

A Rare Effect Of Covid-19: Cerebral Venous Sinus Thrombosis Case Presentation

Bedriye Feyza Kurt^{1,*}, Erman Kurt², Oya Güven³, Okay Kaşıkeman⁴

¹Kırklareli Training and Research Hospital, M.D. Specialist of Emergency Medicine, Kırklareli, Turkey,

²Uzunköprü State Hospital, M.D. Specialist of Radiology, Edirne, Turkey,

³Kırklareli University Medical School, Department of Emergency Medicine, Assistant Professor, Kırklareli, Turkey,

⁴Kırklareli Training and Research Hospital, M.D. , Kırklareli, Turkey,

Abstract

Introduction: Many studies have shown that coagulation disorders and increased risk of thrombosis may occur during coronavirus disease 2019 (COVID-19) infection. Although cardiac or pulmonary vascular pathologies has been detected in most cases, cerebral sinus thrombosis are rare. During COVID-19 infection patients rarely present with neurological symptoms.

Case Report: A 19-year-old man was admitted to our emergency department with neurological symptoms. Cerebral venous sinus thrombosis (CVST) was detected in Brain Computerized Tomography and Magnetic Resonance Imaging examinations. Our patient was hospitalized in the neurology department of our hospital for medical treatment and was discharged after clinical recovery.

Discussion: In this case report we wanted to draw attention to cerebral venous sinus thrombosis which is a rare but treatable complication of COVID-19 infection in a young patient. We examined our patient in the light of literature.

Conclusion: Clinicians should keep in mind the diagnosis of CVST that may occur due to infection associated thrombosis in COVID-19 patients presenting with neurological symptoms and consider adding anticoagulants to the treatment if necessary.

Key words: cerebral venous sinus thrombosis, coronavirus, antikoagulant, MR Venography

Introduction

The SARS-CoV-2 (Severe Acute Respiratory Syndrome causing Coronavirus) infection which was first detected in Wuhan city of China in 2019 caused a pandemic all over the World¹.

Hypercoagulability state in COVID-19 (Coronavirus Disease Infection-2019) is predicted to be hyperviscosity secondary to hypoxia. Cellular infection initiates localized inflammation, endothelial activation, tissue damage and irregular cytokine release. The septic situation which develops with an increase in leukocytes and platelets causes coagulopathy and eventually diffuse intravascular coagulation. Therefore many organ failures may occur. Most commonly cases of pulmonary embolism and cardiac thrombosis have been identified. Cases of COVID-19 associated cerebral venous sinus thrombosis (CVST) are rare in the literature^{2,3,4}. In this article we aimed to investigate, the rare case of COVID-19 associated CVST in a young patient.

Case

A 19-year-old male patient was admitted to our emergency department (ED) with severe headache and vomiting. On

his medical history; ten days ago, he was admitted to the internal medicine unit of our hospital with mild headache, multiple joints pain and fever. After normal blood test and brain computed tomography (CT) (Fig. 1) results, he was tested for COVID-19 with a PCR test. He received five days of antiviral treatment (Hydroxychloroquine+Favipiravir) with a positive test result. The patient was non-smoker and had no comorbidity. He had undergone an operation of right parietal lobe of brain for traumatic injury 15 years ago. On examination his vital signs were stable. There were no signs of meningeal irritation or any neurological deficit. Bilateral pupillary light reflex was ++ and ophthalmoscope examination revealed mild papillary edema on the left. Blood tests showed leukocytosis ($15.57 \times 10^9/L$), lymphopenia ($0.63 \times 10^9/L$), elevated D-dimer (1.52 mg/L) and normal CRP (0.18 mg/dl) level. Observation of hyperdense appearance in confluence sinuum and transverse sinuses (especially on the left) on brain CT (Fig. 1), led to performing contrast-enhanced brain MRI (magnetic resonance imaging) and contrast-enhanced MR venography (MRV) with suspicion of thrombosis. MRI and MR-venography showed filling defects in the superior sagittal sinus, transverse sinuses and left sigmoid sinus. (Fig. 2). Therewith the patient was hospitalized with the final diagnosis of dural sinus thrombosis.

Corresponding Author: Bedriye Feyza Kurt **e-mail:** feyza.karaca@yahoo.com

Received: 10-03-2021 • **Accepted:** 12.04.2021

DOI: 10.33706/jemcr.893939

©Copyright 2020 by Emergency Physicians Association of Turkey - Available online at www.jemcr.com

Low weight heparin treatment was started. On the 5th day of medical treatment his headache completely disappeared and control CT revealed significant decrease of hyperattenuation in the left transverse sinus. Our patient was discharged with an anticoagulant prescription, since no new neurological symptoms were observed. A follow up repeat MRI was performed three weeks after the initial MRI which demonstrated almost complete resolution of the venous thrombosis (Fig. 3).

