Neurological Manifestations of COVID-19 Patients in Tertiary Care Hospital of Lahore

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Abstract

Objective: This study was done to find out the neurological manifestations of COVID-19 patients presenting in Services Hospital Lahore.

Method: It is a prospective observational study done at Services Hospital Lahore where a total 194 patients were enrolled in the study through consecutive sampling.

Results: 99(51%) of them were male and 95(49%) of them were female. Neurological manifestations of COVID-19 infection in our patients included myalgia which was present in 95(49.0%), headache was present in 87(44.8%), dizziness was seen in 38(19.6%), anosmia was reported by 31(16%), 19(9.8%) patients were confused, 9(4.6%) patients had neuropathic pain, 7(3.6%) patients had loss of vision, 4(2.1%) patients had Ischemic Stroke, 3(1.5%) patients had ataxia, 3(1.5%) presented with seizures, 3(1.5%) had a axonal neuropathy, 1(0.5%) patient presented in a coma, 1(0.5%) had encephalitis, 1(0.5%) had a haemorrhagic stroke, and 1(0.5%) patient presented with demyelinating neuropathy.

Conclusion: It is evident from a review of literature that many researches have highlighted similar neurological manifestations associated with COVID-19 infections as our study. Clinicians should be aware about the diverse neurological presentations of COVID-19 infections. Presentations without typical risk factors or in atypical age groups should especially prompt diagnostic testing for COVID-19 Infection.

Keywords: COVID-19, neurological manifestations, myalgia, dizziness, headache

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Introduction

COVID-19 has spread worldwide into a pandemic and caused great mortality and morbidity. One of the greatest challenges in this pandemic has been the varied signs and symptoms which have led to the presentation of COVID-19 cases. While respiratory system involvement has been classically associated with the greatest mortality and morbidity associated with the infection, COVID-19 infection also has a predilection to affect the nervous system. COVID-19 infection is associated with various central and peripheral nervous system findings.[1] This is due to the direct neurotropic affects of the virus and also due to the immune response as a result of the viral infection.[2]

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Material and Method

This study was a prospective observational study done at Services Hospital Lahore between July to September 2021. 194 patients admitted in Services Hospital Lahore between 18 to 80 years and had a positive COVID-19 PCR through a nasal swab were included in the study via consecutive sampling technique. Patients or their close attendants were interviewed by a neurologist after informed consent. The Neurologist completed the 38 item questionnaire for all the interviewed patients. The

data was then analysed using SPSS for Windows version 28.0.1. Frequencies/Percentages were calculated for the co-morbidities and clinical symptoms of the patients and the data displayed in the form of tables.

Results

Total 194 patients were enrolled in the study. 99(51%) of them were male and 95(49%) of them were female. The most common clinical symptom of the patients was Shortness of Breath which was present in 168(85.6%) of patients, 149(76.8%) patients had cough, 145(74.7%) had fever, 71(36.6%) patients had a sore throat, abdominal pain was present in 31(16%) patients and 23(11.9%) had loose stools. The most common neurological manifestation of COVID-19 infection in our patients included myalgia which was present in 95(49.0%), headache was present in 87(44.8%) of the patients, dizziness was seen in 38(19.6%), anosmia was reported by 31(16%), 19(9.8%) patients were confused, 9(4.6%) patients had neuropathic pain, 7(3.6%) patients had loss of vision, 4(2.1%) patients had Ischemic Stroke, 3(1.5%) patients had ataxia, 3(1.5%) presented with seizures, 3(1.5%) had a axonal neuropathy, 1 0.5%) patient presented in a coma, 1(0.5%) had encephalitis, 1(0.5%) had a haemorrhagic stroke, and 1(0.5%) patient presented with demyelinating neuropathy.

