

New-onset psychosis due to COVID-19

Nana Kozato,¹ Monisha Mishra,² Mudasir Firdosi ^{2,3}

¹South West London and St George's Mental Health NHS Trust, Roehampton, UK
²South West London and St George's Mental Health NHS Trust, London, UK
³St George's University of London, London, UK

Correspondence to
 Dr Mudasir Firdosi;
 mudasirfirdosi@gmail.com

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SUMMARY

This is a case report of a middle-aged man with no psychiatric history who presented with severe anxiety and psychotic symptoms from COVID-19. Following his discharge from intensive care unit, he was unable to sleep, was increasingly agitated and was observed hitting his head off the walls, causing haematomas. He remained highly anxious and developed paranoid delusions and auditory and tactile hallucinations, needing admission to a psychiatric ward. Treatment with antipsychotic medication gradually improved his symptoms in a few weeks. This case report highlights the new onset of psychosis due to COVID-19 infection. It demonstrates the importance of early identification and treatment of neuropsychiatric complications within an acute hospital setting. Furthermore, there is a need for research in this area to help in the prevention and treatment of such psychiatric complications due to COVID-19.

BACKGROUND

The COVID-19 outbreak was first reported in Wuhan, China in 2019.¹ As of February 2021, it has globally affected more than 100 million people.² The number of cases in the UK alone has reached nearly 4 million.²

The effects of COVID-19 on the mental health of the general population are well documented. Some effects include increased prevalence of anxiety, depression, insomnia and other distress symptoms.³ Various neuropsychiatric complications and presentations have also been noted in patients suffering from COVID-19 infection.⁴ Additionally, there are reports of sudden onset of psychosis in patients with no psychiatric history following COVID-19.^{5–8} The aetiology of such severe psychiatric presentation is still unknown.

Severe inflammatory response produced by COVID-19 infection could be a mechanism for developing psychiatric symptoms.⁵ Troyer *et al*⁹ suggest immune reactions such as direct viral invasion, cytokine network dysregulation and peripheral immune cell migration could be potential causes of neuropsychiatric sequelae.

We present a case of a 50-year-old man with no psychiatric or family history who developed a psychotic episode due to COVID-19 infection, requiring treatment on an inpatient psychiatric unit.

CASE PRESENTATION

An East European man in his fifties was diagnosed and admitted to the hospital with COVID-19 infection in mid-November 2020.

He had a medical history of type 2 diabetes mellitus, non-alcoholic fatty liver disease and

hypertension. He was a past smoker and had no history of alcohol or drug misuse. His preadmission medications included atorvastatin, enalapril, gliclazide, metformin, lansoprazole and linagliptin. Before contracting the infection, he was living with his family and working full time as a driver for the family business. He has previously worked as a paramedic and firefighter.

His oxygen saturation on admission was 87%. His chest X-ray showed bilateral patchy consolidations. He was admitted to the intensive care unit (ICU) 3 days later, where he was started on ventilatory support using continuous positive airway pressure. He was initiated on remdesivir and dexamethasone as part of the Randomised Evaluation of Covid-19 Therapy (RECOVERY trial), with tocilizumab added a day later.¹⁰ Antibiotic cover of amoxicillin and clarithromycin was started and escalated to Tazocin.

He stayed in the ICU for 8 days and was moved to a general ward. Despite this extensive intervention, he remained breathless and required 2–3 L of oxygen to maintain oxygen saturation above 92%. High-resolution CT (HRCT) scan of his chest showed fibrosis and organising pneumonia. After discussion with respiratory specialists, he was started on a 3-day course of intravenous methylprednisolone. This was weaned down to 20 mg of oral prednisolone. He was finally discharged from the hospital with a reducing regimen of steroid, respiratory outpatient follow-up including repeat HRCT and community diabetes team follow-up.

Since his discharge home, he had struggled to sleep, had multiple panic attacks, started hearing voices and experienced tactile hallucination of something crawling on him. When the voices became overwhelming, he became agitated and started pacing around. He was found biting his fingers and slapping his face. He had lost interest in all activities.

The patient consulted his general practitioner, who started him on sertraline. Despite this, his symptoms continued to progress and worsen and subsequently he presented to accident and emergency department (A&E). Liaison psychiatry assessment reported that he presented agitated, unable to sit down, distressed and was hearing voices. The voices were described as all-male and speaking in a language foreign to him. Collateral history found that he had been responding to unseen stimuli and was having both auditory and visual hallucinations.

He was discharged from A&E under the care of the home treatment team and was started on oral risperidone 2 mg and benzodiazepines. His sertraline was stopped.

Despite this, his symptoms continued to worsen with increased levels of agitation. He started



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self-harming by hitting his head against the walls and he was lashing out without directing to anyone. By this time, he was floridly psychotic and appeared to be responding to unknown stimuli.