Discussion

CVST is a rare cause of stroke due to occlusion of dural venous sinuses⁵. The risk of CVST rises up during COVID-19 infection with an increased tendency to thrombosis. A limited number of CVST cases associated with COVID-19 infection have been reported in the literature. Most of these patients are middle-aged male patients with comorbidities^{6,7}. Our patient differs from the others since he is young and has no comorbidities.

The localization of the thrombosed sinus is important in the occurrence of clinical findings. The superior sagittal sinus is the most commonly affected dural venous sinus. However, more extensive multi-site thrombosis is the typical finding as in our case. Headache and papillary edema associated with increased intracranial pressure are prominent in CVST^{8,9}. Our patient also applied with similar complaints.

Prognosis of CVST is good if diagnosed and treated early. The use of anticoagulants in patients with CVST decreases morbidity¹⁰. The prognosis of our patient was very good.

For patients who have severe headache at admission to the ED, the most commonly used examination is brain CT. CT scans are useful to rule out the presence of haemorrhage. CVST is often overlooked on initial CT scans. Attention should be paid to signs of clot such as the dense clot sign and the empty delta sign. Brain MRI is superior to CT in detecting CVST. The presence of increased signal in the dural sinuses on multiplanar T2 Weighted (W), T1W and FLAIR sequences associated with the disappearance of normal flow suggests the diagnosis. Contrast-enhanced CT or MRI examination provides additional contribution to pre-contrast studies by showing filling defects. However, brain MRV is the most valuable non-invasive method to reveal dural sinus pathologies, especially if it is performed with contrast agent, as in our case.

Conclusion

During the COVID-19 pandemic, clinicians focus mostly on respiratory symptoms, but as the cases are examined in detail, it is noteworthy that organ damages resulting from intravascular coagulation are frequently seen. Clinicians should keep in mind the diagnosis of CVST that may occur

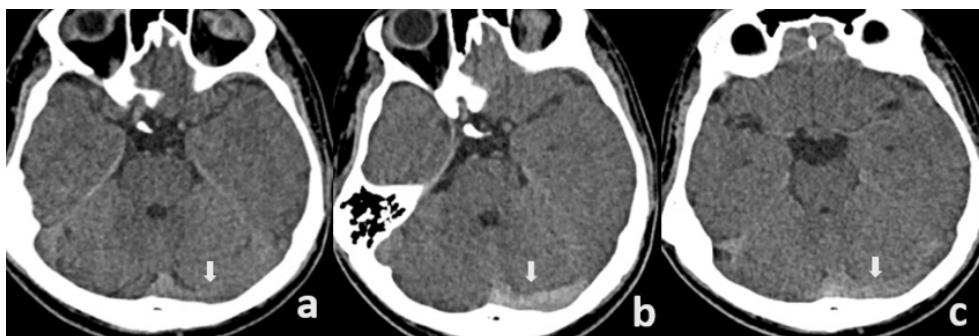


Figure 1: a. Prior non-enhanced CT which was performed 10 days ago shows no attenuation abnormality in the left transverse sinus. b. Non-enhanced CT performed at hospital admission demonstrates hyperdense left transverse sinus (dense clot sign). c. CT imaging -on the fifth day of medical treatment- indicates significant decrease of hyperattenuation in the left transverse sinus.

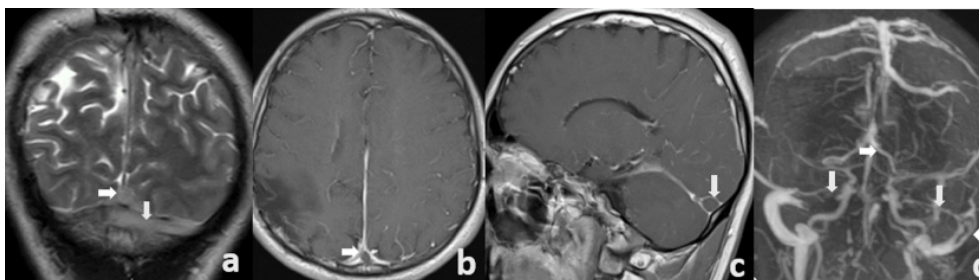


Figure 2: a. Absence of normal flow void in the left transverse sinus and distal superior sagittal sinus on pre-contrast T2 weighted image (coronal plane). b-c. Post-contrast axial and sagittal plane T1 weighted images show filling defects of superior sagittal sinus and left transverse sinus due to thrombosis (empty delta sign). Note the expanded transverse sinus. d. Coronal MIP projection of contrast-enhanced MR Venography demonstrates non-visualization of the left transverse sinus, medial part of the right transverse sinus and superior sagittal sinus. Additionally filling defect was observed in the left sigmoid sinus.

