**Acute neurologic manifestation associated with leukoencephalopathy caused by COVID-19**

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**Introduction**

Covid-19, infectious disease caused by severe acute respiratory syndrome coronavirus 2, can show several neurologic manifestations associated with direct effect of infection or inflammation of nervous system and blood vessels resulting in dizziness, headache, olfactory dysfunction, gustatory dysfunction, skeletal muscle injury. (1) Among the visual symptoms, visual field defects, visual hallucination and visual agnosia have been reported. (2, 3) To our knowledge, dysmetropsia has been rarely reported until now. Herein, we reported case of dysmetropsia and unilateral horner syndrome associated with leukoencephalopathy after COVID-19 infection.

**Method**

A fifty-eight aged patient was admitted to hospital with respiratory distress due to COVID-19 infection. He had no specific medical history before, and had trouble breathing two months before the visit, and he visited another hospital and was diagnosed with covid-19. After the diagnosis, antibiotics and corticosteroid administration were started, but the hypoxemia persisted, so ecmo was inserted, and photodynamic therapy and lung transplantation were received.

He complains of symptoms of not feeling distance perception and smelling well only when viewed with his right eye from the time he was turned on for lung transplantation. On neurological examination, there was anisocoria in which the right eye was 1mm larger than the left, and there was no visual field defect, but the perspective was not recognized well.

A test was done to find the cause of dysmetropsia. There was no abnormality in eye examination at the ophthalmology and no abnormality in EEG. In the cerebrospinal fluid test, no cells were detected, but the protein was slightly increased to 60. In brain MRI, there was a microbleed that spread throughout the brain, and there was a T2 high signal lesion that was partially enhanced at the left occipital lobe. In MRA, cerebrovascular stenoocclusive lesion was not observed. No specific abnormalities were found in additional tests, such as a 24 hour holter, conducted to identify the embolic sources.

**Discussion**

Complications of the nervous system caused by covid-19 include dizziness, headache, olfactory cognitive impairment, and skeletal muscle damage. And, as causes of perspective perception disorder, migraine, epileptic seizure, central nervous system infection, and delirium are known. Until now, there has been no report of cerebral leukoencephalopathy caused by covid-19 due to a cognitive impairment in perspective, so this case is reported.

In conclusion, when a patient with confirmed or suspected covid-19 infection complains of a cognitive impairment in perspective, it is considered that leukoencephalopathy caused by covid-19 infection should be considered.



Figure 1. Brain MRI (A; diffusion weighted image, B; apparent diffusion coefficient, C; susceptibility weighted image, D; T1 weighted image, E; T2 weighted image, F; fluid attenuated inversion recovery image, G; intracranial time-of-flight image, H; neck time-of-flight image, arrow: T2 high signal intensity with gadolinium enhanced lesion, dotted arrow: diffuse cerebral microbleed lesion)

**Reference**

1. Ellul MA, Benjamin L, Singh B, Lant S, Michael BD, Easton A, et al. Neurological associations of COVID-19. Lancet Neurol. 2020;19(9):767-83.

2. Paterson RW, Brown RL, Benjamin L, Nortley R, Wiethoff S, Bharucha T, et al. The emerging spectrum of COVID-19 neurology: clinical, radiological and laboratory findings. Brain. 2020;143(10):3104-20.

3. Whittaker A, Anson M, Harky A. Neurological Manifestations of COVID-19: A systematic review and current update. Acta Neurol Scand. 2020;142(1):14-22.