Cavernous Sinus Thrombosis after Recovery from COVID-19 – A Rare Case Report

Authors
HN Sarker¹, Masum Ahmed², Dr Muhammad Zubaer Hussain³
¹Professor (Ex), Medicine, Sher E Bangla Medical College, Barishal, Bangladesh
²Assistant professor, respiratory medicine, Sher E Bangla Medical College, Barishal, Bangladesh
³Assistant professor, Medicine, Sher E Bangla Medical College, Barishal, Bangladesh
*Corresponding Author
HN Sarker

Abstract
A 40-year-old man presented with severe headache and pain and swelling of right eye for four days and consulted with an eye specialist who prescribed him analgesic and steroid, but he did not get any relief. The patient was hospitalized and treated at a medical college hospital for COVID-19 moderate illness, which was identified clinically and confirmed by RT-PCR positive and HRCT of the chest. He improved immensely without complications and was discharged from the hospital on 28/4/2021 following a 14-day hospital stay on rivaroxamine 10 mg daily, vitamin D, vitamin C, and zinc. The cavernous sinus (CS) is a pair of cerebral dural venous sinuses found in the middle cranial fossa on each side of the sella turcica. The cavernous sinus contains the third, fourth, and sixth cranial nerves, as well as the ophthalmic and maxillary divisions of the fifth cranial nerve and the internal carotid artery with its surrounding sympathetic plexus. CST related with COVID-19 is becoming more common, however therapy is problematic since the appropriate anticoagulant and length of therapy are unknown. We are now treating the patient with subcutaneous low molecular heparin.

Introduction
The world is facing the second wave of Coronavirus Disease 2019 (COVID-19) pandemic which is the most troublesome challenge to public health. COVID-19 caused by severe acute respiratory syndrome coronavirus-2 (SARS CoV-2) started in Hubei Province, People’s Republic of China in December 2019[1]. The virus has since spread globally rapidly and World Health Organization (WHO) declared COVID-19 pandemic on 11th March 2020. The second wave is running and nobody knows where we are in the course of this disease. It becomes a significant challenge for the public health, science, and medical sectors[2].
COVID-19 is primarily the disease of respiratory tract and initially the mortality is related to severe acute respiratory distress syndrome (ARDS), but more and more understanding of this disease in course of time, it revealed that COVID-19 caused an inflammatory response with severe systemic complications like stroke, acute liver failure and acute renal failure[3].
Neurologic complications are frequent in patients with COVID-19, occurring in 36% to 65% of hospitalized patients[4, 5]. Stroke is the most
common neurological complication in COVID-19 patients accounting 5% in critically ill patients and more in other COVID-19 patients\cite{6}. COVID-19 is known to increase the risk of developing venous thromboembolism; the incidence of cerebral venous sinus thrombosis/cavernous sinus thrombosis is being increasingly reported. Venous thromboembolism has become an important cause of morbidity and mortality in patients with COVID-19, in the intensive care unit (ICU) and in the general inpatient setting, even after receiving prophylactic/therapeutic anticoagulation\cite{7}. We report the case of an adult patient who presented a cavernous sinus thrombosis after recovery from COVID-19.

**Case Report**

A 40-year-old man presented with severe headache and pain and swelling of right eye for four days and consulted with an eye specialist who prescribed him analgesic and steroid, but he did not get any relief. In the meantime he developed fever for one day and came to my chamber on 01/5/21. Physical examination showed proptosis of right eye, chemosis (Fig.1) and external ophthalmoplegia with limitation of ocular movements in all directions of gaze. Patient is conscious, oriented and his temperature is 38 °C and blood pressure 130/85 mm Hg.

The patient suffered from COVID-19 moderate disease diagnosed by clinical symptoms and confirmed by RT-PCR positive and HRCT of chest (Fig.2), and was admitted and treated in a medical college hospital. He recovered fully without any complication and discharged from hospital on 28/4/2021 after 14 days of hospital stay with rivaroxamine 10 mg daily, vit-D, vit-C and Zinc.

After 2 days of hospital discharge, he developed headache and pain in right eye which increased gradually to its peak with one day. Right eye became swollen and protruded forward.

With this complaint he visited an eye specialist who referred the patient to me. He is diagnosed as cavernous sinus thrombosis supported by MRI with contrast (Fig.3) and admitted into Hospital. He is being treated with low molecular weight heparin injection, inj. Ceftriaxone and supportive measures. His condition is improving observed at the time of writing this case report.
Cavernous sinus thrombosis (CST) was first described by Bright in 1831 as a complication of epidural and subdural contamination [8]. CST usually occurs due to spread of infection from its draining areas such as mid-face, paranasal sinuses, teeth, orbit, and oral cavity i.e. septic thrombosis [9]. Although its incidence is low, the mortality rate from CST was almost 100% prior to antibiotics era. Recently with the COVID-19 infection there is increasing reports with cerebral venous thrombosis as a complication of the disease; so we present a case of CST soon after recovery from COVID-19.

Conclusion
This case provides support for the postulation that COVID-19 is a serious contributor to hypercoagulation, increasing the mortality of the disease. Hence, a guideline should be developed regarding the thromboprophylaxis and treatment of treatable complications like this.

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Compliance with Ethical Standards
Conflict of interest
As a corresponding author and on behalf of coauthors, I declared that I take full responsibility for the integrity of the content of the manuscript. There is no conflict of interest needed to be declared. There is no financial support received from any organization.

Consent was taken from family member.

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