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Case report

Acute psychosis associated with recent SARS-CoV-2 infection: A case report

Mohamed Elfil[a], Laura Selby[b,*], Trevor C. Van Schooneveld[b], Nada Fadul[b]

[a] Department of Neurological Sciences, University of Nebraska Medical Center, Omaha, NE 68198, USA
[b] Division of Infectious Diseases, Department of Internal Medicine, University of Nebraska Medical Center, Omaha, NE 68198, USA

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ABSTRACT

The COVID-19 pandemic has created overwhelming circumstances not only in the medical field, but in other walks of life. SARS-CoV-2, the causative virus of COVID-19 [1], primarily affects the respiratory system leading to respiratory illnesses of varying severity ranging from mild flu-like symptoms to acute respiratory distress syndrome [2]. However, the clinical manifestations of COVID-19 are not limited to the respiratory system [3]. There is a growing body of literature showing the incidence of a varying clinical spectrum of neuropsychiatric manifestations in a significant proportion of COVID-19 patients [4]. With the variability in neuropsychiatric presentation of COVID- 19, multiple mechanisms have been proposed to explain the pathophysiology of these presentations [5]. In this case report, we present a 20-year-old female with no significant respiratory symptoms or previous history of psychotic episodes who manifested with acute psychosis as a significant complication of COVID-19.

Introduction

The COVID-19 pandemic has created overwhelming circumstances not only in the medical field, but in other walks of life. SARS-CoV-2, the causative virus of COVID-19 [1], primarily affects the respiratory system leading to respiratory illnesses of varying severity ranging from mild flu-like symptoms to acute respiratory distress syndrome [2]. However, the clinical manifestations of COVID-19 are not limited to the respiratory system [3]. There is a growing body of literature showing the incidence of a varying clinical spectrum of neuropsychiatric manifestations in a significant proportion of COVID-19 patients [4]. With the variability in neuropsychiatric presentation of COVID-19, multiple mechanisms have been proposed to explain the pathophysiology of these presentations [5]. In this case report, we present a 20-year-old female with no significant respiratory symptoms or previous history of psychotic episodes who manifested with acute psychosis as a significant complication of otherwise mild episode of COVID-19 infection.

Case report

A 20-year-old female with a prior history of mild intermittent asthma and atopic dermatitis was admitted to the hospital following rapidly progressing acute psychosis. She had been diagnosed with COVID-19 infection by polymerase chain reaction (PCR) testing one month prior after exposure to a roommate who tested positive after developing respiratory symptoms. Her only symptom at time of diagnosis was fatigue which resolved by hospital presentation. At baseline, the patient was a high functioning college student with no history of mental illness. Approximately 2 weeks after her COVID-19 diagnosis, she developed insomnia and panic attacks, which progressed over a span of two weeks to acute psychosis manifested by anxiety, agitation, forgetfulness, disorganized thoughts, paranoia, flight of ideas, insomnia and visual hallucinations of her recently decreased grandmother. She was initially prescribed quetiapine, but due to progression of psychosis, she was admitted for further diagnostic workup.

Based on the hospital policy regarding admission testing for COVID-19, a nasopharyngeal swab was obtained and tested by PCR, and was noted to be positive. Computed tomography of the head without contrast and magnetic resonance imaging of brain did not demonstrate any abnormalities. Continuous electroencephalogram was normal, and both urine drug screen and blood alcohol test were negative. Acetaminophen, salicylate and heavy metals toxicities were excluded. Cerebrospinal fluid (CSF) protein, glucose and cellular counts were normal. A meningitis/encephalitis panel (Biofire), which included numerous bacterial and viral targets, was negative. Additional workup including serum human immunodeficiency virus (HIV) antigen/antibody and treponema pallidum

* Corresponding author.
E-mail address: laura.selby@unmc.edu (L. Selby).

