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Acute Disseminated Encephalomyelitis (ADEM) Following COVID-19: Case Report and Review of the Literature

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Abstract **Case Report**

We describe à case of acute disseminated encephalomyelitis occurring after COVID-19 pneumonia in a 25-year woman. She presented with confusional syndrome and heaviness on the left side. Magnetic Resonance Imaging with gadolinium showed asymmetrical and bilateral hyperintense lesions within the deep white matter. The patient's clinical symptoms resolved after corticosteroid therapy. Acute disseminated encephalomyelitis should be considered in patients with COVID-19 who present with altered mentation and neurological deficits.

Keywords: COVID-19, Acute disseminated encephalomyelitis, MRI, Corticosteroids.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first identified in patients presenting with pneumonia in China in December 2019. Although the predominant clinical presentation is a respiratory disease, neurologic manifestations are being recognized increasingly [1, 2]. Acute disseminated encephalomyelitis (ADEM) is an inflammatory demyelinating disease of the CNS, characterized by fulminant multifocal neurologic injury and distinct neuropathologic findings. ADEM is classically thought to be preceded by vaccination or a systemic infection, of which upper respiratory tract infections are most commonly reported [3]. Here we describe a case of ADEM occurring after COVID-19 pneumonia in a 25-year woman.

CASE PRESENTATION

A 25 years old previously healthy woman was admitted to the emergency department of our hospital, 2 weeks after COVID-19 pneumonia. She presented with confusional syndrome and heaviness on the left side. On the first examination in the neurology department where she was transferred, she had a good general condition and was apyretic and conscious but slightly disoriented. The blood pressure was at 120/70 mmHg. Neurological examination found left hemiparesis and pyramidal syndrome. The remaining neurological exam was with no particularity. Otherwise, cardiovascular and respiratory systems examination was within normal limits. Electrolytes, white blood cells, hemoglobin, C-reactive protein, transaminases, and serum creatinine levels were within the normal range, as were TSH, T3, and FT4 levels.

Cerebrospinal Magnetic Resonance Imaging (MRI) with gadolinium showed multiple hyperintense lesions within the subcortical and deep white matter of the periventricular region, bilaterally with a predominance of the left side, and that of the right temporal, right and left occipital regions as well as the splenium of the corpus callosum (Figure 1). The patient was diagnosed with ADEM and received 5 days of intravenous methylprednisolone 1 g followed by a weaning course of prednisolone, starting at 60 mg/day and reducing by 10 mg/week. After one month, the patient's clinical symptoms resolved, and mental status evaluation were also normal.

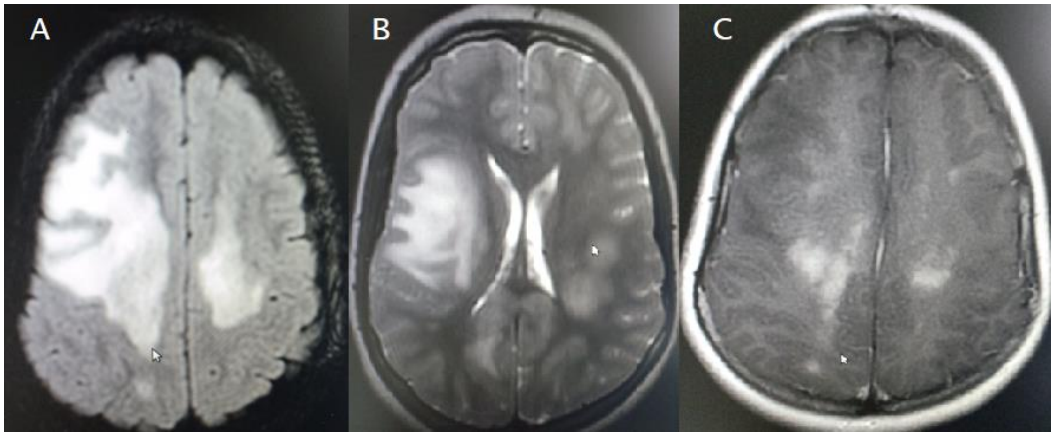

Fig-1: MRI brain demonstrating asymmetrical and bilateral hyperintense lesions within the deep white matter (A) Flair sequence, (B) T2-weighted sequence, (C) T1-weighted sequence.

DISCUSSION

Neurological associations of COVID-19 are being increasingly described during the ongoing pandemic. ADEM is a demyelinating inflammatory condition existing at the severe end of the spectrum of neurological manifestations in COVID-19 [4]. The clinical presentation is heterogeneous. Typically, patients show prodromal symptoms such as fever, headache, malaise, nausea, and vomiting. The acute phase occurs with encephalopathy, characterized by altered behavior including irritability, confusion, and consciousness like lethargy, stupor, or coma associated with multifocal or focal neurological deficits depending on the area involved in the demyelinating process [5, 6]. A history of preceding viral infection is also supportive of the diagnosis [4, 7].

Bilateral and asymmetrical brain lesions on MRI in the supratentorial or infratentorial white matter are the radiological hallmark of this condition, which are hyperintense on T2-weighted and FLAIR sequences. Typically, new clinical and radiological findings do not occur after 3 months of symptom onset [4].

Although corticosteroids can be beneficial in the resolution of symptoms in ADEM patients, prescription of corticosteroids should be done with caution as it can increase the risk of increased viral replication [8]. Regarding clinical outcomes, it is generally favorable in the cases of ADEM. This was the case with our patient [5].

CONCLUSION

Given the significant number of ADEM cases associated with COVID-19 infection, Clinicians treating COVID-19 and neurologists should bear in mind severe neurological complications that might occur after a COVID-19 infection and promptly take action to prevent further potential damages.

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