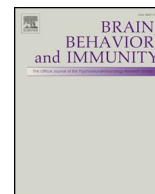




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Letter to the Editor

SARS-CoV-2 Detected in Cerebrospinal Fluid by PCR in a Case of COVID-19 Encephalitis



Dear Editor:

We are writing to provide an update to the article published in *Brain, Behavior, and Immunity* published on April 17, 2020 titled “Meningoencephalitis without Respiratory Failure in a Young Female Patient with COVID-19 Infection in Downtown Los Angeles, Early April 2020” (Duong et al., 2020).

1. Updated clinical course

A 40-year-old woman with type 2 diabetes mellitus and obesity presented with fever and syncope and was admitted for encephalitis. Nasopharyngeal swab on admission was positive for SARS-CoV-2 and negative for influenza A and B viruses. Cerebrospinal fluid (CSF) was negative for both bacterial culture and herpes simplex virus type 1 on polymerase chain reaction (PCR) assay. The initial report of this case could not directly demonstrate SARS-CoV-2 in the patient’s CSF (Duong et al., 2020). We report here that CSF was subsequently found to be positive for SARS-CoV-2 on reverse transcription polymerase chain reaction (Quest Diagnostics, San Juan Capistrano, CA). The patient was started on hydroxychloroquine. Her mental status gradually improved and returned to baseline without neurological deficits by hospital day 12.

2. Discussion

The majority COVID-19 patients present with respiratory symptoms and fever. Although rare, neurologic sequelae of COVID-19 have been reported, including syncope (Tapé et al., 2013), Guillain-Barré syndrome (Toscano et al., 2020), polyneuropathy (Gutiérrez-Ortiz et al., 2020), and stroke (Oxley et al., 2020; Li et al., 2020). We describe a case of SARS-CoV-2 infection that was entirely confined to the central nervous system, with no involvement of other organ systems. Given the

patient’s clinical presentation and positive PCR testing for SARS-CoV-2 in the CSF, we propose that this case is most consistent with SARS-CoV-2 encephalitis. To our knowledge, this presentation of COVID-19 has not yet been reported and is important to consider as an atypical manifestation of the viral infection. Further, we demonstrate that RT-PCR of SARS-CoV-2 in the CSF can be considered as a detection modality for cases of COVID-19 affecting the central nervous system.

References

- Duong, L., Xu, P., Liu, A., 2020. Meningoencephalitis without respiratory failure in a young female patient with COVID-19 infection in Downtown Los Angeles, early April 2020. *Brain Behav. Immun.*
- Gutiérrez-Ortiz, C., Méndez, A., Rodrigo-Rey, S., San Pedro-Murillo, E., Bermejo-Guerrero, L., Gordo-Mañas, R., de Aragón-Gómez, F., Benito-León, J., 2020. Miller Fisher Syndrome and polyneuritis cranialis in COVID-19. *Neurology*.
- Li, Yanan, Wang, Mengdie, Zhou, Yifan, Chang, Jiang, Xian, Ying, Mao, Ling, Hong, Candong, Chen, Shengcai, Wang, Yong, Wang, Hailing, Li, Man, Jin, Huijuan, Bo, Hu, 2020. Acute cerebrovascular disease following COVID-19: a single center, retrospective, observational study. *Lancet* 13.
- Oxley, T.J., Mocco, J., Majidi, S., Kellner, C.P., Shoirah, H., Singh, I.P., De Leacy, R.A., Shigematsu, T., Ladner, T.R., Yaeger, K.A., Skliut, M., Weinberger, J., Dangayach, N.S., Bederson, J.B., Tuhim, S., Fifi, J.T., 2020. Large-vessel stroke as a presenting feature of Covid-19 in the young. *N. Engl. J. Med.* 28.
- Tapé, C., Byrd, K.M., Aung, S., Lonks, J.R., Flanigan, T.P., Rybak, N.R., 2020. COVID-19 in a patient presenting with syncope and a normal chest X-ray. *R I Med J* (2013) 103 (3), 50–51.
- Toscano, G., Palmerini, F., Ravaglia, S., Ruiz, L., Invernizzi, P., Cuzzoni, M.G., Franciotta, D., Baldanti, F., Daturi, R., Postorino, P., Cavallini, A., Micieli, G., 2020. Guillain-Barré syndrome associated with SARS-CoV-2. *N. Engl. J. Med.* 17.

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