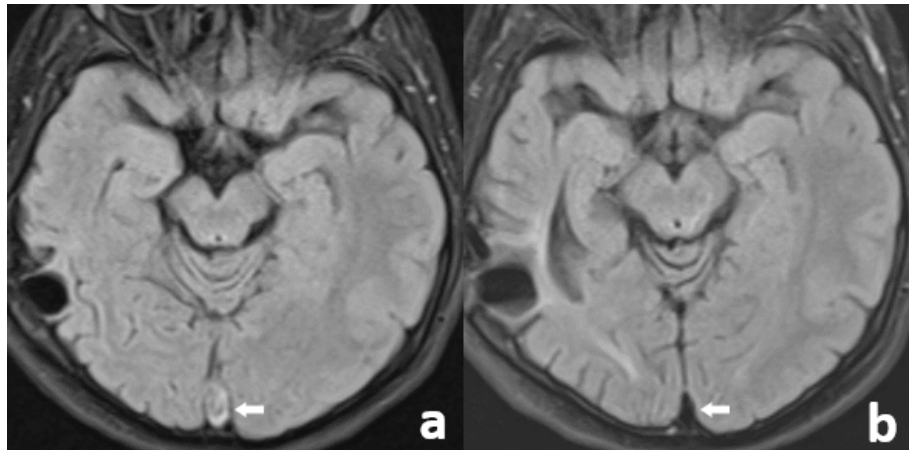


Figure 3: a. Absence of normal flow void in the superior sagittal sinus on FLAIR image. Note the expanded sinus. **b.** Normal flow void in the same localisation on the third week of medical treatment.

due to infection associated thrombosis in COVID-19 patients presenting with neurological symptoms and consider adding anticoagulants to the treatment if necessary.

The case report has written in an anonymous characteristic, thus secret and detailed data about the patient has removed. Editor and reviewers can know and see these detailed data. These data are backed up by editor and by reviewers.

References

1. www.indemic.org/expert-perspectives-thromboembolic-disease-in-covid-19 (accessed 18.12.2020)
2. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020; 395:507–13 CrossRef Medline [https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7)
3. Tang N, Li D, Wang X, et al. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. *J Thromb Haemost* 2020; 18:844–47 CrossRef Medline <https://doi.org/10.1111/jth.14768>
4. Nwajei F, Anand P, Abdalkader M, et al. Cerebral Venous Sinus Thromboses in Patients with SARS-CoV-2 Infection: Three Cases and a Review of the Literature. *J Stroke Cerebrovasc Dis.* 2020;29(12):105412. <https://doi.org/10.1016/j.jstroke-cerebrovasdis.2020.105412>
5. Stam J. Thrombosis of the cerebral veins and sinuses. *New Engl J Med.* 2005;352(17):1791–1798. <https://doi.org/10.1056/NEJMra042354>
6. Silvis, S. M., de Sousa, D. A., Ferro, J. M., & Coutinho, J. M. (2017). Cerebral venous thrombosis. *Nature reviews. Neurology*, 13(9), 555–565. <https://doi.org/10.1038/nrneuro.2017.104>
7. Tu, T. M., Goh, C., Tan, Y. K., Leow, A. S., Pang, Y. Z., Chien, J., Shafi, H., Chan, B. P., Hui, A., Koh, J., Tan, B. Y., Umaphathi, N. T., & Yeo, L. L. (2020). Cerebral Venous Thrombosis in Patients with COVID-19 Infection: a Case Series and Systematic Review. *Journal of stroke and cerebrovascular diseases : the official journal of National Stroke Association*, 29(12), 105379. <https://doi.org/10.1016/j.jstrokecerebrovasdis.2020.105379>
8. Kaya, Dilaver. "Serebral Venöz Sinüs Trombozunda Tanı ve Tedavi." *Turkish Journal of Neurology/Turk Noroloji Dergisi* 23.3 (2017).
9. Cavalcanti, D. D., Raz, E., Shapiro, M., Dehkharghani, S., Yaghi, S., Lillemoe, K., Nossek, E., Torres, J., Jain, R., Riina, H. A., Radmanesh, A., & Nelson, P. K. (2020). Cerebral Venous Thrombosis Associated with COVID-19. *AJNR. American journal of neuroradiology*, 41(8), 1370–1376. <https://doi.org/10.3174/ajnr.A6644>
10. Behrouzi, R., & Punter, M. (2018). Diagnosis and management of cerebral venous thrombosis. *Clinical medicine (London, England)*, 18(1), 75–79. <https://doi.org/10.7861/clinmedicine.18-1-75>