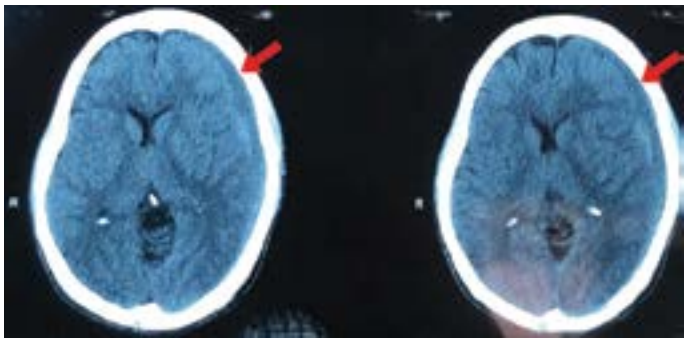

Figure 1: Plain CT scan of the brain showing Spontaneous Subacute Fronto-Temporal Subdural Hematoma marked with a red arrow.

patient gradually stopped reacting to painful stimuli. Brain CT revealed a SDH in the left frontotemporal area with edema brain on the ipsilateral side (Figure 1). A left frontotemporal craniotomy was performed to evacuate 130 mL of hematoma followed by duraplasty. The day after surgery, the patient was extubated without any post-surgical complications.

DISCUSSION

As a neurotropic and neuroinvasive virus, SARS-CoV-2 is linked to neurological symptoms of COVID-19, including encephalitis, myelitis, seizures, ischemic stroke, and viral presence in the cerebrospinal fluid [4]. The first investigation by Rothstein et al. demonstrated that SARS-CoV-2-associated intracerebral hemorrhage, subarachnoid hemorrhage, and ischemic stroke manifested in COVID-19 patients, a phenomenon deemed very unusual[5]. Our patient was not taking any antiplatelet or anticoagulant medication. Gogia et al. reported the first case where a patient receiving both Aspirin and Clopidogrel suffered from a hyperacute subdural hematoma and intracerebral hemorrhage[6]. In November 2020, Altschul et al. identified various forms of cerebral bleeding and its risk factors among individuals with COVID-19 . Of the 5227 COVID-19 patients, 35 experienced some form of bleeding, and 17 of these had acute SDH. Five were on anticoagulant medication, and 70.6% (n = 12) had experienced a head injury before the bleeding[7]. These risk variables were not present in our case . In a review, Cheruiyot et al. evaluated intracranial bleeding in people with COVID-19 from the data extracted from 23 studies. Only 19 of the 148 people had been diagnosed with SDH, and according to that study, none of them had the subacute SDH[8].

There are some explanations why these patients tend to develop SDH. Since the brain parenchyma has the ACE-2 receptors, it becomes the most likely site for SARS-CoV-2 to enter the brain. Furthermore, ACE-2 receptors are crucial for cerebral blood flow and vascular autoregulation. According to Sharifi-Razavi et al.,

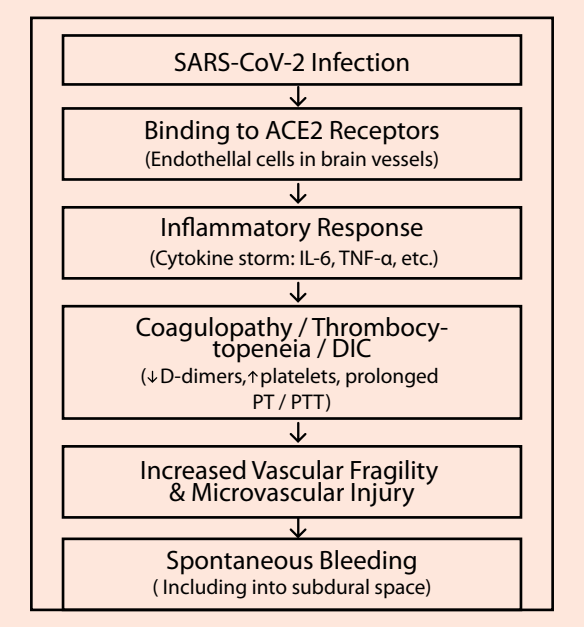

Figure 2: Pathogenesis of COVID-19-Induced Subdural Bleed.

direct invasion by SARS-CoV-2 may produce ACE-2 receptor malfunction, which might impair autoregulation and increase the risk of arterial wall rupture when hypertensive[9]. Due to viremia and weakening of the vessels of the subdural space, a minor jerk of the head from coughing, sneezing, or a Valsalva maneuver may make the bridging veins more vulnerable to bleeding. Figure 2 explains the possible pathogenesis of the COVID-19-induced SDH.

While many COVID-19 patients develop blood clotting, it is also important to know that they can experience bleeding. Thrombocytopenia, hyperfibrinolytic condition, excessive anti-coagulation factors intake, and the use of preventive anticoagulant medications are among the variables that increase a patient's risk of bleeding [10]. Prolonged hypoxia of the endothelial cells as well as immune inflammation, triggered by too many cytokines, could trigger more internal bleeding [3,11]. With increased levels of matrix metalloproteinases and tissue plasminogen activator, the risk of bleeding within the subdural space is higher with a minor blow to the head.

CONCLUSION

Besides the blood clots commonly seen, we should further look out for cerebral bleeding, as it may happen in COVID-19 patients. Healthcare workers should be aware of the possibility of cerebral bleeding from COVID-19 infection.

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AUTHORS' CONTRIBUTION

- ***Syed Muhammad Ali Haider:*** *Conception and design, Acquisition of data, Drafting the article, Critical revision*
- ***Muhammad Sharjeel Sadiq:*** *Acquisition of data*
- ***Muhammad Siddique Abdullah:*** *Aanalysis and interpretation of data, Drafting the article*
- ***Muhammad Maaz Qamar:*** *analysis and interpretation of data, Drafting the article*
- ***Muhammad Hissan Raza:*** *Drafting the article*
- ***Muhammad Moeed Azwar Bhatti:*** *Drafting the article*
- ***Mohammad Hassan Yousaf:*** *Drafting the article, Critical revision*
- ***Syed Waseem Akhtar:*** *Critical revision*

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