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Coronavirus Pandemic

Brief psychotic disorder in COVID-19 patient with no history of mental illness

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Abstract

Introduction: COVID-19 pandemic affects mental health globally. Reports showed the increase of mental illness as a response to the COVID-19 pandemic. However, the correlation between the COVID-19 and mental illness is not fully understood yet.
Methodology: We reported a brief psychotic disorder in a COVID-19 patient with no history of mental illness who was hospitalized in Persahabatan Hospital, Jakarta, Indonesia.
Results: Psychotic symptoms appeared five days after COVID-19 onset and laboratory tests showed elevated levels of d-dimer and fibrinogen.
Conclusions: Elevated levels of d-dimer and fibrinogen suggest an ongoing COVID-19-associated coagulopathy that might cause a microdamage in the central nervous system. It might contribute to the manifestation of psychotic symptoms. The correlation between brief psychotic disorder and COVID-19 requires further investigation.

Key words: COVID-19; brief psychotic disorder; acute psychosis; neuropsychiatry.

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Introduction

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been declared as a public health emergency of international concern on 30 January 2020 by the World Health Organization (WHO) [1]. Following the declaration, COVID-19 has been reported to affect mental health in some countries. A study in China, where the outbreak first started, showed that more than half of the respondents experienced a moderate to severe psychological impact following COVID-19 outbreak, including depression and anxiety [2]. Here we report a brief psychotic disorder (BPD) in a COVID-19 patient with no previous history of mental illness.

Case report

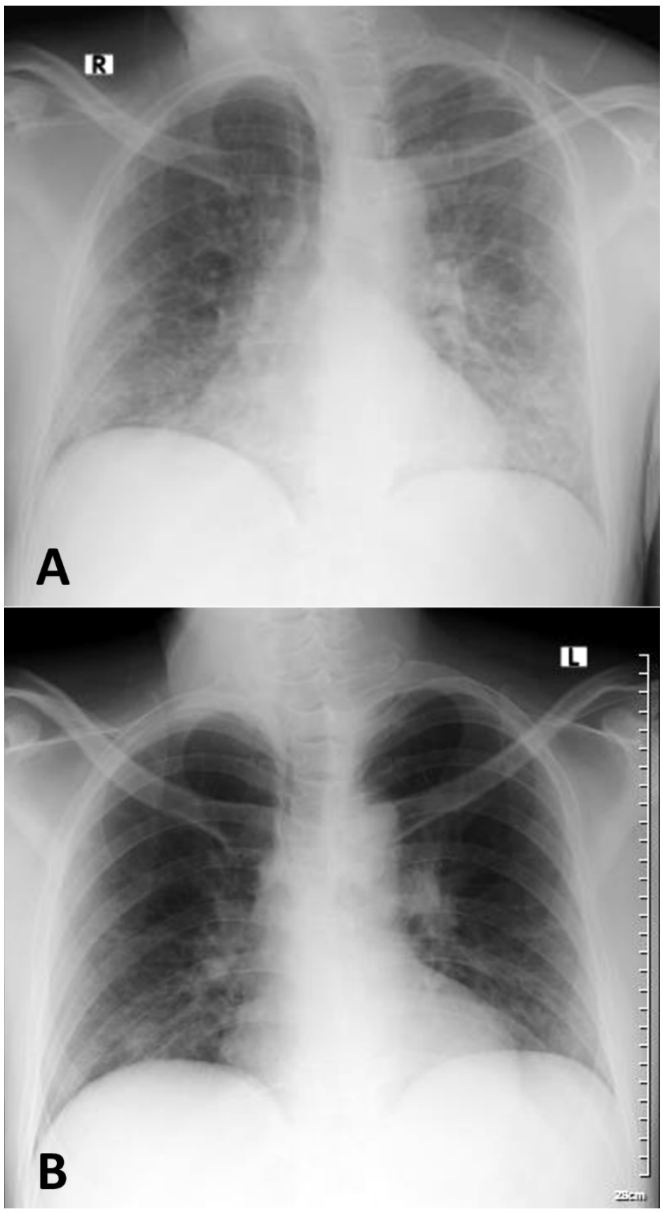
A 48-year-old male patient was referred to Persahabatan Hospital during the COVID-19 pandemic on 1 June 2020. His chief complaint was breathlessness accompanied by a dry cough, which had begun since five days before admission. Ten days before admission, he had a fever with nausea, vomitus, and diarrhea. When the first symptoms appeared, he went to another hospital and was suspected of COVID-19. He then went to another hospital for a second opinion, in which he had been admitted for five days before referred to our hospital. During his previous admission, chest X-ray examination, brain CT scan, blood test, and nasopharyngeal swab test using reverse transcription-polymerase chain reaction (RT-PCR) were performed. The brain CT scan showed no abnormality. However, based on the swab test, he was confirmed as having COVID-19 and then referred to Persahabatan Hospital, a national referral hospital for COVID-19.

