

**Case Report**

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# Neuroleptic Malignant Syndrome in A Patient with Symptoms of Corona Virus 2019: A Case Report



**Faiza Izhar Hussain<sup>1\*</sup>, Dumindu Witharana<sup>2</sup> and Christina Tang<sup>3</sup>**

<sup>1</sup>Speciality Doctor in Forensic Psychiatry at Cygnet Hospital, United Kingdom

<sup>2</sup>Consultant Forensic Psychiatrist working at Cygnet Hospital, United Kingdom

<sup>3</sup>Consultant Forensic Psychiatrist working at Farm field Hospital, United Kingdom

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**\*Corresponding author:** Faiza Izhar Hussain, Speciality Doctor in Forensic Psychiatry at Cygnet Hospital, United Kingdom

## Abstract

We are reporting a case of Corona Virus 2019 (Covid 19) with confirmed diagnosis of Neuroleptic Malignant Syndrome ("NMS") to focus attention on NMS when considering Covid 19 management, specially in patients known to have risk factors for NMS. The patient was recovering from Covid 19 symptoms in the medium secure unit where he was detained. He has subsequently developed dehydration NMS due to reduced oral intake of food and fluids. This case report is intended to highlight the risk of developing NMS when a patient is suffering from Covid 19 and is taking antipsychotic medication. Patient's consent was obtained for the article and his views are presented at the end.

**Keywords:** Covid 19; Neuroleptic Malignant Syndrome; NMS

## Introduction

Covid 19 has been found to have a wide variety of psychological and neurological manifestations [1]. Neurological symptoms most commonly seen in patients suffering from the illness are headaches and a loss of taste and smell. These mild symptoms, although affect a larger population, will resolve in a few weeks. Some complications which may be fatal in patients with Hypoxic Respiratory Failure are delirium, seizures and meningoencephalitis [2]. Although there isn't enough evidence linking acute infectious stage of Covid 19 and NMS, there have been a few cases reported with patients suffering from Covid 19 progressing to develop NMS [1].

NMS is thought to be caused by neuroleptic medication which block dopamine receptors (specifically D2 receptors). Other risk factors for NMS are dehydration, fatigue, heat exposure, hyponatremia, iron deficiency, malnutrition, trauma, thyrotoxicosis, alcohol, consumption of psychoactive substances and the presence of a structural or functional brain disorder such as encephalitis, tumour, delirium, or dementia [3]. Some of these risk factors are symptoms or complications of Covid 19 such as dehydration, fatigue and delirium. This may explain the relationship between a Covid 19 infection and NMS.

It is being considered that in-patients suffering from a Covid 19 infection, SARS COV 2 virus uses Ace 2 receptors in the nervous system to cause neurological symptoms [1]. Autopsies of patients who died due to Covid 19 have reported neuronal degeneration [4]. The full impact of Covid 19 on neurobiology of an individual is yet to be established, however it is known that Covid 19 causes dehydration [5] and dehydration is a known risk factor for NMS.

## Case Report

A 24 year old male with a diagnosis of Paranoid Schizophrenia, developed Covid 19 symptoms - mainly cough and vomiting - on 30th March 2020 while detained in a medium secure forensic unit. He developed fever 1 day after the symptoms started. On 2nd April 2020, he was commenced on a course of antibiotics for productive cough with which his compliance was fluctuating. He complied with the Covid PCR test on 7th April 2020 which was negative. On 12th April 2020, he reported feeling unwell and signs of mild dehydration were noted by the observing staff who continued to encourage him to have adequate oral intake. He reported feeling stiff and weak. Mild tremors, stiffness and hyper salivation with reduced levels of consciousness were noted.

He was sent to A&E on the morning of 17th April 2020 where he was given a bolus of IV fluid which improved his presentation. The medical team concluded that his symptoms did support a diagnosis of Covid 19 and that his current presentation was post Covid related lethargy. The medical team recommended a further 7 day isolation and was discharged back to the medium secure forensic unit. On 18th April 2020 he developed high temperature (38 °C) with faecal incontinence and reduced level of consciousness (non-responsive to verbal command) after which he was transferred to A&E again.