Table 1: *Gender of Patients Included in the Study*

Gender	Frequency (Percentage)
Female	99 (51.0)
Male	95 (49)

Table 2: *Co-morbidities of Patients Included in the Study*

Comorbidities	Frequency (Percentage)
Hypertension	83 (42.8)
Diabetes	80 (41.2)
Ischemic Heart DIsease	35 (18)
Chronic Kidney Disease	14 (7.2)
Chronic Obstructive Pulmonary Disorder	2 (1.0)
Asthma	2 (1.0)
Smoking	1 (0.5)

Table 3: *Neurological manifestations of the patients included in the study.*

Neurological Manifestations	Frequency (Percentage)
Myalgia	95 (49)
Headache	87 (44.8)
Dizziness	38 (19.6)
Anosmia	31 (16)
Confusion	19 (9.8)
Neuropathic Pain	9 (4.6)
Loss of Vision	7 (3.6)
Ischemic Stroke	4 (2.1)
Ataxia	3 (1.5)
Seizures	3 (1.5)
Axonal Neuropathy	3 (1.5)
Coma	1 (0.5)
Encephalitis	1 (0.5)
Haemorrhagic Stroke	1 (0.5)
Demyelinating Neuropathy	1 (0.5)

Discussion

Our research showed that patients presenting to Services Hospital Lahore and having positive COVID-19 tests showed a wide range of Neurological manifestations. The most common neurological manifestation we saw was Myalgia. Myalgia is one of the major symptoms of most viral infections and COVID-19 in particular and it was calculated by a meta-analysis done by Lippi et al.[3] that Myalgia is seen as symptom of onset in around 36% of COVID-19 patients. 49% of our patients had myalgia. Headache was seen in 44.8% of our cases. COVID-19 infection has been consistently associated with headache throughout the pandemic. This has more often been a bifrontal or holocephalic, pressing in nature and moderate to severe in intensity. Patients with migraine have seen a worsening in their headache frequency and have had attacks that are longer and more intense.[4] Interestingly headache has been associated with a lower mortality rate in COVID-19 patients and associated with lower CRP levels.[5]

Like in our study, dizziness due to COVID-19 infection has been a common symptom, with countless studies showing the association.[6] Interestingly, it is being increasingly recognised that these cases may be due to the increased incidence of Benign Paroxysmal Positional Vertigo with hyper coagulability and micro thrombus formation playing a part.[7]

Anosmia was one of the first symptoms linked to COVID-19 infection and our study showed that 16% of our patients had the same. Some of the earlier studies reported anosmia to be present in around half of COVID-19 patients8 and it was used as a clue and an indicator of infection earlier on in the pandemic. COVID-19 has also been associated with delirium and encephalopathy. The encephalopathy in particular has been associated with the cytokine storm and interleukin mediated damage.[9] It is one of the worst manifestations

of COVID-19 associated with a high mortality, with best treatment options still up as a matter of debate and research. Our study had patients present with such symptoms including 19 with confusion, 3 with seizures, 1 with coma and 1 with encephalitis.

7 of our patients has loss of vision associated with COVID-19 infection and while this has been an uncommon manifestation there are numerous case reports which highlight the various causes of such a presentation including Ischemic Stroke, increased intracranial pressure, retinopathy among others.[10-12]

Coagulopathy, Cardiac Embolisation, and Endothelitis due to COVID-19 has led to its association with multiple types of stroke including Ischemic Stroke, Cerebral Venous Sinus Thrombosis and Haemorrhagic Strokes.[13,14] Our study group also included 1 patient with Ischemic and 3 with Haemorrhagic strokes. It has been seen that many of these patients lack the usual risk factors for stroke and COVID-19 seems to play a major causative role in these patients. These patients are being managed as per the usual protocols for these illnesses.[15]

Lastly we saw patients with COVID-19 showing symptoms of Neuropathy including 9 with neuropathic pain, 3 with axonal neuropathy and 1 with demyelinating neuropathy. Neuropathy on the other hand has been associated with immune mechanisms as well as due to drugs used for COVID-19 treatment and pressure due to compression due to bedding during ICU/hospital stay.[16] It is evident from a review of literature that many researches have highlighted similar neurological manifestations associated with COVID-19 infections as our study. However the frequencies have differed in different studies and populations. There is still a lot of room to research the best treatment options for these manifestations, and if they adhere to or differ from similar manifestations due to the usual causative factors.

Conclusion

Clinicians should be aware about the diverse neurological presentations of COVID-19 infections. Presentations without typical risk factors or in atypical age groups should especially prompt diagnostic testing for COVID-19 Infection. Further research is needed in this area to determine all the neurological manifestations of COVID-19 and to find best treatment options and management strategies in these cases.