Since he had been suspected of having a COVID-19 infection, the patient grew anxious and restless and also experiencing cold sweat and tremors. These symptoms were then followed by visual and auditory hallucinations. When the patient was confirmed COVID-19 infection, he became depressed, quieter, and disturbed while sleeping. The patient did not have any history of diabetes mellitus, hypertension, cardiovascular diseases, chronic lung disease, nor other comorbidities. Any previous history of mental illness or disruption of daily activity was also absent. The patient

worked as a manager in a parking service company. The patient did not consume alcohol, ilicit drugs, or smoke. The patient was a religious person who prayed routinely.

Physical examination upon admission showed a blood pressure of 130/90 mmHg, a heart rate of 99 beats per minute, a respiratory rate 18 breaths per minute, a body temperature of 36.9 ºC, and a peripheral oxygen saturation (SpO2) of 100% on room air. No abnormalities were found on general physical examination. Initial routine laboratory test revealed elevated levels of D-dimer, fibrinogen, C-reactive protein (CRP), ferritin and liver enzyme, and lymphopenia. Blood glass analysis and blood electrolyte results were within the normal range. The human immunodeficiency virus (HIV) test was proven to be non-reactive. The results of laboratory examination on admission were as follows: low hemoglobin (12.8 g/dL), leukocyte (7×10^3/µL), low lymphocyte (17%), neutrophil (73.3%), thrombocyte (406×10^3/µL), aspartate aminotransferase (AST) (56 U/L), alanine aminotransferase (ALT) (106 U/L), serum creatinine (0.6 mg/dL), serum urea (18 mg/dL), blood sugar level (91 mg/dL), sodium (134 mEq/L), potassium (3.9 mEq/L), high CRP (30.2 mg/L), high ferritin (1365.3 ng/mL), activated partial thromboplastin time (APTT) (22.4 sec), prothrombin time (PT) (10.4 sec), high D-dimer (2360 µg/L), and high fibrinogen (408.2 mg/dL). Blood gas analysis result on admission was as follows: pH (7.459), partial pressure of carbon dioxide (pCO_2) (29.2 mmHg), partial pressure of oxygen (pO_2) (97.3 mmHg), bicarbonate (HCO_3) (20.9 mmol/L), base excess (-3.2), and O_2 saturation (98.4%). Chest x-ray taken at the time of the admission showed multifocal bilateral ground-glass opacity, which dominated the periphery of the lung. A chest x-ray taken on June 10 showed improved bilateral ground-glass opacity (Figure 1). Nonetheless, RT-PCR nasopharyngeal swab tests were still positive for SARS-CoV-2 on day two, day three, and day eight.

Figure 1. Chest X-ray. (A) Day 1 of admission (June 1st, 2020) (B) Day 10 of admission (June 10th, 2020).



The patient was treated with oseltamivir, hydroxychloroquine, azithromycin, vitamin C, vitamin D, vitamin Bs, zinc, and enoxaparin. After showing persistently high blood pressure, the patient was also given amlodipine. As for the psychosis, haloperidol was given on the first and second day of admission or as needed, along with risperidone and lorazepam. The patient was admitted to the isolation room with negative pressure together with another COVID-19 patient.