He was again brought to A&E, where he continued to be agitated and banging his head. On liaison psychiatric assessment, he was advised to start treatment on a psychiatric ward and was admitted informally.

Psychiatric ward admission assessment stated he was still restless, distressed and difficult to establish rapport with. Communication was difficult despite the help from an interpreter of his native language. He was responding to external stimuli and was unable to demonstrate insight into his current mental state, believing that he was there for COVID-19 infection. However, his symptoms were less severe at this point compared with when he was seen in A&E. There was some improvement in his mental state likely due to the initiation of antipsychotic treatment before admission.

In the next few days, he denied experiencing any auditory, visual and tactile hallucinations, but remained anxious. Within a few days, he was sleeping better and there was little evidence of any depressive symptoms.

A week into the admission, he had a panic attack at night. He was seen hitting his head against the wall and shouting. The dose of risperidone was increased to 4 mg. He gradually became less anxious and was feeling safe around people. Within 2 weeks, most of his psychotic symptoms had improved.

Three weeks after admission, he presented calm with little evidence of any psychotic symptoms. He continued to have some anxiety about relapsing when discharged from the hospital. He had developed some understanding of his presentation but was not able to remember most of his psychotic symptoms.

He was discharged home under the care of early intervention services (EIS) and was continued on risperidone at 4 mg. The benzodiazepines were discontinued.

INVESTIGATIONS

On admission to the psychiatric ward, his vital signs were as follows: oxygen saturation 97%, heart rate 94 per minute, blood pressure 125/89 mm Hg and respiratory rate 20 breaths per minute. SARS-CoV-2 RNA on admission from nasopharyngeal swab was still positive. Blood test showed normal renal function, normal electrolyte, normal C-reactive protein (CRP), normal white cell count and slightly elevated alanine transaminase at 68 U/L. Capillary blood glucose was 8.5 mmol/L. Urine dip was normal.

Physical examination and MRI of the brain did not show any abnormalities.

DIFFERENTIAL DIAGNOSIS

Given a new presentation and short history of psychotic symptoms after the COVID-19 infection, his diagnosis is consistent with acute and transient psychotic disorder in the International Statistical Classification of Diseases and Related Health Problems (ICD)-10. This diagnosis is described as 'a heterogeneous group of disorders characterized by the acute onset of psychotic symptoms such as delusions, hallucinations, and perceptual disturbances, and by the severe disruption of ordinary behaviour' that develops within 2 weeks and recovers in a few months.¹¹

Brief psychotic disorder with stressor in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-5 is another diagnosis that fits the patient's presentation.¹² This is defined as a brief and sudden onset of a psychotic episode lasting less than a

month, preceded by an acute stressor. DSM-5 specifies that the symptoms are not associated with medical or psychiatric comorbidities or substance misuse and should resolve within a month.

TREATMENT

On admission to the psychiatric hospital, he continued on risperidone 2 mg, which was gradually increased to 4 mg in a week. Regular benzodiazepines were prescribed to help with anxiety symptoms. Sertraline was discontinued due to limited evidence of low mood.

The mainstay of treatment remained antipsychotic medications. In addition to this, he was offered psychological support from the nursing staff to allay his anxiety. He attended some psychological sessions with the psychotherapist.

He continued to take his physical health medications and was monitored regularly for any physical health symptoms, including blood sugar.

Follow-up treatment was organised with EIS to monitor his mental health and medication after discharge from the ward.

OUTCOME AND FOLLOW-UP

EIS follow-up monitored his mental state and provided ongoing support. His daughter reported he had trouble sleeping on one occasion, but there were no concerns for his behaviour. He had reported the urge to scratch himself occasionally, but did not act on it. There were no tactile hallucinations and he was coping well at home. The patient continued to take his antipsychotic medication.

DISCUSSION

There are other reports of patients presenting with a new onset of psychotic symptoms after contracting COVID-19.⁴⁻⁸

A recent large-scale analysis of neurological sequelae in patients with COVID-19 infections found that there was an increased incidence of psychotic, mood and anxiety disorder. Additionally, neurological complications have been reported when compared with influenza and other respiratory tract infections 6 months after contracting COVID-19.⁴ In this study, the hazard ratio (HR) for the psychotic disorder was greater in patients with hospitalisation compared with those without. This suggests that the more severe the infection, the higher the risk of neuropsychiatric symptoms.

The patient in this case report had significant respiratory symptoms prior to developing psychotic symptoms: paranoid thoughts with auditory and tactile hallucinations.

Ferrando *et al*⁵ reported three cases of psychotic symptoms in patients who had COVID-19 without any significant respiratory symptoms. In one of the cases, it was unclear if the psychotic symptoms were COVID-19-related as the patient had a known history of panic disorder. Another patient had a history of opioid addiction and was on maintenance methadone. Comparing this, our patient had no history of psychiatric conditions or drug misuse.

