

CASE STUDY

MENINGO-ENCEPHALITIS IN A MIDDLE-AGED WOMAN HOSPITALIZED FOR COVID-19

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ABSTRACT

The aim: To pay attention of clinicians to possible lesions of the central nervous system (encephalitis) in patients with COVID-19.

Case presentation: A 44-year-old woman was admitted to our clinic because of 2-month-history of mild fever, bilateral lower lobe pneumonia, respiratory failure, generalized weakness, and some neurologic symptoms. SARS-CoV-2 RNA was detected in nasopharyngeal swab. Chest CT demonstrated bilateral pulmonary poly segmental consolidations in the mid and lower zones. Focal hyper intensive abnormalities in various parts of the left hemisphere were found at MR brain imaging in T2WI, and T2 FLAIR mode. Cerebrospinal fluid (CSF) examination showed a white cell count of 31/uL (normal <5/uL), protein 0.73 g/L (0.15-0.45), and glucose 1.4 mmole/L (2.2-3.9). Standard CSF neuroviral PCR panel and PCR for SARS-CoV-2 were negative. She was treated with ganciclovir, and dexamethasone. Due to suspected tuberculosis meningitis (cytosis, decreased level of protein and glucose), she also received *ex juvantibus* a course of anti-TB therapy (isoniazid, kanamycin, and levofloxacin) and made a steady improvement.

Conclusion: This case shows that SARS-CoV-2 in association with other pathogens may cause various lesions of the CNS accompanied by severe neurological manifestations in adults.

KEY WORDS: SARS-CoV-2, COVID-19-associated encephalitis

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INTRODUCTION

For more than a year, a new public health crisis threatens the world through the emergence and spread of novel coronavirus SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2). The epidemic disease caused by SARS-CoV-2 called coronavirus disease-19 (COVID-19). The presence of COVID-19 was manifested by several symptoms, ranging from asymptomatic/mild symptoms to acute respiratory distress syndrome and multi organ dysfunction and death.

The clinical features of COVID-19 are varied, ranging from asymptomatic state to. The common clinical features include loss of smell and/or taste, fever, cough, and shortness of breath. Other reported symptoms are sore throat, headache, weakness, fatigue, myalgia, malaise, and conjunctivitis [1]. Gastrointestinal symptoms observed in a lower percentage of cases include diarrhoea, nausea and vomiting. Li et al. [2] supposed that SARS-CoV-2 could have adverse effect on CNS as viral entry into the brain may partially contribute to the development of respiratory failure in some patients. The observed hyposmia and dysgeusia experienced by many patients with COVID-19 confirm a neurotropism of this virus. [3]. Some studies have reported that COVID-19 may damage CNS [4]. Seizures, stroke, and acute necrotizing hemorrhagic encephalopathy have been reported in patients with severe COVID-19 infection. Observed symptoms include losing the senses of smell, taste or vision, and decreasing alertness. However, the neuroinvasive potential of SARS-CoV-2 remains poorly understood and warrants further investigation.

CASE PRESENTATION AND DISCUSSION

A 44-year-old female-baker presented to the Center of Infectious Disorders of the Nervous System (CIDNS, Kyiv, Ukraine) in February 18 2021, with a few weeks history of confusion, severe weakness, headaches, mild fever, paresthesia in the limbs (more on the right), speech and coordination disorders, dizziness, and nausea. She was completely well until January 02 2021 when did the symptoms of SARS appear. There was no medical, infectious or behavioral prodrome. There were no alcohol or nutritional problems. Fifteen days following onset of COVID-19 symptoms she had been home, then she admitted to the local hospital in January 16 because of SARS-CoV-2 PCR-test was positive in nasopharyngeal swab. The diagnosis of COVID-19 with bilateral lower lobe pneumonia, respiratory failure score I had been made. She was treated two weeks in accordance with the protocol approved by the Ministry of Health of Ukraine however February 05 2021, her condition deteriorated sharply (weakness and numbness in the limbs, headaches and speech impairment appeared). In connection with the appearance of neurological symptoms, neuroprotective and anti-edema therapy was initiated.

