

Long COVID Clinical Manifestations

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Abstract. People are becoming more aware of the complications and sequelae that can occur as COVID-19 research advances. These complications and sequelae are referred to collectively as "Long COVID" (Long COVID-19). This paper summarizes the clinical manifestations of Long COVID and sequelae observed in the respiratory, neurological, circulatory, digestive, and other affected systems caused by Long COVID through an extensive review of clinical studies published in recent years, with the goal of raising awareness of the importance of Long COVID patients and informing the development of a comprehensive treatment system for COVID-19 patients.

Keywords: Long COVID, Aftermath, COVID-19, Multi-System Diseases.

1. Introduction

According to the WHO, since the COVID-19 outbreak to the current date of 17 September 2022, the New Coronary Pneumonia outbreak has resulted in a total of 6,083,28548 infections, of which only 65,014,669 deaths have been attributed to New Coronary, accounting for only 1% of all deaths. Although the rate of death and serious illness is low, the sequelae associated with the recovery of COVID-19 cannot be ignored. The sequelae associated with it are developing into a new global health crisis after acute infection as the number of patients discharged from hospitals with novel coronavirus pneumonia keeps rising. A new global health crisis has emerged. The sequelae involve respiratory, neurological, circulatory, digestive, and other systems. Their duration and severity vary, negatively impacting people's physical and mental health as well as society's development.

The long-term sequelae caused by COVID-19 are extremely complex. A UK team conducted a survey of 600,000 Neocon patients and discovered that the top six most common symptoms were severe fatigue, breathing difficulties, insomnia, hearing impairment, chest pain or heaviness, and headache, in that order [1].

2. Clinical manifestations of long-term symptoms of neocoronary pneumonia

2.1. Respiratory system

The organ that COVID-19 affects most is the lungs. Persistent dyspnoea is one of the most common persistent symptoms in patients discharged from the hospital. 22.9% to 53% of patients continue to have persistent dyspnoea for 2 months after 'recovery'. 6.6% of discharged 'recovered' patients require long-term oxygen [2]. In a Chinese study of 55 non-critical patients with neocoronary pneumonia, pulmonary function tests showed exceptions in 25% of patients and decreased respiratory diffusion in 16% of patients during a 3-month period of follow-up [3].

A large number of 'recovered' patients with neocoronary pneumonia also had long-term abnormalities in their lung images. When patients with severe neocoronary pneumonia were assessed three months after 'recovery' from hospital discharge, 81% still had abnormal chest CT images [4]. As a result, consensus and guidelines have been published in many countries to address the prevention of pulmonary health sequelae in patients discharged from the hospital, recommending early post-discharge pulmonary rehabilitation measures. For example, pulmonary rehabilitation (PR) programmes are a core component of the management of patients with chronic respiratory disease, and can significantly improve lung function, exercise capacity and quality of life in patients with COVID-19 through a combination of multidisciplinary, personalised respiratory physiotherapy, endurance training, daily living training and psychological support. It has been shown to be effective,

feasible and safe in improving the respiratory sequelae of patients with COV-ID-19 at different severity levels.

2.2. Nervous system

A new Coronavirus infection may not only result in decreased grey matter thickness and brain tissue damage, but it may also impair their brains' ability to perform complex tasks. In a UK study of 785 brain scans of people aged 51 to 81 years, 401 neocon positive patients had lower grey matter thickness in the orbitofrontal cortex and parahippocampal gyrus, tissue injury in areas associated with primary sensory cortical function, and lower brain volume (brain atrophy) than 384 neocon negative patients [5]. The most common clinical manifestations were taste disturbance, olfactory disturbance, headache, and dizziness [6]. According to studies, more than half of patients have smell or taste disturbances four weeks after the acute phase, with some patients (11.7%) having symptoms for up to a year after infection [7]. A follow-up study from Spain discovered that 74.6% of patients experienced headaches while in the hospital, some experienced significant loss of smell, and a quarter experienced severe painful migraine-like episodes [8].

Furthermore, COVID-19 patients have cognitive deficits, primarily in the form of short-term memory impairment, inattention, executive function, and visuospatial processing [9]. As a result, it is reasonable to suspect that the neurological sequelae of COVID-19 may not be accompanied by persistent central nervous system damage, and that additional comprehensive long-term neurological follow-up is required to identify the mechanisms involved in the sequelae's development.