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antibody was also negative. Routine laboratory tests including complete blood count (CBC), erythrocyte sedimentation rate, C-reactive protein, creatinine kinase, thyroid stimulating hormone, folic acid and vitamin B12 were within normal ranges. CSF encephalopathy panels were completed, and the results did not suggest autoimmune encephalopathy as an underlying cause for this patient's acute psychosis.

After discussion with the microbiology lab, COVID-19 PCR testing was performed on the patient's CSF sample. Though this test is non-FDA approved, multiple reports in the literature showed that the COVID-19 PCR testing on CSF samples has been performed and was positive in some cases [6,7]. Our patient's CSF sample was negative for COVID-19.

The psychiatry team were consulted, and after assessing the patient's past medical history, clinical manifestations and laboratory findings, the patient was diagnosed with hyperactive catatonia. She was started on high-dose lorazepam, with the intention to taper off the dose in the outpatient settings.

Discussion

We describe a young female, with recent COVID-19 infection and no prior psychiatric history, who developed acute psychosis. Despite extensive workup, no etiology of her symptoms was identified. The rapid onset with no prior psychiatric symptoms was considered to be a highly unusual presentation. Therefore, COVID-19-induced psychosis was thought to be the most likely etiology of her symptoms.

A number of studies have reported the incidence of neuropsychiatric complications in COVID-19 patients [5,8]. More specifically, acute psychosis was described as a complication of COVID-19 in a few studies and case reports [8–13]. However, the pathophysiology of how COVID-19 causes non-respiratory illnesses, including neuropsychiatric complications, is not yet well understood.

Other coronaviruses such as SARS-CoV-1, have shown the ability to gain access to the central nervous system (CNS) via retrograde axonal transport from the peripheral nerves, primarily the olfactory nerve [14]. Based on this, there is speculation that SARS-CoV-2 may have a similar neuro-invasive potential [5,15], which could lead to encephalitis and/or neuropsychiatric complications. Another suggested mechanism of the CNS involvement is through increased permeability of the blood-brain barrier due to significant systemic inflammation allowing SARS-CoV-2 infected lymphocytes to cross into the CNS [7]. Overall, despite the uncertainty regarding the mechanism of SARS-CoV-2 neuroinvasion, there are a reports of CSF PCR tests were positive for SARS-CoV-2 [6,7,16].

CNS side effects may be present in COVID-19 infection for other reasons. Systemic corticosteroids such as dexamethasone have shown benefit in severe COVID-19 and these agents have previously been linked to neuropsychiatric manifestations, including psychosis [17]. As this patient was never systemically ill enough to meet criteria for dexamethasone therapy, steroid-induced psychosis was excluded as a potential etiology in her case.

Mast cells hyperactivation has also been suggested as a cause of COVID-19-induced psychosis. COVID-19 has been found to be associated with overstimulation of both peripheral and central mast cells [18], and mast cell activation has been associated with increased risk of psychiatric symptoms and diseases [19], including paranoid psychosis. Furthermore, psychological stress related to the COVID-19 pandemic or being diagnosed with COVID-19 infection has been suggested as another contributing factor to development of psychiatric illness [18]. An extensive medical and psychiatric history from the family of the patient suggested that this was less likely for this patient.

Clearly there is uncertainty about the exact mechanism by which a COVID-19 illness could trigger psychiatric manifestations and mental stress may have been a contributing factor given the equivocal laboratory and imaging results.

Further research is needed to understand the neuropsychiatric manifestations of COVID-19, and the potential pathophysiologies that might lead to such complications. Physicians treating known COVID-19 patients or in settings with high community spread should be alert and maintain a high level of suspicion for neuropsychiatric symptoms as a possible presentation and or a complication of COVID-19 infection.

Author statement

Laura Selby: writing original draft, resources.
Mohamed Elfil: writing original draft.
Trevor C. Van Schooneveld: Supervision, writing, reviewing, and editing.
Nada Fadul: Supervision, writing, reviewing, and editing.

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Ethical approval

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Consent

Consent for publication was obtained from patient's medical decision maker per hospital policy by written consent.

