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BRIEF COMMUNICATION

Effortful speech with distortion of prosody following SARS-CoV-2 infection

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Abstract

Coronavirus disease 2019 (COVID-19) infection has the potential for targeting the central nervous system, and several neurological symptoms have been reported in patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). We describe a 48-year-old Caucasian woman with SARS-CoV-2 infection followed by the onset of word finding difficulties, effortful speech along with prosody distortion, in the context of spared semantic and syntactic abilities. The clinical picture, perceived as foreign accent syndrome (FAS), was not associated with structural and functional imaging changes or neurophysiological assessment abnormalities. We suggest that FAS, herein perceived as a regional accent syndrome, should be considered a possible additional neurological manifestation of SARS-CoV-2.

Keywords COVID-19 · SARS-CoV-2 · foreign accent syndrome · language · Neurology

Introduction

The World Health Organization has declared COVID-19 a public health emergency of international concern. Since February 20, 2020, Lombardy, Italy, has experienced a major outbreak of coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), with more than 90,000 cases and 16,000 deaths in the region as of June 15, 2020.

Clinical studies have initially showed that COVID-19 presents with fever and upper respiratory symptoms. However, more recently, a wide spectrum of neurological manifestations has been associated with COVID-19, including encephalitis, cerebrovascular disorders, delirium, and autoimmune neurological disorders [1, 2].

Herein, we report a case characterized by unusual speech disturbances with the onset after COVID-19, perceived as foreign accent syndrome (FAS), thus extending the spectrum of neurological symptoms related to the disease.

Case report

We describe a 48-year-old Caucasian woman with SARS-CoV-2 infection followed by the onset of effortful speech along with prosody distortion.

On January 2020, she presented to the emergency room in Piario, Bergamo, one of the epicenter of SARS-CoV-2 infection in Italy [1], with fever, headache, and evidence of pneumonia at chest computer tomography. She also complained ageusia and anosmia, and the onset of undefined speech disturbances. Her past medical history was unremarkable except for Hashimoto thyroiditis under replacement therapy with levothyroxine. Brain magnetic resonance imaging (MRI) was unremarkable as well as cerebrospinal fluid analysis, excluding central nervous system infection. At that time, nasopharyngeal and oropharyngeal swab for SARS-CoV-2 was

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not performed as COVID-19 pneumonia firstly occurred in Italy in February 2020.

On April 1, 2020, she was admitted to the Neurology Unit, University of Brescia, for persistency of speech disturbances. Nasopharyngeal swab for SARS-CoV-2 at admission resulted negative, but serology for SARS-CoV-2 S1/S2 performed afterwards confirmed previous COVID-19 infection with IgG positivity (22.8 AU/ml cutoff < 3.80).

At neurological examination, patient exhibited word finding difficulties, effortful speech, and a prosodic change perceived as a regional accent, along with dysprosody in the context of spared semantic and syntactic abilities. The audio recordings performed before the onset of symptoms and during hospitalization further confirmed the development of speech patterns different from her native accent (audio materials, file 1—before symptoms onset; and file 2—after symptoms onset). Indeed, the original accent was a northeastern Italian regional accent (town: Bergamo), and after SARS-CoV-2 infection, the patient did not acquire another accent, but lost her native regional accent.

No other neurological signs or symptoms were reported. No psychiatric disturbances were diagnosed. Brain MRI, brain positron emission tomography (PET) with fluorine-18 fluorodeoxyglucose and electroencephalography, resulted unremarkable.

The clinical picture remained unchanged after 2 months from discharge.

Discussion

Speech alteration recorded in our patient partially matched the language difficulties pattern of FAS [3], a rare speech disorder characterized by accent change which perceived by listeners as a foreign accent. In this case, regional accent syndrome is more appropriate. Although many cases have been described, it remains a poorly understood condition. The commonly reported etiologies of FAS include stroke, traumatic brain injury, multiple sclerosis, vasculitis, primary neurodegenerative disorder, brain tumor, herpes simplex encephalitis, or mental disorders [4, 5]. The lesions in FAS patients are typically located in the supratentorial left hemisphere, generally involving the primary motor cortex and premotor cortex, and/or the basal ganglia.

In our case, no structural lesion was detected at imaging, no evidence of central nervous system infection was reported, and no psychiatric disturbances were diagnosed.

Recent neuropathological autopsy series of patients with SARS-CoV-2 reported cerebral hypoxic changes secondary to respiratory distress [6], or vascular and demyelinating lesions of the central nervous system [7], even though there is still a gap in our understanding of the neuropathology, and the likely occurrence of molecular brain changes in the context of no neuroimaging abnormalities.

In our case, the temporal sequence suggests, but does not prove, that SARS-CoV-2 was a causal factor of FAS and cannot address the pathogenetic mechanism leading to speech disorder. Despite this, we suggest that FAS should be considered a possible neurological manifestation of SARS-Co-V-2.

Compliance with ethical standards

Disclosures Maria Sofia Cotelli, Filippo Manelli, Graziella Bonetti, Renata Rao, Alessandro Padovani and Barbara Borroni reported no disclosures relevant to the manuscript.

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Ethical approval The study was approved by the local ethics committees and was conducted in accordance with the Declaration of Helsinki.

Consent to participate The participant was made fully aware of the aims of the research and written informed consent was obtained.

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