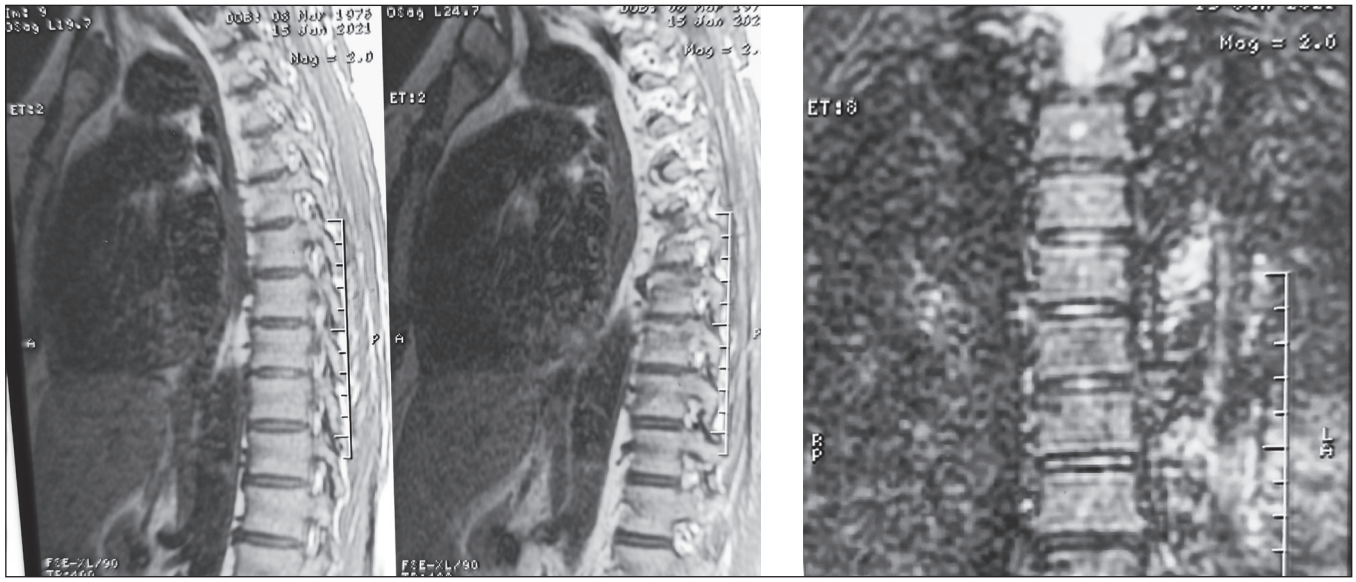

Fig. 1. CT of chest, abdomen, and pelvis. There are signs of bilateral poly segmental pneumonia.

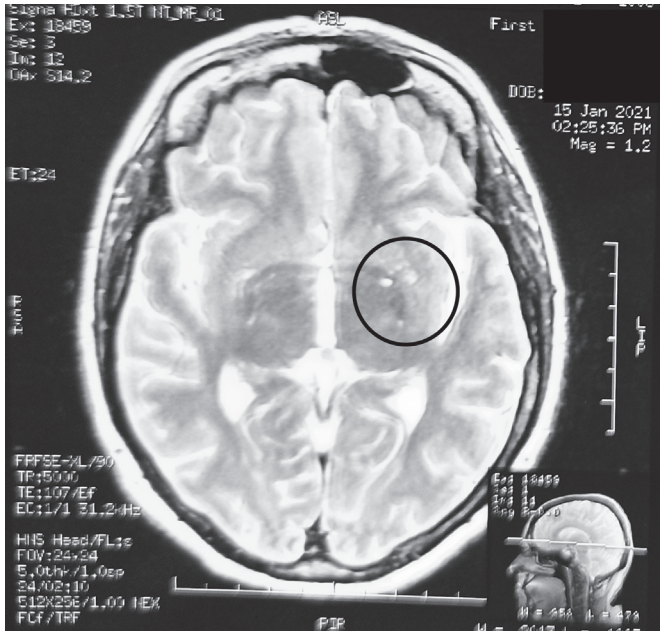

Fig. 2. A single leisure of a left parietal lobe.