He remained at Covid ward from 18th April 2020 with 2 escorting staff members. A CT Brain and Lumbar puncture were performed which showed no abnormality. His chest x-ray showed right upper lobe ground glass changes. Blood culture was positive with *Streptococcus oralis*. He was treated with a course of IV antibiotic and antiviral. The blood result showed an increase of CK level (just under 600). All other blood test results were within normal range. The medical team implemented management plan for suspected NMS. At this point due to the diagnosis of NMS, all his psychotropic medications were stopped.

#### Investigations:

- a) Chest X-Ray completed showed mild ground glass changes in the right upper lobe.
- b) CT scan of head was normal.
- c) Lumbar Puncture was normal
- d) Blood Cultures showed *Streptococcus Oralis* which was thought to be a likely contaminant and the rest of the cultures were negative.
- e) All blood results were within normal range except Serum Creatinine Kinase which was 595 (normal range: 24-195 in males) [6].

#### Differential Diagnosis:

In available evidence, NMS often mimics Serotonin Syndrome and Malignant Hyperthermia [7]. In this case; the psychiatric team at the medium secure unit considered neurological sequelae of Covid 19 and requested for a MRI scan which was not considered necessary by the general hospital medical team.

#### Treatment:

At the time of admission to the hospital, patient was taking these drugs:

- a) Clonazepam 2mg TDS
- b) Sodium Valproate 1g BD
- c) Salbutamol 100mcg PRN
- d) Olanzapine 10mg OD

Due to patient refusing oral medication, he was being given Zuclopenthixol Decanoate depot 600mg IM once a week.

All the above medications were stopped at admission to the general hospital and instead he was given:

- a) Ondansetron 4mg TDS PRN
- b) Codeine 30mg QDS PRN
- c) Lactulose 10ml BD
- d) Procyclidine 2.5mg TDS
- e) Omeprazole 20mg OD
- f) Paracetamol 1g QDS
- g) IV fluids.

Patient was kept in the hospital for ongoing physiotherapy. Initially he required assistance to complete his activities of daily living due to rigidity. This improved through the duration of admission with the help of therapy. It was decided by the clinical team that he is free of symptoms and would not require a follow up. He was discharged back to the medium secure forensic unit on 5th May 2020. Repeat CK levels were 79 on discharge.

### Result

- a) Although the relationship between Covid 19 and NMS is not established, risk of NMS should always be considered for patients on antipsychotics presenting with symptoms of Covid 19.
- b) Review of medication, having regard to this association for patients presenting with Covid 19 may be considered as a preventive measure by clinicians.
- c) To maintain good hydration in patients on neuroleptic medication presenting with COVID 19 symptoms.

### Discussion

The first 3 patients reported to have suffered from Covid 19 and NMS were in Japan and the USA. The first case was a 46 year old man who suffered from Acute Respiratory Distress Syndrome (ARDS) due to Covid 19 infection and was suspected to have developed NMS after he received Midazolam. The second case was a 44 year old man being treated for ARDS caused by Covid 19 and was given Risperidone for delirium, after which he developed NMS which was confirmed [8]. A third case was of a middle aged man with an established diagnosis of schizophrenia in the USA who tested positive for Covid 19. He had been given Haloperidol Decanoate injection 3 weeks prior to presenting at the emergency department where he was confirmed to have NMS [1].

### Acknowledgement

We would like to acknowledge the patient's contribution in the study.

He mentioned:

"I felt quite scared and vulnerable due to having Neuroleptic Malignant Syndrome on top of the symptoms I was having of

Covid 19. It is important for people to be aware of the co-existence of something as serious as NMS with Covid 19 which in itself can be life threatening.

I am very happy that my case can be used to create awareness and might save lives.”

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