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Case Report:

Post-covid Parkinsonism and Response to Levodopa: A Case Report

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Abstract

Introduction: Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) invades many organs including central nervous system through olfactory nerves and hematogenic pathways causing many disorders ranging from mild to severe. In what follows, we discuss a post-covid Parkinsonism case in a previously healthy 59-year-old man one week after mild covid infection.

Case presentation: A 59-year-old man presented with symmetric resting tremor, symmetric rigidity, festinating gait and balance difficulty with a history of COVID-19 one week before admission. Examination was notable for Parkinsonism. Lab tests and MRI were normal. Eight months after starting with levodopa-benserazid, pramipexole, trihexiphenidyl, vitC, vitE and COQ10, the patient had a complete resolution of all symptoms.

Conclusion: Several cases report post-covid Parkinsonism in previously healthy patients with no family history of parkinson's disease. The age of patients with post-covid Parkinsonism ranged from 35-74 with mild, moderate, or severe symptoms of covid. The most common complaint of patients was tremor and most of them had a significant response to levodopa. Our patient and those mentioned in the case reports did not have any family history of Parkinson's disease and used to be healthy. These data obtained from case reports indicate that there might be a possible link between covid infection and acute Parkinsonism.

Keywords: Covid19, Neurological sequel, Parkinsonism, Post-covid, Parkinsonism

1. Introduction

SARS-COV2 is a single-stranded RNA encapsulated neurotropic virus that invades the CNS through olfactory and hematogenic pathways; it binds with Angiotensin-Converting Enzyme-2 (ACE-2) which is expressed in neurons in substantia nigra, ventricles, middle temporal gyrus, posterior cingulate cortex, and olfactory bulb and causes inflammation and degeneration [1-6]. There are numerous case reports demonstrating neurological symptoms of covid-19 ranging from mild to severe [2, 7]. These defects appear in 22.5 to 36.4 percent of patients. Main risk factors for developing neurological disorders after covid are being hospitalized and severe covid. The most common neurological symptoms of covid are headache, dizziness, hyposmia and neuropsychiatric disorders including anxiety, mood disorders, and insomnia which occurs in almost 50% of patients. Other neurological manifestations are acute ischemic stroke, cerebral venous sinus thrombosis, cerebral hemorrhage, meningitis/encephalitis, Guillain-Barre syndrome, and acute necrotizing hemorrhagic encephalopathy [2, 7]. Also, several cases report post-covid Parkinsonism [8-11]. Parkinson's disease is a neurodegenerative disorder that is characterized by motor dysfunction (hypokinesia, postural imbalance,

cogwheel rigidity, resting tremor, etc.) caused by loss of midbrain dopamine neurons, neuroinflammation, and development of intraneuronal protein aggregates (Lewy bodies) in many brain regions [11]. Multifactorial etiologies can cause Parkinson's disease; they include genetic factors, trauma, vascular disease, and infection [12-17]. Studies have revealed the association between Parkinsonism and viral infections such as influenza, EBV, varicella and hepatitis C`. In what follows, we discuss a post-covid Parkinsonism case in a previously healthy 59-year-old man one week after mild covid infection.

2. Case Presentation

A 59-year-old male presented with cough, chills, rhinorrhea, hyposmia, and fatigue which had been annoying him for two days. His test was positive for covid19 as confirmed by a real-time PCR performed through using a nasopharyngeal swab. He had no other comorbidities and did not use any drugs. There was no family history of Parkinson's disease. At the time of admission, he was afebrile; his pulse was 98; his blood pressure was 12/7, and spo2 of 97%. A Lung CT scan showed multilobar patchy ground-glass opacities in subpleural areas of both lungs (Figure 1). He did not require hospitalization. One week later he recovered from covid symptoms but presented with symmetric bradykinesia, generalized symmetric rigidity, severe symmetric resting tremor, and masked face. A diagnosis of acute Parkinsonism was considered based on clinical features. His cognition was found to be normal, yet his examinations revealed severe rigidity and festinating gait. Laboratory findings are summarized in table 1. MRI did not show any significant abnormalities (Figure 2). EEG was performed and it was normal, too. He was prescribed levodopa/benserazide100/25mg three times a day in combination with trihexyphenidyl, amantadine, vitamin E, vitamin C, and CoQ10. After one month, levodopa dose was increased to 5 times a day because the patient did not have complete relief from symptoms. Also, the patient was prescribed a daily dose of pramipexole; then, the symptoms gradually started to relieve. At the six-month follow-up, the patient reported a major improvement in symptoms. He did not have any tremor, bradykinesia, or rigidity, so drugs started to be tapered within a month. At first, pramipexole was tapered followed by levodopa. At the eight-month follow-up, the patient had a complete resolution of symptoms. In further follow-ups, the patient did not report any relapse.