Author contribution

Selby- literature review, writing of manuscript.
Elfil- writing of manuscript, literature review.
Van Schooneveld and Fadul- writing of manuscript.

Declaration of Competing Interest

No conflicts of interest to disclose for any authors.

References

[1] Singhal T. A review of coronavirus disease-2019 (COVID-19). Indian J Pediatr 2020;87(4):281–6.
[2] Liu Y, Yan LM, Wan L, et al. Viral dynamics in mild and severe cases of COVID-19. Lancet Infect Dis 2020;20(6):656–7.
[3] Lai CC, Ko WC, Lee PI, et al. Extra-respiratory manifestations of COVID-19. Int J Antimicrob Agents 2020;56(2)106024.
[4] Wilson BA, Betteridge S, Fish J. Neuropsychological consequences of Covid-19. Neuropsychol Rehabil 2020;30(9):1625–8.
[5] Troyer EA, Kohn JN, Hong S. Are we facing a crashing wave of neuropsychiatric sequelae of COVID-19? Neuropsychiatric symptoms and potential immunologic mechanisms. Brain Behav Immun 2020;87:34–9.
[6] Domingues RB, Mendes-Correa MC, de Moura Leite FBV, et al. First case of SARS-COV-2 sequencing in cerebrospinal fluid of a patient with suspected demyelinating disease. J Neurol 2020;267(11):3154–6.
[7] Huang YH, Jiang D, Huang JT. SARS-CoV-2 detected in cerebrospinal fluid by PCR in a case of COVID-19 encephalitis. Brain Behav Immun 2020;87:149.
[8] Varatharaj A, Thomas N, Ellul MA, et al. Neurological and neuropsychiatric complications of COVID-19 in 153 patients: a UK-wide surveillance study. Lancet Psychiatry 2020;7(10):875–82.
[9] Correa-Palacio AF, Hernandez-Huerta D, Gomez-Arnau J, et al. Affective psychosis after COVID-19 infection in a previously healthy patient: a case report. Psychiatry Res 2020;290:113115.
[10] Ferrando SJ, Klepacz L, Lynch S, et al. COVID-19 psychosis: a potential new neuropsychiatric condition triggered by novel coronavirus infection and the inflammatory response? Psychosomatics 2020;61(5):551–5.
[11] Losee S, Hanson H. COVID-19 delirium with psychosis: a case report. S D Med 2020;73(8):346–9.

[12] Mawhinney JA, Wilcock C, Haboubi H, et al. Neurotropism of SARS-CoV-2: COVID-19 presenting with an acute manic episode. BMJ Case Rep 2020;13(6).
[13] Parra A, Juanes A, Losada CP, et al. Psychotic symptoms in COVID-19 patients. A retrospective descriptive study. Psychiatry Res 2020;291:113254.
[14] Desforges M, Le Coupanec A, Dubeau P, et al. Human coronaviruses and other respiratory viruses: underestimated opportunistic pathogens of the central nervous system? Viruses 2019;12(1).
[15] Li YC, Bai WZ, Hashikawa T. The neuroinvasive potential of SARS-CoV2 may play a role in the respiratory failure of COVID-19 patients. J Med Virol 2020;92 (6):552–5.
[16] Moriguchi T, Harii N, Goto J, et al. A first case of meningitis/encephalitis associated with SARS-Coronavirus-2. Int J Infect Dis 2020;94:55–8.
[17] Dubovsky AN, Arvikar S, Stern TA, et al. The neuropsychiatric complications of glucocorticoid use: steroid psychosis revisited. Psychosomatics 2012;53 (2):103–15.
[18] Kempuraj D, Selvakumar GP, Ahmed ME, et al. COVID-19, mast cells, cytokine storm, psychological stress, and neuroinflammation. Neuroscientist 2020;26 (5-6):402–14.
[19] Afrin LB, Pohlau D, Raithel M, et al. Mast cell activation disease: an underappreciated cause of neurologic and psychiatric symptoms and diseases. Brain Behav Immun 2015;50:314–21.