On day one of admission, the patient grew anxious and shut himself in the toilet because he was afraid that he might get infected from the other patient who was in the same room as him. Therefore, the other patient was then transferred to another room on the next day. On day three of admission, the patient refused to take any medication nor examinations and appeared to be aggressive. On the next day, the patient finally agreed to take medications. However, when a medical staff came into his room, the patient quickly rushed to close the door, feared that the room would be contaminated by the presence of the staff. On day five of admission, the patient agreed upon undergoing a follow-up chest x-ray examination. On day six of admission, the patient was starting to be calmer and pray again. On the next day, the patient appeared even calmer even though the psychotic symptoms were still present. The psychotic

symptoms disappeared completely starting from day 13 of admission. The nasopharyngeal swab test result was negative on day 11 and day 15 of admission. The patient was discharged on day 16.

Discussion

In this case report, we present the direct effect of COVID-19 on mental health. Our finding is consistent with a previous report stated that COVID-19 might cause psychotic disorder in patients with no previous history of mental illnesses. In Spain, new-onset psychoses were found in some COVID-19 patients bearing no previous history of mental illnesses [3]. It was reported that some of these patients initially presented with acute delirium before being confirmed as COVID-19 cases. This finding is different from our patient, in which there was no prior history of a loss of consciousness nor delirium. Another case also described an affective psychosis following COVID-19 infection in a previously healthy patient [4]. However, the patient had a history of cocaine use, even though the urine test result showed nothing significant. On the other hand, our patient did not have any history of alcohol consumption nor drug use.

The authors hypothesized that the pathophysiological of BPD in COVID-19 might be either due to primary psychosis or secondary psychosis. Being diagnosed as having COVID-19 infection could be a substantial stressor that triggered the appearance of primary psychosis, even in patients with no history of mental illnesses. A brief psychotic disorder could be explained as a reaction to the stressor that can emerge as long as the stressor is still ongoing, although temporary. Although acute psychotic can disappear without the help of medication, cases with persistent exposure to the stressor might require pharmacological intervention to control the symptoms [5]. The frequent news coverage of COVID-19 that might create fear and stigma to the disease and the people contracting it could be one of the factors that made COVID-19 as a stressor for BPD.

SARS-CoV-2 can infect the central nervous system (CNS) through its binding with angiotensin-converting enzyme 2 (ACE2) on the brain, which could also be found in other human organs [6]. The RNA of SARS-CoV-2 has been isolated from the central nervous system of a patient [7]. The infected CNS could be directly or indirectly causing a secondary psychosis. Another mechanism that leads to CNS damage might be correlated with COVID-19-associated coagulopathy, which was indicated by the increase of D-dimer levels [8]. A case series of stroke manifesting in a COVID-19 patient also showed the same elevated D-dimer levels, accompanied by an increase in liver enzyme [9]. Even though our patient did not experience any neurological deficits since the first day of symptoms onset and during hospital admission, along with the absence of abnormality on the brain CT scan, we suggested that the CNS microvascular damage might be occurred and contributed to the psychotic break. This might cause an organic mental disorder. The hypercoagulable state is also associated with schizophrenia [10]. However, our patient did not have any history of mental illnesses nor any problem in daily activity, as coagulopathy in schizophrenia is associated with a sedentary lifestyle.

Another possible explanation is that the brief psychotic disorder was also one of the side effects of hydroxychloroquine [11]. Nonetheless, since the symptoms had manifested before hydroxychloroquine was ever given, it is unlikely that the BPD was merely caused by hydroxychloroquine. However, it should be noted that hydroxychloroquine might prolong the psychosis symptoms. Still, the effect of hydroxychloroquine on psychosis in COVID-19 patients remains unclear at this moment.

Conclusions

COVID-19 affects not only physical health but also mental health. It is unknown whether the psychotic symptoms presented in our patient were caused by the stressor of having the infection, or rather the COVID-19 itself. Furthermore, neuropsychiatry study is even more challenging during the COVID-19 pandemic. Therefore, the association between BPD and COVID-19 still requires further investigation.

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