

COVID-19-Associated Neuropathy A Case Report and Literature Review Author

Muhammad Haris Latif^{1*}, Atta Ur Rehman², Emaan Mazhar³, Ali haider⁴ and Hassan Nawaz⁵

¹Department of Medicine, Nishtar Medical University, Multan, Pakistan

***Corresponding Author**

Muhammad Haris Latif, Department of Medicine, Nishtar Medical University, Multan, Pakistan.

Submitted: 2023, June 25; **Accepted:** 2023, July 17; **Published:** 2023, July 26

Citation: Latif, M. H., Rehman, A. U., Mazhar, E., Haider, A., Nawaz, H. (2023). COVID-19-Associated Neuropathy A Case Report and Literature Review Author. *Int Internal Med J*, 1(3), 05-07.

Abstract

Objective: The goal of this succinct case report and literature analysis is to shed light on the symptoms, diagnosis, course, and outcomes of COVID-19-associated neuropathy.

Method: An instance of chronic peripheral neuropathy that developed after a COVID-19 infection is presented. Neurologists, infectious disease experts, and rehabilitation specialists are involved in the diagnostic workup and multidisciplinary management detailed here. An in-depth analysis of the literature on COVID-19-related neuropathy was performed.

Results: Following COVID-19, the patient continued to experience symptoms of peripheral neuropathy. Diagnostic testing confirmed neuropathy. Medication, rehabilitation, and supportive care were all part of the treatment. The review of the literature added knowledge about pathophysiology, diagnostics, and therapeutic strategies.

Conclusion: Neuropathy brought on by COVID-19 is a significant clinical problem. This brief report emphasizes the ongoing peripheral neuropathy caused by COVID-19. The thorough management strategy and literature review improve comprehension of the diagnosis and course of action. Early detection is crucial for the best results.

Keywords: COVID-19, Neuropathy, Peripheral Neuropathy, Neurological Complications, Case Report.

1. Introduction

The new coronavirus SARS-CoV-2 that causes COVID-19 has created a variety of clinical symptoms that go beyond respiratory illness. [1] New data points to the virus's potential to impact the nerve system and cause a variety of neurological issues, including neuropathy. The term "COVID-19-associated neuropathy" refers to the deterioration of peripheral nerves and ensuing sensory and motor deficits in infected people.

Damage to the peripheral nerves causes the well-known disorder known as peripheral neuropathy, which manifests as symptoms including numbness, tingling, weakness, and pain in the extremities. The precise mechanisms by which COVID-19 causes neuropathy are not well understood yet. In COVID-19 patients, neuropathy may occur as a result of immune-mediated processes, hyperinflammatory reactions, direct viral invasion, immune-mediated mechanisms, or indirect effects of systemic problems.

From moderate sensory disturbances to severe motor deficits, COVID-19-associated neuropathy can manifest clinically in a va-

riety of ways. The beginning of neuropathy can also happen at different times; in some cases, it happens during the acute phase of the infection, whereas in other situations, it happens during the post-acute or protracted COVID-19 phase. The symptoms of neuropathy can overlap with those of other COVID-19-related problems, making identification difficult. Confirmatory procedures such as nerve conduction studies and electromyography may be required to make the diagnosis.

The primary goals of treating COVID-19-associated neuropathy are to provide supportive care, alleviate symptoms, and address the virus's underlying systemic manifestations. For the best possible patient results, multidisciplinary approaches comprising neurologists, infectious disease experts, rehabilitation specialists, and pain management teams are crucial.

2. Case Presentation

A 54-year-old female patient presented with a constellation of symptoms that began on March 3rd, 2020. She complained of tingling sensations, burning pain, and itching throughout her entire

body, extending from the scalp down to the toes. Additionally, she reported experiencing an electric sensation in her bilateral legs, which started later in March 2020. Notably, the patient had been diagnosed with COVID-19 in March 2020 based on serum antibodies, and her mother had also been diagnosed with the same infection.

In August 2020, the patient developed double vision. Magnetic resonance imaging (MRI) of the brain and computed tomography (CT) of the spine revealed the presence of syringohydromelia, a hyperintense focus in the brain consistent with chronic ischemia, and tortuosity of the optic nerve. However, there was no evidence of hyperintense lesions on a subsequent MRI scan, and the syrinx at the C4 level remained stable.

The patient did not exhibit progression of pain, weakness, or areflexia suggestive of Guillain-Barré syndrome (GBS). Initial blood work for neuropathy and an autoimmune panel yielded negative results. However, urine analysis showed microalbuminuria with borderline HbA1c levels, raising some concern for potential diabetic complications. Further investigations, including VDRL, RPR, and Borrelia profiles, returned negative results.

To explore potential treatment options, a course of 40mg of prednisone for five days was prescribed but failed to produce significant improvement. Minimal improvement was noted with acyclovir, while the patient reported a 50% improvement with Lyrica, although she experienced leg heaviness as a side effect. Given the complex presentation, a nerve biopsy was planned to gather additional information.

All laboratory investigations, except for the COVID-19 antibody, came back negative, further contributing to the diagnostic challenge in this case.

3. Discussion

SARS-CoV-2 is the primary cause of COVID-19, which affects the respiratory system. However, new data suggests that the virus may also cause neuropathies and other neurological symptoms.[1] Although many theories have been put forward, the mechanisms of COVID-19-associated neuropathy are still not completely understood.