Smith *et al*⁶ reported a skilled employed woman who presented with persecutory delusions and disturbed sleep, but no hallucinations. Furthermore, she only had mild respiratory symptoms. In comparison, our patient had severe respiratory symptoms and predominant hallucinations in auditory and tactile modalities.

Rentero *et al*⁷ reported several patients with psychosis and COVID-19 infection, but the details of individual symptoms and treatments are not described. Parra *et al*⁸ reported 10 patients presenting with psychotic symptoms characterised by structured delusions mixed with confusion. Moreover, these patients had

no known psychiatric history. They displayed symptoms of infection such as fever, cough and dyspnoea.

The pathophysiology of psychotic disorder after COVID-19 is not clear. Secondary psychosis following infection with HIV, *Toxoplasma gondii* or syphilis is a well-documented phenomenon.¹³ In predominantly respiratory infections including influenza and severe acute respiratory syndrome, the first presentation of psychosis has been identified.^{14 15}

A study on psychosis and coronavirus has found an increased prevalence of IgG antibodies against three viral strains in patients with psychotic presentation compared with patients without

psychosis.¹⁶ This suggests a potential link between coronavirus infections and psychosis. This may also be true in COVID-19.

The hyperinflammatory response has been suggested as the mechanism for the neurological manifestation of COVID-19. A different mechanism for the inflammatory response has been suggested, such as cytokine dysregulation, molecular mimicry post-COVID-19 infection and peripheral immune cell migration.¹⁷

Psychosis after corticosteroids is a well-documented phenomenon, typically within 1–2 weeks of initiation of treatment.¹⁸ This does not fit with our patient, who developed symptoms out of this timeframe. That being said, it is difficult to deny the contributory effects of steroids to the presentation. To date, there is no major evidence to suggest neuropsychiatric side effects with remdesivir.¹⁹

Admission and treatment in ICU can cause significant distress to patients due to the noisy and disorientating environment. In addition, it can contribute to mood and sleep disturbance, which is evident in our case. It has been reported that about one-third of ICU survivors experience anxiety and depression for a prolonged period after their recovery.²⁰ Psychological interventions such as ICU diaries and cognitive therapy may support better mental healthcare in both ICU inpatients and survivors.²¹

Transient psychosis after COVID-19 infection is a new and emerging diagnosis with no consensus on management strategy. The case highlights the need for clinicians to be vigilant of not just the general mental well-being but also the subtle and florid psychotic symptoms. Further studies are needed to investigate the neuropsychiatric aetiology of post-COVID-19 psychosis and the optimum treatment for this group of patients.

Given the number of case reports with a similar presentation, more investigations into the aetiopathology and management of this new disease are required.

Twitter Monisha Mishra @DrMonishaMishra and Mudasir Firdosi @drmfirdosi

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ORCID iD

Mudasir Firdosi <http://orcid.org/0000-0002-8450-6484>

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Patient's perspective

Everything started one day when I woke up and I felt unwell. I went straight for a COVID test. The following morning my wife woke up with the same symptoms. Her test came back positive, and I was sure mine was going to be as well. Within next 4 days I was getting worse and worse to the point I couldn't go out of bed. My muscles were hurting, I was feeling dizzy every time I tried to get up. I had no appetite and I just wanted to sleep. My breathing was also affected. My daughter called an ambulance and I think this has saved my life; I was taken to hospital COVID test was confirmed positive. I deteriorated and I was transferred to ITU. I was on maximum level of oxygen with a CPAP hood. After few days on the CPAP hood, I started having panic attacks and the nurses were giving me diamorphine so I can tolerate the hood, because it was keeping me away from the ventilator. I stayed in ITU for two weeks before the doctors were able to take me off the maximum oxygen and transfer me to a normal ward. When I was transferred to the ward, I started having problems sleeping. The nurses were giving me sleeping pills, which were helping for a short period of time. There I started having the attacks again, but everybody was focused on treating the COVID and the hospital staff were taking it to the fact that I have been staying a long time in hospital.

When I was discharged, I barely remember what happened with me to the point when I was home and had to be admitted to a psychiatric hospital. I remember going to the A&E with my daughter and seeing the Crisis Team, but nothing more. It feels like it was a delirium. I don't remember much what was happening to me apart from feeling unsafe and hearing voices at the start. Following the treatment on psychiatric ward, I felt much better and relaxed and was no longer experiencing anything unusual. This illness has turned my life 360 degrees. It feels like I need to learn how to live again. I do not wish it to anybody.

Learning points

- ▶ COVID-19 can cause neuropsychiatric complications including psychosis.
- ▶ Psychosis can be a late presentation following COVID-19 infection.
- ▶ Other organic causes should also be considered for psychosis post-COVID-19.
- ▶ Patients with new-onset psychosis should be tested for COVID-19 infection.
- ▶ There should be a greater liaison between intensive care unit and psychiatry to diagnose and start treatment early for neuropsychiatric complications.

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