Post-COVID worsening of Parkinson's disease patient.

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Abstract

Background The theory of "hit and run" raises a possibility of novel COVID19-associated Parkinsonism cases, as well as worsening of symptoms in patients with pre-existing Parkinson's Disease (PD). Aim/method To demonstrate that the COVID19 infection may lead to long lasting immunological and neurological changes at PD patients.

Key Clinical Message

Worsening of clinical symptoms after COVID-19 illness as well as misregulation of CD4 and CD8 T cells numbers may be revealed at post COVID-19 period at PD patients. Immunological changes may be a background for clinical worsening of the patient.

Key words: Post-COVID-19, Parkinson's Disease, motor symptoms, non-motor symptoms, immunology.

Background

With the global coronavirus disease 2019 (COVID-19) pandemic under way, the full effect of the virus infection on affected individuals with and without underlying health conditions is still far from clear. However, there is an on-going accumulation of scientific data about an impact of the COVID-19, on the patients with health conditions that might be exacerbated by the virus, such as Parkinson's disease (PD). The theory of "hit and run" [1] raises a possibility of novel COVID19-associated Parkinsonism cases, as well as worsening of symptoms in patients with pre-existing Parkinson's Disease (PD). Here we present a short clinical study of a patient suffering from PD, whose neurological condition was significantly impacted by the COVID19 infection, even upon recovery from the novel virus.

Aims of the study

To investigate whether the COVID19 infection may lead to long lasting immunological and neurological changes at PD patients.

Methods and results

A clinical case of a 39-year-old man with a 2-year history of Parkinson's disease was observed at our Centre. The Study was approved by local Ethics Committee and Study Agreement was voluntary signed by the subject at the beginning. Section III of the Unified Parkinson's Disease Rating Scale (MDS-UPDRS) of the International Society for Movement Disorders (2008) was used for assessment of severity of the patients' motor symptoms. The symptoms were recorded at 26 in the off-period (after a 12-24 hour break in taking antiparkinsonian drugs) and at 17 in the on-period (1 hour after medication was taken). Non-motor symptoms data according to the following scales was: Hamilton Depression Rating Scale (HDRS)-7, the Pittsburgh

Sleep Quality Index (PSQI)-5, the Epworth Sleepiness Scale (ESS)-7, Non- Motor Symptoms Scale (NMS)-7, The 39-item Parkinson's Disease Questionnaire Summary Index (PDQ-39SI)-39.8.

Magnetic resonance imaging of brain was normal.

The treatment of the patient included Pramipexolum (prolonged form) 2,25 mg daily and Amantadinum 300 mg daily with marked improvement of neurological symptoms. It is noteworthy that even though the primary use of Amantadinum is the treatment of dyskinesia associated with parkinsonism, the drug also has marked anti-viral properties, against type A influenza virus in particular [2].

Three weeks after the examination, the patient informed us that he was suffering from COVID-19 (positive PCR-test and bilateral polysegmental pneumonia on CT-scan).

Two weeks later PCR-retest was negative and the pneumonia symptoms were absent. However, the patient began to exhibit general weakness, depression, loss of appetite, multiple joint pain and increased clumsiness and heaviness of the body. The patient was prescribed an anti-inflammatory drug tenoxicam 20 mg daily for 10 days, which did not yield positive results.

The second examination was performed two months after the first visit. Anti-parkinsonian therapy was the same through the course of the treatment. In addition to previous neurological signs, cogwheeling of the right leg and intensified bradykinesia on finger tapping of the right hand were found. The overall score of the third part of the UPDRS scale amounted to 31 in the off-period and 22 in the on-period, which marks worsening of the condition. Passive and active rotation in the right hip joint was painful, which was a new symptom that we have not observed before in this patient.

Patients' non-motor symptoms were also worse : HDRS-8, PSQI-5, ESS-8, NMS-6, PDQ-39SI-41.3.

Misregulation of CD4 and CD8 T cells numbers was also revealed as an additional finding at post COVID-19 period: CD4+CD25hiCD127- - 0.023 (normal ranges (NR) 0.05-0.15), CD62L+CD45RA- - 0.607 (NR 0,18-0,54), CD62L+CD45RA+ - 0.122 (NR 0,15-0,38), CD62L-CD45RA+ - 0.052 (NR 0,08-0,31).

Conclusion

Our data is in agreement previously published information, that there is substantial worsening of motor and non-motor symptoms during mild to moderate COVID-19 illness in a cohort of patients with PD [3]. We found post-COVID-19-related immunological changes three weeks after the end of an acute episode. Several previously published studies point to only reduction of both CD4 and CD8 T cells in moderate and severe COVID-19 cases, whereas our observations point towards more long-term immunological changes [4, 5]. We think that these changes may be a background for clinical worsening of the patient. It is a main finding of the present study.

This case demonstrates also quite a short time recovery from COVID-19 and associated pneumonia, which could indicate a possible positive effect of Amantadinum against the virus. This fact can be important when investigating drug repurposing for COVID19 treatment [6]. It is a second finding.

Although the data on the effect of COVID19 infection on the patients with neurological disorders such as PD is still quite scarce, as the data further accumulates, there might be a need for more comprehensive guidelines for treating long-term neurological and immunological complications of COVID-19 in patients with PD and other neurological disorders.

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References

1. Henry J, Smeyne R, Jang H, et al. Parkinsonism and neurological manifestations of influenza throughout the 20th and 21st centuries. Parkinsonism Relat Disord 2010;16:566–571.
2. Pinto, L. H., and R. A. Lamb. Understanding the mechanism of action of the anti-influenza virus drug amantadine. Trends Microbiol. 1995;3:271.
3. Roberto Cilia, Salvatore Bonvegna, Giulia Straccia, et al. Effects of COVID-19 on Parkinson's disease clinical features: a community-based case-control study. Mov Disord. 2020; 10.1002/mds.28170. doi: 10.1002/mds.28170 [Epub ahead of print] PMCID: PMC7280741
4. Chen, G., Wu, D., Guo, W., Cao, Y., Huang, D., Wang, H., Wang, T., Zhang, X., Chen, H., Yu, H., et al. (2020c). Clinical and immunological features of severe and moderate coronavirus disease 2019. J Clin Invest. 2020;130(5):2620-2629. https://doi.org/10.1172/JCI137244.
5. Nie, S., Zhao, X., Zhao, K., Zhang, Z., Zhang, Z., and Zhang, Z. (2020b). Metabolic disturbances and inflammatory dysfunction predict severity of coronavirus disease 2019 (COVID-19): a retrospective study. medRxiv. https://doi.org/10.1101/2020.03.24.20042283.
6. Philip W. Tipton, Zbigniew K. Wszolek. What can Parkinson's disease teach us about COVID-19? Neurologia i Neurochirurgia Polska Polish Journal of Neurology and Neurosurgery 202054;2:204–206.