



COVID-19-associated Leukoencephalopathy Involving the Splenium of the Corpus Callosum

Korpus Kallozum Spleniumunu İçeren COVID-19 ile İlişkili Lökensefalopati

● Özlem Kayım Yıldız¹, ● Bülent Yıldız², ● Mürşit Hasbek³, ● Gülsüm Aslı Tatlı¹, ● Murtaza Öz⁴

¹Cumhuriyet University Faculty of Medicine, Department of Neurology, Sivas, Turkey

²Cumhuriyet University Faculty of Medicine, Department of Radiology, Sivas, Turkey

³Cumhuriyet University Faculty of Medicine, Department of Microbiology, Sivas, Turkey

⁴Cumhuriyet University Faculty of Medicine, Department of Infectious Diseases and Clinical Microbiology, Sivas, Turkey

Keywords: Viral infections, MRI, DWI, COVID-19, leukoencephalopathy

Anahtar Kelimeler: Viral enfeksiyonlar, MRG, DWI, COVID-19, lökensefalopati

Dear Editor,

A previously healthy 45-year-old male patient, who had fever and malaise a few days before admission, was admitted to the hospital with complaints of acute onset of confusion and headache. Neurological examination revealed an acute encephalopathy with disorientation, attention deficit, and visuospatial dysfunction. The nasopharyngeal severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) reverse transcription polymerase chain reaction was positive, and the chest computed tomography scan showed areas of ground-glass opacity, suggesting the diagnosis of coronavirus disease-2019 (COVID-19) pneumonia. The oxygen saturation was 95% in room air. The results of the cerebrospinal fluid (CSF) analyses were within normal limits and SARS-CoV-2 was not detected in the CSF samples. The brain magnetic resonance images (MRI) of the patient revealed restricted diffusion in the splenium of the corpus callosum and periventricular white matter (Figure 1). None of the brain MRI findings suggested encephalitis, such as CSF pleocytosis or gadolinium enhancement; thus, no specific treatment was provided based on neurological findings. The treatment included favipiravir and a prophylactic dose of low molecular weight heparin. The patient was fully recovered in the subsequent 4 weeks and a repeated brain MRI obtained on day 28 showed complete resolution (Figure 2).

The patient's brain MRI findings suggested parainfectious leukoencephalopathy (1). The imaging findings, including diffuse

white matter diffusion restriction with sparing of subcortical U-fibers, microhemorrhages, splenium, and edema of the basal ganglia and pons, have been reported in critically ill patients with COVID-19 (1). The edema of the splenium and posterior body of the corpus callosum has also been reported in patients with Middle East Respiratory Syndrome coronavirus encephalitis (2). The cause of the findings has not yet been elucidated; however, the proposed mechanisms include post-hypoxic leukoencephalopathy, viral encephalitis due to viral neuroinvasion, cytokine storm, immune-mediated postviral demyelination, and critical illness-related encephalopathy (1). The patient did not have a clinically significant hypoxemia as found in some patients with leukoencephalopathy reported to date; thus, it was speculated that hypoxemia is not the sole mechanism (1,3). However, the possibility of the patient having silent hypoxemia, which did not require medical attention preceding neuroimaging findings, cannot be excluded.

Ethics

Informed Consent: Informed consent was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Ö.K.Y., G.A.T., M.Ö., Concept: Ö.K.Y., Design: Ö.K.Y., Data Collection or Processing: B.Y., M.H., Analysis or Interpretation: B.Y., M.H., Literature Search: Ö.K.Y., G.A.T., M.Ö., Writing: Ö.K.Y., G.A.T.

Address for Correspondence/Yazışma Adresi: Özlem Kayım Yıldız Prof. MD, Cumhuriyet University Faculty of Medicine, Department of Neurology, Sivas, Turkey Phone: +90 346 258 00 00 E-mail: ozlemkayim@yahoo.com ORCID: orcid.org/0000-0002-0382-9135

Received/Geliş Tarihi: 02.03.2021 **Accepted/Kabul Tarihi:** 23.11.2021

©Copyright 2021 by Turkish Neurological Society
Turkish Journal of Neurology published by Galenos Publishing House.

