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Clinical Notes

Myalgic encephalomyelitis/chronic fatigue syndrome post coronavirus disease 2019

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Coronavirus disease 2019 (COVID-19), an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been the most impactful infectious disease in the 21st century. The SARS-CoV-2 pandemic significantly increased the number of patients and deaths worldwide. Long-course diseases related to COVID-19, which present with persistent reparatory distress or fatigue (so-called long COVID) have been reported in adult and pediatric patients since the latter half of 2020. Long-COVID is observed as a persistent symptom after the acute phase of the disease.[1] Recent research suggested that it can present with myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS).[2] We report a case of long COVID to contribute to the body of knowledge regarding this disease, which has not been well investigated in children.

A 14-year-old boy with well controlled asthma, controlled by a long-acting muscarinic antagonist, long-acting beta-agonist, and corticosteroid inhaler, was admitted to our hospital for severe fatigue and appetite loss. He suffered from COVID-19 diagnosed using reverse transcription polymerase chain reaction 90 days prior to hospitalization. He presented with a low-grade fever, mild cough, dysgeusia, and dysosmia. He was placed under quarantine in a hotel room for 6 days. His low-grade fever and mild cough resolved after 10 days, while the dysgeusia and dysosmia disappeared within a month. He presented with gradually progressive upper limb muscle weakness, severe fatigue, and difficulty concentrating (so-called "brain fog") 20 days before hospitalization (70 days after the onset of COVID-19). He was unable to commute to attend junior high school. Three days before hospitalization, the patient did not eat due to appetite loss. He received oral prednisolone (20 mg/day) and Kanpō medicine (Rikkun-shito and Hotyu-ekkito). However, his symptoms were not relieved, and the patient was hospitalized. At the time of hospitalization, he did not present with fever, dyspnea, or desaturation. Physical examination revealed an upper limb strength of grade 4 on manual muscle testing, but the tendon reflexes or sensory/motor nerve abnormalities were not noted in the extremities. Blood tests revealed normal white blood cell and C-reactive protein levels. Epstein–Barr virus and human immunodeficiency virus antibodies and antinuclear antibodies were not detected. The 10 min standing test revealed an increase of 52 heartbeats after standing at an upright position (from 81 to 133 beats/min). The patient was diagnosed with postural orthostatic tachycardia syndrome (POTS). After the test, the patient complained of worsening fatigue, suggesting post-exertional malaise (PEM), a specific characteristic of ME/CFS. Based on the clinical course and physical examination, the patient was diagnosed with ME/CFS due to long-COVID. Oral prednisolone was discontinued, while the Kanpō medicine was continued. The patient then developed alopecia. Meanwhile, his muscle weakness and fatigue were alleviated by activity restriction due to hospitalization. On the 14th day of admission, he was discharged because his appetite improved, and he was referred to a hospital that specifically tended to chronic fatigue syndrome patients. Neither brain imaging nor electroencephalography were performed throughout the patient's hospitalization.

The National Institute for Health Research in England classified long-COVID into four categories, namely, post-ICU syndrome, long-term organ damage, post-viral syndrome, and an entirely novel syndrome.[3] Myalgic encephalomyelitis/chronic fatigue syndrome is typical of post-viral syndromes in adults, and similar cases have also been reported in children.[4] Females are more likely to suffer from the disease, but males could also be affected. The exacerbation of symptoms upon exertion is known as PEM; avoiding extensive work is the essential aspect of ME/CFS management.[5] In this case, the patient's muscle fatigue and weakness dramatically improved with activity restriction due to hospitalization. This strategy may be useful for treating the severe exacerbation of ME/CFS. Chronic fatigue syndrome is diagnosed based on the persistence of symptoms for more than 6 months.[2] This implies

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that patients have to wait for 6 months to be diagnosed with ME/CFS. Thus, new diagnostic criteria, specifically for ME/CFS due to COVID, are required to allow early intervention. Petracek *et al*. reported that POTS might be an early sign of COVID-induced ME/CFS,[4] POTS is considered to be a viable diagnostic criterion. To prepare for a surge of pediatric ME/CFS, the diagnostic and treatment algorithm for the disease should be standardized, and physicians need to know about or recognize the disease.

Disclosure

The authors declare no conflict of interest.

Informed consent

We obtained informed consent from the patient and his parents.

Author contributions

Y.K. wrote the manuscript. F.T. and M.M. diagnosed this case. F.T., M.M., K.K., and T.M. assisted in the writing of the manuscript and provided specific advice about the report. All authors read and approved the final manuscript.

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