Table 1. Lab findings

Laboratory parameters	Value
Hemoglobin	14mg/dl (14-16)
total leukocyte	8000/ml (4000-1000)
CRP	7 (UP to 0.9 mg/dL)
ESR	40 (0 to 22 mm/h)
LDH	150 (105 to 333 IU/L)
D-Dimer	200 (up to 0.5)

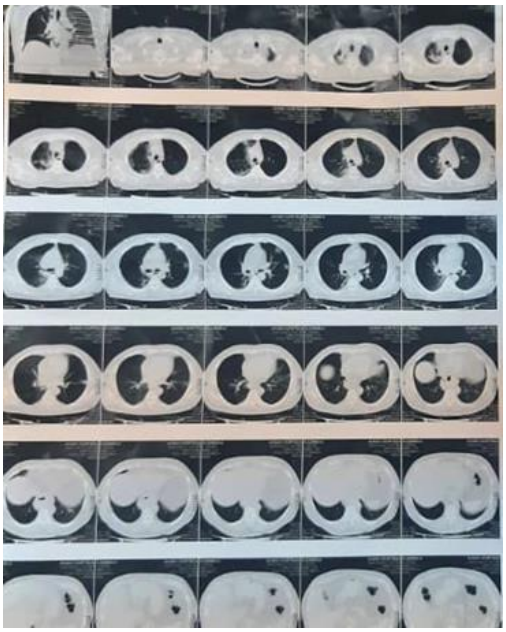

Figure 1. Lung CT scan of patient. multilobar ground glass and patchy opacities are seen

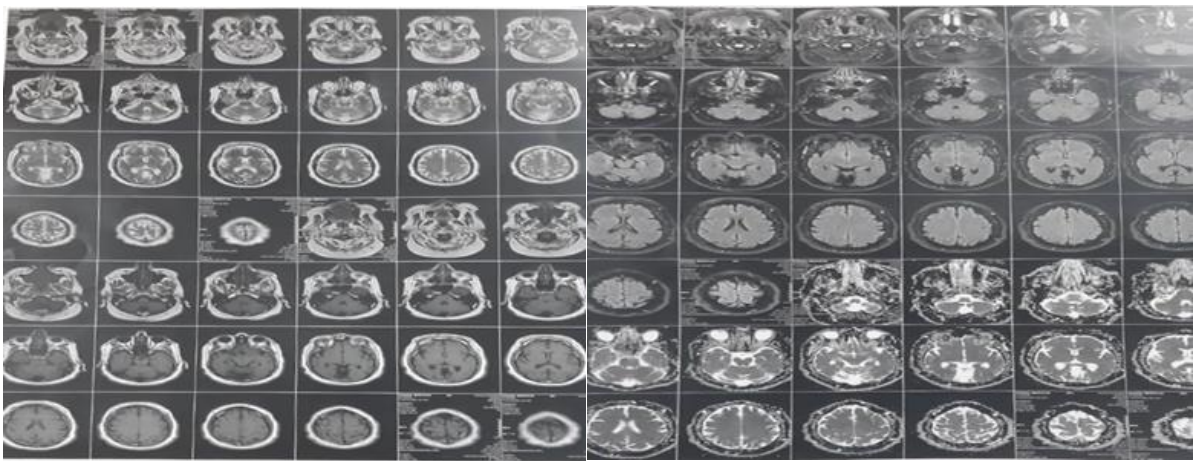

Figure 2. MRI did not show any significant abnormalities

4. Discussion and Conclusion

One of the major topics to be investigated is the chronic neurological sequelae of covid19. It is believed that the most common neurological manifestation of the disease is headache [18]; however, with increasing evidence of patients developing neurological complications such as Guillain-Barré, Parkinson's, encephalitis, and the like, it will be of great value for physicians to understand the prevalence of these neurological disorders to monitor them for efficient development of preventative interventions and mitigation of sequelae; it can also help them to be more cautious in treating patients with advanced Parkinsonism already infected by covid. Many researchers have reported that covid increases the mortality rate of patients with advanced Parkinson's disease [19]. To date, there have been some reports of parkinsonism in covid patients [20-33]. The age of the patients ranged from 31 to 74, mostly in their 60s-70s. There was a slight male predominance in cases. Similar to our case, the primary presentation of parkinsonism was in 10-14 days after covid infection [34]. Even though the severity of covid infection was observed to range from mild to severe, parkinsonism was more common among those who suffered from severe infection and needed hospitalization [34]. Some patients presented with signs of encephalopathy. It is important to note that the sign of parkinsonism appeared to be asymmetrical in nearly 70% of the cases. The case of the current report also manifested with asymmetrical symptoms. In the majority of the cases in prior reports, parkinsonism was persistent, and a significant response was observed to dopaminergic agents. In our case, levodopa started immediately after diagnosis, and during the six months of treatment the symptoms improved significantly. In some other cases, immunomodulatory treatments were administered to patients, but results were conflicting [34]. Of note, few data are available regarding the long-term neurological sequels of covid. Follow-up time in other cases were 6 months at most (six months in our case as well). Thus, longer observation is required to monitor such findings.

These data also provide valuable insights for preventing a potential Parkinsonism storm similar to what occurred in 1918 after a Spanish influenza pandemic, and developing a comprehensive guideline for treating long-term neurological complications of COVID-19.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of the islamic Azad university of medical science, tehran branch.

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Author's contributions

RHN analyzed and interpreted the patient data. MML contributed in follow ups and writing the manuscript.

Conflict of interest

The authors declare that they have no conflicting interests.

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Not applicable.

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