

SEVERE NEUROCOGNITIVE DEFICITS AFTER COVID-19 INFECTION: A CASE REPORT

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received: 7.6.2022;

revised: 11.8.2022;

accepted: 22.8.2022

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INTRODUCTION

Coronavirus disease (COVID-19) pandemic continues to affect practically all societal classes bearing negative effects on socio-economic status, physical and mental health, especially among the most vulnerable population. Neurocognitive changes after COVID-19 infection are not yet well understood (Sinanovic 2021). Many viral infections can cause severe damage to both the structure and the function of the central nervous system (CNS). SARS-CoV-2 is a neurotropic virus that can invade the neural tissue infecting macrophages, astrocytes or microglial cells in the CNS (Mukaetova-Ladinska et al. 2021).

Disorders of cognitive function (difficulties in concentration, memory and language comprehension, executive dysfunction) have been reported in many people with COVID-19 infection. This cognitive dysfunction may develop and persist for many months after the infection, being part of what is called "Long COVID" syndrome (Penninx 2021).

Crivelli et al. (2022) made a systematic review and meta-analysis of the cognitive effects of COVID-19 infection in adults without previous history of cognitive dysfunction. Meta-analysis included the comparison of Montreal Cognitive Assessment (MoCA) test scores between patients who convalesced after the infection and healthy people of a control group. The mean age in the patient group was about 56 years and the time space of their neuropsychological evaluation was between the acute phase and seven months after their infection. The findings of this research revealed disorders in attention, memory and executive function (Crivelli et al. 2022).

We report on the case of a patient who manifested severe neurocognitive dysfunction after COVID-19 infection. Our aim is dual: first, we want to increase the vigilance of clinicians about the timely recognition of such deficits in patients who suffered from COVID-19. Second, we want to emphasize the serious consequences that the infection may have in people without previous neurocognitive problems.

CASE REPORT

Our patient is a 58-year-old married man. He has a history of chronic psychosis and previous stroke in basal

ganglia, with satisfactory regulation under treatment. Furthermore, he has an old history of substance abuse and regular nicotine use, and current, sparse cannabis use (one cigarette every other day). In the context of his regular follow-up at our outpatient clinic, he was examined in early March, 2022. As has always been the case, he came alone to the clinic. He did not present any changes from his usual clinical condition, nor did he manifest clinically evident neurocognitive deficits.

After three months, he came again for clinical examination. This time he was escorted by his wife. She mentioned that, approximately three months ago, the patient had been diagnosed with COVID-19 infection. Since then, his daily functional status had gradually declined and serious memory problems had become apparent. Clinically, the patient gave the diagnostic impression that he suffered from dementia; he had problems with his attention, concentration and memory and could not easily comprehend spoken language.

We administered a MoCA test in order to examine the neurocognitive deficits more subjectively. The total score of the test was 14 out of 30. According to the results, the patient had evident cognitive deficits with dysfunctional ability in alternating attention, disorders in the speed of information processing, semantic memory and executive function. More specifically, indications emerged that the patient had reduced processing of complex stimuli, reduced ability to alternate the perceptual standard in order to adapt to changing requirements, reduced ability of selective attention and cognitive flexibility, as well as resistance to the interference of external stimuli (word test).

His visuospatial ability, movement efficiency/speed and working memory were also reduced. Slowness of response and inability to insist on the task were evident. The neuropsychological tests that demanded attention, concentration and speed in information processing proved to be difficult for the patient who showed slow speed in information processing. The aforementioned neuropsychological profile seems to be related to organic factors.

Taking into consideration that, before the infection, the clinical picture of the patient and the relevant information from his family were diametrically opposed compared to the clinical picture and the available

information after the infection, as far as it concerns the neuropsychological deficits and the functional status of the patient, we believe that COVID-19 infection was responsible for this change. Additionally, the first author has been examining the patient during the last 10 years and has never witnessed such a clinical picture before.

DISCUSSION

The patient is going to be submitted to a new neuropsychological evaluation six months after the infection. As more people convalesce from COVID-19 and we begin to acquire more knowledge about the disease, it is probable that we will be examining many patients with neurocognitive dysfunction in the near future.

Patients with COVID-19 disease may manifest both short-term and long-term neurocognitive disorders in the spectrum of memory disorders and executive dysfunction, which may have negative impact concerning their prognosis and their functional outcome (Aiello et al. 2022).

CONCLUSION

COVID-19 infection may lead to serious neurocognitive deficits as evidenced by this case, but also by our clinical experience with other patients too. High clinical suspicion is necessary in order to make the proper clinical examination and administer neuropsychological tests. Systematic neurocognitive evaluation may aid to timely recognition of neurocognitive disorders in order to improve prognosis of the patients.

Acknowledgements: None.

Conflict of interest: None to declare.

Contribution of individual authors:

Theocharis Chr. Kyziridis: clinical examination of the patient, literature search, first draft.

Antonios Theofilidis & Ioannis Al. Nimatoudis: neuropsychological evaluation, first draft.

All authors approval of the version to be published.

References

1. Aiello EN, Fiabane E, Manera MR, Radici A, Grossi F, Ottonello M et al.: Screening for cognitive sequelae of SARS-CoV-2 infection: a comparison between the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA). *Neurol Sci* 2022; 43:81–4
2. Crivelli L, Palmer K, Calandri I, Guekht A, Beghi E, Carroll W et al.: Changes in cognitive functioning after COVID-19: A systematic review and meta-analysis. *Alzheimer's Dement* 2022; 18:1047–66
3. Mukaetova-Ladinska EB, Kronenberg G, Raha-Chowdhury R: COVID-19 and neurocognitive disorders. *Curr Opin Psychiatry* 2021; 34:149-56
4. Penninx BWJH: Psychiatric symptoms and cognitive impairment in "Long COVID": the relevance of immunopsychiatry. *World Psychiatry* 2021; 20:357-8
5. Sinanovic O: Long-term neuropsychiatric consequences of SARS-COV infections. *Psychiatr Danub* 2021; 33(Suppl 3): S309-17

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