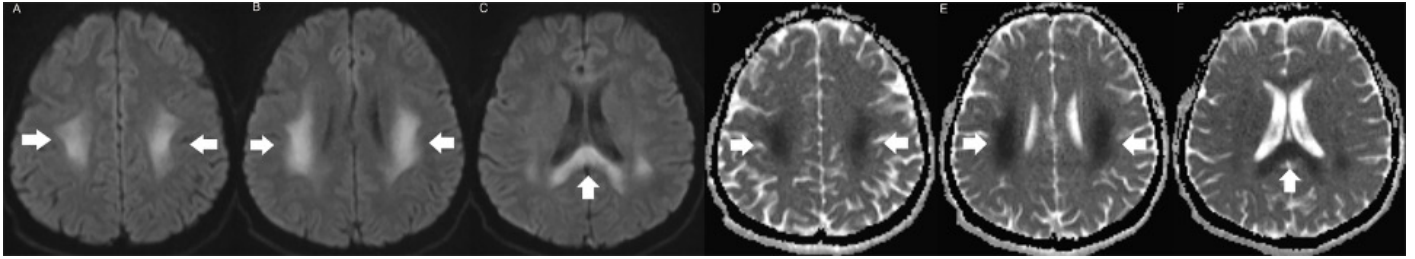


Figure 1. Brain magnetic resonance imaging. Axial (A, B, and C) diffusion-weighted images and (D, E, and F) apparent diffusion coefficient maps show restricted diffusion in the (A, D) centrum semiovale, (B, E) periventricular white matter, and (C, F) the splenium of the corpus callosum and the adjacent white matter

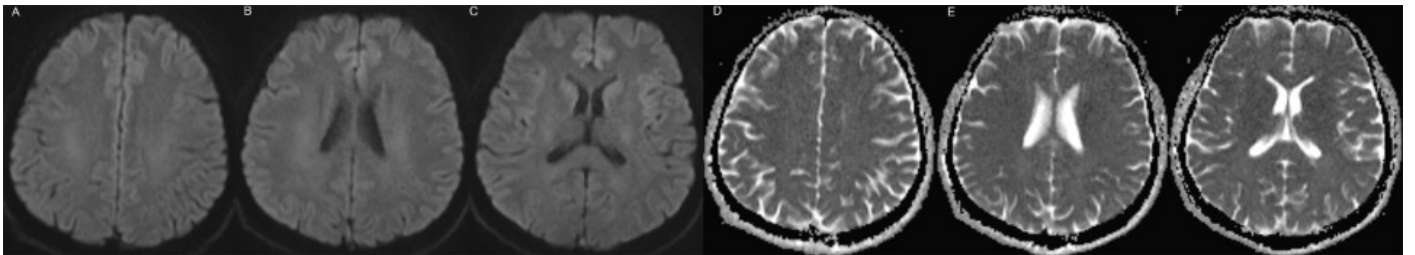


Figure 2. Repeated brain magnetic resonance imaging (day 29). Axial (A, B, and C) diffusion-weighted images and (C, D, and E) apparent diffusion coefficient maps show the complete resolution of the diffusion restriction

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Kihira S, Delman BN, Belani P, et al. Imaging Features of Acute Encephalopathy in Patients with COVID-19: A Case Series. *AJNR Am J Neuroradiol* 2020;41:1804-1808.
2. Arabi YM, Harthi A, Hussein J, et al. Severe neurologic syndrome associated with Middle East respiratory syndrome corona virus (MERS-CoV). *Infection* 2015;43:495-501.
3. Kumar A, Olivera A, Mueller N, Howard J, Lewis A. Delayed SARS-COV-2 leukoencephalopathy without Severe Hypoxia. *J Neurol Sci* 2020;418:117146.