Conflict of Interest: *None*

References

1. Johansson A, Mohamed MS, Moulin TC, Schiöth HB. Neurological manifestations of COVID-19: A comprehensive literature review and discussion of mechanisms. Journal of Neuroimmunology. 2021 Sep 15;358:577658.
2. Leven Y, Bösel J. Neurological manifestations of COVID-19–an approach to categories of pathology. Neurological Research and Practice. 2021 Dec;3(1): 1-2.
3. Li LQ, Huang T, Wang YQ, Wang ZP, Liang Y, Huang TB, Zhang HY, Sun W, Wang Y. COVID-19 patients' clinical characteristics, discharge rate, and fatality rate of meta-analysis. Journal of medical virology. 2020 Jun; 92(6):577-83.
4. Membrilla JA, de Lorenzo Í, Sastre M, Díaz de Terán J. Headache as a Cardinal Symptom of Coronavirus Disease 2019: A Cross-Sectional Study. Headache: The Journal of Head and Face Pain. 2020 Nov;60(10): 2176-91.
5. Trigo J, García-Azorín D, Planchuelo-Gómez Á, Martínez-Pías E, Talavera B, Hernández-Pérez I, Valle-Peñacoba G, Simón-Campo P, de Lera M, Chavarría-Miranda A, López-Sanz C. Factors associated with the presence of headache in hospitalized COVID-19 patients and impact on prognosis: a retrospective cohort study. The journal of headache and pain. 2020 Dec; 21(1):1-0.
6. Saniasiaya J, Kulasegarah J. Dizziness and COVID-19. Ear, Nose & Throat Journal. 2021 Jan;100(1):29-30.
7. Maslovara S, Košec A. Post-COVID-19 Benign Paroxysmal Positional Vertigo. Case Reports in Medicine. 2021 Jun 1;2021.
8. Klopfenstein T, Kadiane-Oussou NJ, Toko L, Royer PY, Lepiller Q, Gendrin V, Zayet S. Features of anosmia in COVID-19. Médecine et Maladies infectieuses. 2020 Aug 1;50(5):436-9.
9. Siow I, Lee KS, Zhang JJ, Saffari SE, Ng A. Encephalitis as Neurological Complication of COVID-19: A Systematic Review and Meta Analysis of Incidence, Outcomes and Predictors. European journal of neurology. 2021 May 13.
10. Khan AW, Ullah I, Khan KS. Ischemic stroke leading to bilateral vision loss in COVID-19 patient—A rare case report. Journal of Medical Virology. 2021 Feb; 93(2): 683-5.
11. Ilhan B, Cokal BG, Mungan Y. Intracranial hypertension and visual loss following COVID-19: A case report. Indian Journal of Ophthalmology. 2021 Jun 1;69(6): 1625-7.

12. Conrady CD, Faia LJ, Gregg KS, Rao RC. Coronavirus-19-Associated Retinopathy. Ocular immunology and inflammation. 2021 Apr 11:1-2.
13. Berlin DA, Gulick RM, Martinez FJ. Severe COVID-19 [published online ahead of print May 15, 2020]. N Engl J Med.;10.
14. Dakay K, Cooper J, Bloomfield J, Overby P, Mayer SA, Nuoman R, Sahni R, Gulko E, Kaur G, Santarelli J, Gandhi CD. Cerebral venous sinus thrombosis in COVID-19 infection: a case series and review of the literature. Journal of Stroke and Cerebrovascular Diseases. 2021 Jan 1;30(1):105434.
15. Pizzi MA. Acute Neurologic Manifestations of Respiratory Viruses. CONTINUUM: Lifelong Learning in Neurology. 2021 Oct 1;27(5):1365-81.
16. Finsterer J, Scorza FA, Scorza CA, Fiorini AC. Peripheral neuropathy in COVID-19 is due to immune-mechanisms, pre-existing risk factors, anti-viral drugs, or bedding in the Intensive Care Unit. Arquivos de Neuro-Psiquiatria. 2021 Jul 19;79:924-8.

Authors Contribution

MAA, QB: Conceptualization of Project
MJM, MU: Data Collection
GMA: Literature Search
MJM, MU: Statistical Analysis
MAA, QB: Drafting, Revision
MAA, QB, MJM: Writing of Manuscript