Nevertheless, these symptoms gradually improved, so the patient was transferred to CIDNS.

On admission, the patient in conscious, communicative, adequate, speech is difficult by the type of motor aphasia. There is horizontal nystagmus. Reflexes are asymmetric, increased. The muscle strength of the limbs is reduced to three points. She had also experienced of oral Bekhterev' symptom and meningeal signs (neck stiffness, positive symptoms of Kernig, Brudzinsky, Matskevich). Complete blood examination was normal except WBC count (12.7 x 10^9/L). A lumbar puncture was performed just on admission and cerebrospinal fluid (CSF) sample examination showed a white cell count of 31 cell/μl (neutrophils 24%, lymphocytes 75%). The protein and glucose levels were 0.73 g/L and 1.4 mmol/L, respectively. G class antibodies to cytomegalovirus (CMV) were also detected. Bacteriological examinations were negative. Standard CSF neuroviral PCR panel and PCR for SARS-CoV-2 were negative. Three days following admission second puncture was performed and it was found that the number of cells and protein content tend to increase (59/ul, neutrophils 46%, lymphocytes 54%, respectively), and glucose to decrease (1 mmol/L). A CT of chest, abdomen and pelvis showed bilateral multiple small peripheral foci of ground-glass opacification in the lungs, and sub segmental consolidation, suggestive of bilateral atypical pulmonary infection with COVID-19 (Fig.1). SARS-CoV-2 PCR was positive in a nasopharyngeal swab. SARS-CoV-2 IgG was negative. Focal hyper intensive abnormality in the left parietal lobe up to 4 cm in diameter without perifocal infiltration was found at MR brain imaging in T2WI, and T2 FLAIR mode. In the frontal and parietal lobes, subcortical and at the level of the basal nuclei, there are foci of hyperintense MR signal in T2DWI and T2 FLAIR, oval in shape, without signs of perifocal infiltration, up to 2 mm in size, due to the expanded perivascular spaces (Fig.2).

In view of the above (moderate cytosis, antibodies to cytomegalovirus with underlying coronavirus infection), she was commenced on intravenous ganciclovir 1 g per day, and dexamethasone 4 mg per day. Taking into account the level of glucose and protein isoniazid, kanamycin, and levofloxacin have been administrated *ex juvantibus* [5]. Following initiation of therapy there was slow progressive improvement in her neurological symptoms, decreased weakness, headaches and paresthesias in the limbs. 15 days after onset of drug treatment, the number of cells in the CSF sample dropped to 3/ul, protein level decreased to 0.55 g/L, but level of glucose increased to 2.4 mm/L.

CONCLUSIONS

This case expands on emerging literature describing neurological sequelae affecting the central nervous system in

patients with COVID-19. Although the presence of coronavirus infection in this patient seems obvious (clinical, radiological signs, detection of the viral genome leaves no room for doubt), the causes of CNS lesions seem very vague. In fact, the causation of encephalitis and especially meningitis is difficult to prove. There is only indirect evidence of the involvement of certain pathogens. So, the immunological profile (the presence of antibodies to CMV in the CSF) with a high probability implicates herpesvirus infection as a contributing factor [6]. On the other hand, herpesvirus infection is not characterized by high amount of cells and protein in the CSF and low glucose levels. All these are indicators of tuberculosis infection, bacteriological and molecular markers of which have not been found. Therefore, when prescribing treatment, we were guided in many respects by assumptions. This case highlights also a possible role for steroids in patients where a post-COVID-19 complications including encephalitis are suspected. Resolution of respiratory and neurologic symptoms together with repeated negative SARS-CoV-2 PCR and normal blood/CSF lymphocyte count allow us to conclude that the active phase of the infection in the patient is completed and she is on the way to full recovery.

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Conflict of interest:

The Authors declare no conflict of interest.

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