



Post COVID Syndrome

Masoud Mardani ^{1,*}

¹Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

*Corresponding author: Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Tel: +98-9121132678, Email: drmasoudmardani@yahoo.com

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The coronavirus disease 2019 (COVID-19) may take weeks to overcome; however, in some patients, symptoms persist even after the original infection (1).

Despite passing months after the first case of COVID-19, scientists are facing long-term complications. This disease can cause heart failure, neurological diseases, such as stroke, and lung disease. Symptoms include fatigue and brain fog, which may be related to cytokines that cross the blood-brain-barrier (BBB) and affect the brain. These symptoms should be seriously considered because they may reflect the post-viral syndrome associated with COVID-19 (1). Moreover, difficulty in reading, insomnia, general myalgia, dry skin, and increased anxiety are other common symptoms (1).

After the acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreak, some people, such as health care workers did not come back to their work for nearly 20 months because of developing myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS). It seems that a subgroup of remitted patients is likely to experience long-term adverse effects of symptoms ME/CFS, such as persistent fatigue, diffuse myalgia, depression, and non-restorative sleep (2).

According to post-mortem findings in COVID-19 cases, the olfactory pathway is the way, by which the virus can cross the BBB and enter the hypothalamus. The perivascular space along the olfactory nerves that can pass the cribriform plate into the nasal mucosa is an important pathway involved in brain lymphatic drainage (2). Thus, the anosmia observed in some COVID-19 patients may be related to the effects of coronavirus affecting this pathway. Moreover, the virus disturbs lymphatic drainage from the microglia in the brain.

Production of pro-inflammatory agents, such as interferon-gamma and interleukin-7 is caused by disturbance of lymphatic drainage. The production of cytokines

in the central nervous system can cause post-viral symptoms because pro-inflammatory cytokines cross the BBB in circumventricular organs, like the hypothalamus, resulting in autonomic impairment that is presented as a high fever. Long-term consequences are dysregulated sleep-wake cycle, cognitive impairment, and profound unremitting anergia (ME/CFS representations). Following the SARS outbreak, the number of COVID-19 patients may increase and cause a severe post-viral syndrome that is called "Post-COVID-19 Syndrome", in which long-term chronic fatigue is associated with post-exertional neuroimmune exhaustion (2).

Common symptoms, such as cough, fever, dyspnea, musculoskeletal symptoms, and anosmia have been seen in a large proportion of patients in a study in Italy. The patients who were discharged from the hospital were assessed, of whom 12.6% had no symptoms of COVID-19, 32% had one or two symptoms, and 55% had three or more. Also, 53% had fatigue, 43% dyspnea, 27% joint pain, and 21% chest pain. According to this study, 87.4% had persistence of at least one symptom, especially fatigue and dyspnea (3).

According to the Centers for Disease Control and Prevention (CDC), ME/CF affects 2.5 million Americans. A significant minority are homebound, even bedbound. As with post-COVID syndrome, the majority of people announce that their disease started with an acute episode of infectious disease (mostly mononucleosis/flu). Several neurologic, metabolic, immunologic, and other impairments have been reported but the cause of ME/CFS has not yet been identified and there is no effective medicine for its treatment. The cardinal symptom is not only fatigue; a long-term relapse of exhaustion, cognitive impairment, etc. following activity is reported, which is generally called "post-exertional malaise (4)."

Those with ME/CFS have been long dismissed by physicians, employers, and families as experiencing exagger-

ated/psychosomatic disorders. Some cases with post-COVID syndrome report that their troubling symptoms are possibly due to anxiety, depression, or post-traumatic stress (4).

Based on the unaccepted and currently extensively questioned hypothesis regarding nonpharmacologic Treatments for ME/CFS, symptoms persist with irrational fears of exertion. Such beliefs lead to a downward trend of deconditioning, muscle atrophy, sleep disorders, and depressive symptoms. The proposed treatments according to the hypothesis include a course of psychotherapy or increasing workout (4).

Reassurance, self-care, and symptomatic control are considered in patients at the risk of the post-viral syndrome. "Sleep problems are addressed with sleep hygiene measures: turning off the lights in bedroom at night, no TV in the bedroom, trying not to be very active in bed (not to read something on a tablet). "Sometimes sleep medications or even low-dose antidepressants are used to help patients fall asleep." Also, sometimes, therapies, such as cognitive-behavioral therapy (CBT) and exercise can be used (1). "Acupuncture and massage have also been tried. There are currently no FDA-approved treatments, specifically for this condition. It should be noted that, for people experiencing ME/CFS, the CDC recommends vigorous aerobic exercise. It also notes that "Standard exercise recommendations for normal individuals may be damaging for cases with ME/CFS (1)".

To sum up, assessing the prevalence of fatigue-induced

symptoms after COVID-19 should be considered as a priority. Also, relatively inexpensive practical techniques for treating post-viral fatigue should be explored, and alleviating the symptoms and improving the quality of life for those affected by COVID-19 should be highly regarded (2).

Footnote

Conflict of Interests: None.

References

1. Citroner G. *Fauci Warns About 'Post-Viral' Syndrome After COVID-19*. Healthline; 2020. Available from: <https://www.healthline.com/health-news/fauci-warns-about-post-viral-syndrome-after-covid-19#Treating-post-viral-syndrome>.
2. Perrin R, Riste L, Hann M, Walther A, Mukherjee A, Heald A. Into the looking glass: Post-viral syndrome post COVID-19. *Med Hypotheses*. 2020; **144**:110055. doi: [10.1016/j.mehy.2020.110055](https://doi.org/10.1016/j.mehy.2020.110055). [PubMed: [32758891](https://pubmed.ncbi.nlm.nih.gov/32758891/)]. [PubMed Central: [PMC7320866](https://pubmed.ncbi.nlm.nih.gov/PMC7320866/)].
3. Carfi A, Bernabei R, Landi F; Gemelli Against Covid-Post-Acute Care Study Group. Persistent Symptoms in Patients After Acute COVID-19. *JAMA*. 2020. doi: [10.1001/jama.2020.12603](https://doi.org/10.1001/jama.2020.12603). [PubMed: [32644129](https://pubmed.ncbi.nlm.nih.gov/32644129/)]. [PubMed Central: [PMC7349096](https://pubmed.ncbi.nlm.nih.gov/PMC7349096/)].
4. Tuller D, Lubet S. *Chronic fatigue syndrome may hold keys to understanding post-Covid syndrome*. 2020. Available from: <https://www.statnews.com/2020/07/21/chronic-fatigue-syndrome-keys-understanding-post-covid-syndrome/#:~:text=Chronic%20fatigue%20syndrome%20may%20hold%20keys%20to%20understanding%20post%20Covid%20syndrome&text=Some%20survivors%20of%20acute,pain%2C%20headaches%2C%20and%20more>.