Post-infectious Immune-Mediated Neuropathy: This condition is caused when the body's immune system incorrectly targets the peripheral nerves in reaction to a viral infection.[2] This immune reaction may cause swelling and damage to the nerve fibers, which could result in neuropathy. Other viral infections, including those caused by the influenza virus and the Zika virus, have also been linked to post-infectious neuropathies.

Direct Viral Invasion: Direct viral invasion of the peripheral neurons is another proposed route. The central nervous system (CNS) and peripheral nerves are two organs and tissues outside the respiratory system where SARS-CoV-2 has been identified [3]. It is thought that the virus may enter the peripheral nerves directly,

harming and disrupting them. To confirm this mechanism and determine the degree to which viruses contribute to the development of neuropathy, more research is required.

Microvascular Ischemia: The prothrombotic state that COVID-19 has been linked to increases the likelihood of blood clot formation[4]. Microvascular ischemia, brought on by tiny blood clots or reduced blood flow to the nerves, may play a role in the onset of neuropathy. Peripheral nerve ischemia can lead to neuropathy and subsequent nerve dysfunction.

COVID-19 has been shown to cause a systemic inflammatory reaction in the body[5]. The peripheral nerves, among other organ systems, may suffer negative consequences from this severe inflammation. Neuropathy can be caused by nerve injury or dysfunction brought on by chronic inflammation. Furthermore, increased pro-inflammatory cytokine levels found in COVID-19 patients may be a factor in the onset of neuropathy [6].

Clinical Presentation and Diagnosis: The neurological symptoms of COVID-19-associated neuropathy can include sensory impairments, motor weakness, pain, and autonomic dysfunction. The pattern of involvement can differ; some people may have a sensorimotor or largely motor neuropathy, whereas others may have a mostly sensory or sensorimotor neuropathy. As a result of COVID-19, reports of cranial neuropathies, GBS, and acute transverse myelitis have also been made.

A thorough clinical evaluation, including a thorough medical history, physical examination, and diagnostic tests, is required to identify COVID-19-related neuropathy. The function and integrity of peripheral nerves can be evaluated using the diagnostic techniques of nerve conduction studies (NCS) and electromyography (EMG). These tests can help distinguish between various neuropathy subtypes and provide information on the nature and extent of nerve injury.

Treatment, Symptom Management, and Nerve Recovery: The treatment of COVID-19-associated neuropathy concentrates on treating the underlying infection, symptom management, and nerve recovery. There isn't presently a specific antiviral treatment available for COVID-19-related neuropathy. Physical therapy, pain management, supportive care, and, in more serious situations, immunomodulatory medications like intravenous immunoglobulin (IVIG) or corticosteroids are all common components of treatment plans.

Depending on the severity and extent of the nerve injury, COVID-19-associated neuropathy has a range of prognoses. With the right management, the neuropathy is frequently anticipated to improve over time. But some people could develop long-lasting or irreversible brain impairments. To track the development of symptoms and ensure proper care, close observation and follow-up with neurology experts are crucial.

4. Conclusion

When patients report with neurological symptoms, COVID-19-associated neuropathy is an emergent consequence of the viral infection that needs to be taken into account. To improve patient outcomes, prompt recognition, evaluation, and management are crucial. To comprehend the pathogenesis, risk factors, and long-term effects of COVID-19-associated neuropathy, more study is required. Healthcare professionals should be on the lookout for neurological symptoms, providing early intervention and, when necessary, proper referral to neurology specialists.

Ethical Permit

Published case reports have been included in this Case study. This work did not include any details about the personal lives of the patients. This study did not include any human participants. We did not seek ethical approval from a committee.

Consent Statement

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy

Conflict of Interest

We do not have any financial or other conflicts of interest about our case study on COVID neuropathy, "COVID-19-Associated Neuropathy A Case Report and Literature Review." We don't have any relationships, either financial or otherwise, that would skew the objectivity of our research or reporting. I promise to promptly disclose any new conflicts.

References

1. Cordova-Martínez, A., Caballero-García, A., Pérez-Valdecantos, D., Roche, E., & Noriega-González, D. C. (2022). Peripheral neuropathies derived from COVID-19: New perspectives for treatment. *Biomedicines*, 10(5), 1051.
2. Ye, Q., Wang, B., & Mao, J. (2020). The pathogenesis and treatment of the Cytokine Storm 'in COVID-19. *Journal of infection*, 80(6), 607-613.
3. Bobker, S. M., & Robbins, M. S. (2020). COVID-19 and headache: a primer for trainees. *Headache: The Journal of Head and Face Pain*, 60(8), 1806-1811.
4. Østergaard, L. (2021). SARS CoV-2 related microvascular damage and symptoms during and after COVID-19: Consequences of capillary transit-time changes, tissue hypoxia and inflammation. *Physiological reports*, 9(3), e14726.
5. Masi, P., Hékimian, G., Lejeune, M., Chommeloux, J., Desnos, C., Pineton De Chambrun, M., ... & Frere, C. (2020). Systemic inflammatory response syndrome is a major contributor to COVID-19-associated coagulopathy: insights from a prospective, single-center cohort study. *Circulation*, 142(6), 611-614.
6. Merad, M., Blish, C. A., Sallusto, F., & Iwasaki, A. (2022). The immunology and immunopathology of COVID-19. *Science*, 375(6585), 1122-1127.
7. Sharma, A., Tiwari, S., Deb, M. K., & Marty, J. L. (2020). Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): a global pandemic and treatment strategies. *International journal of antimicrobial agents*, 56(2), 106054.

Copyright: ©2023 Muhammad Haris Latif, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.