

Defining Long COVID

Defining Long-COVID What exactly is Long-COVID syndrome? Long-COVID or post-COVID-19 is an umbrella term that refers to symptoms persisting past the initial phase. There are many definitions that have been offered. Long-COVID has recently been defined as “the condition that occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually 3 months from the onset of COVID-19, with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis” Likewise, there now exists an International Classification of Diseases, Tenth Revision (ICD-10) code corresponding to Long-COVID condition—U09.9. Basically, there are individuals who do not completely recover over a period of weeks, usually 2–3 weeks. Since COVID-19 is a novel disease, there is still no consensus of the definition of Long-COVID symptoms. A systematic review documented 20% of the reports of long-term COVID symptoms involved abnormal lung function, 24% involved neurological complaints and olfactory dysfunction, and 55% on specific widespread symptoms, mainly chronic fatigue and pain. The World Health Organization (WHO) developed a clinical case definition of Long-COVID by Delphi methodology that included 12 domains. However, the understanding of this definition has been going through changes as new evidence emerges, and we are gaining a better understanding of the consequences of COVID-19 and its mutations. Usually, three or more months past the acute COVID-19 infection, symptoms that last for at least 2 months and cannot be explained by alternate diagnoses may fit this definition. These symptoms include fatigue, shortness of breath, cognitive dysfunction, and symptoms that affect the functional capacity of patients with daily living and productivity. Symptoms may fluctuate, flare up, or relapse over time, adversely affecting multiple organ systems. We propose that the delay between surviving the acute COVID infection and the onset of the Long-COVID symptoms is a function of the P&S nervous systems. The P&S nervous systems function together to coordinate and control organs and organ systems to maintain normal organ function, even when the two nervous systems are dysfunctional. Prolonged P&S dysfunction, once severe enough, then leads to poor organ control and then symptoms. This process may take up to 3 months, faster if there were prior comorbidities, including age. This is the basis for our claims that Long-COVID is a combination of both parasympathetic dysfunction(s) and sympathetic

dysfunction(s). In our experience, the prolonged severe immune responses to COVID-19 seems to cause prolonged excessive parasympathetic responses, leading to secondary, prolonged, excessive beta-adrenergic (sympathetic) responses which prolongs and exaggerates heart rate, blood pressure, histaminergic, inflammatory, pain, and anxiety responses. The parasympathetic excess may also lead to both upper and lower GI symptoms. The oxidative stress of the acute COVID-19 infection also causes oxidative stress which often leads to alpha-adrenergic (sympathetic) dysfunction which leads to orthostatic dysfunction and poor coronary and cerebral perfusion and the perfusion of the anatomy in between causing many of the rest of the symptoms of Long-COVID. Long-COVID may directly affect the lungs, heart, nervous system, kidneys, and pancreas. Unfortunately, the lack of a standardized definition for Long-COVID syndrome presents obstacles for researchers Fig. 1 The cytokine storm involved in COVID-19 infections is a source of oxidative stress. Viruses and traumas (mental or physical) in general may lead to oxidative stress, which may lead to parasympathetic or sympathetic dysfunction(s), known as dysautonomia (adapted from Rasa et al.) ◀ Current Cardiology Reports 1 3 in studying the condition with controlled studies and arriving at a precise diagnosis and treatment algorithms. In addition, many patients with Long-COVID syndrome require rehospitalization especially those with comorbidities, such as cardiovascular disease, diabetes mellitus, obesity, cancer, and kidney disease.

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