2.3. Circulation systems

Patients with neointima had a significantly increased risk of developing cardiovascular disease within 30 days to a year of infection, according to the study [10].

The neovirus attaches to the cardiomyocytes' ACE2 receptor, which converts angiotensin II into nitric oxide, which is also the virus's entry point. ACE2 receptors were found to be expressed in 7.5% of cardiac myocytes in a single-cell RNA sequencing study, putting them at an increased risk of direct viral damage to the target organ [11]. This was also confirmed in autopsy studies, where neocon viral RNA was found in 61.5% of the myocardium of deceased patients [12].

According to a large study of 153,760 newly infected patients in the United States, newly infected patients have a 52% higher risk of stroke, a 69% higher risk of heart rhythm problems, a 66% higher risk of inflammatory heart disease, and a 72% higher risk of heart failure. [11]. Moreover, the more severe the acute phase of the new coronary infection, the higher the risk of developing cardiovascular disease in the infected person [10].

Additionally, a routine examination of 100 patients who had been released from the hospital with neocoronary pneumonia increased nutrient troponin T in 60% of them, with nearly 71% of them having prolonged myocarditis [13]. This finding has been the subject of clinical debate, as other similar studies have not been reported, but it does seem to indicate a longer duration of cardiac effects following human infection with NCCV. In a study of 1216 patients hospitalised with neocoronary pneumonia [13], 55% of patients had echocardiographic abnormalities, including 46% of 901 patients without previous heart disease. Although the echocardiographic findings were not published at subsequent long-term follow-up, it is important to take into account any cardiac complications during hospitalisation in the long-term care of these patients. Governments and health systems worldwide should prepare for the significant impact of a new coronary pandemic that could lead to an increased burden of cardiovascular disease.

2.4. Digestive system

Gastrointestinal symptoms are also a common clinical manifestation of neonatal coronary artery disease.

In a retrospective study by Aiyegbusi et al of GI symptoms in patients 'recovering' from neocon pneumonia, diarrhoea was in the top 10, with an incidence of 6%. Anorexia, abdominal pain, vomiting,

and lack of appetite were some additional long-term symptoms [14]. COVID-19 persist in the digestive tract even after respiratory samples are negative and are excreted in the feces, so these symptoms are probably related to the virus' ongoing replication in the digestive tract. [15]. The study by Zuo et al. Liver function abnormalities are common in the acute phase of Neoplastic pneumonia and may be caused by hepatocellular damage or cholestasis [16]. This is associated with systemic inflammation, coagulation issues, hypoxia, adverse drug reactions, and adverse adverse drug reactions as well as direct viral toxicity, especially in the biliary tract [16].

2.5. Other affected systems

Long covid clinical manifestations also affect the reproductive, motor, and urinary systems.

COVID-19 patients have reproductive dysfunction, including testicular pain, orchitis, and epididymitis. A Swiss study [17] found that young soldiers recovering from COVID-19 had significantly lower motile sperm counts after a short period of follow-up. Although Chinese study [19] found SARS-CoV-2 in the testes and sperm of SARS-CoV-2 patients, the possibility of sample contamination cannot be ruled out, and the infection of SARS-CoV-2 in the male reproductive system remains unknown and controversial.

Joint pain is another common complaint. According to research [19], ACE2 receptors can be found in skeletal muscle and synovial tissue, and when the virus binds to these receptors, it can cause joint pain and other symptoms. The presence of ACE2 receptors in skeletal muscle and synovial tissues causes joint pain and other symptoms when the virus binds to these receptors.

Acute infections caused by COVID-19 frequently result in acute kidney injury (AKI), with a high incidence of AKI during hospitalization, which is strongly correlated with in-hospital mortality and a high proportion of patients who do not regain renal function by the time they leave the hospital [20]. Therefore, a larger study is required to ascertain whether renal impairment and COVID-19 are related. This will allow for appropriate control measures to be implemented in time to improve renal function and thus reduce the disease's long-term burden.

3. Conclusions

In this paper, some of the symptoms that have been long-term COVID-19 patients' symptoms are described, tentatively referred to as the long COVID. Regardless of the initial severity of the disease or the age of the patient, it is likely that the long COVID will affect the quality of survival after "recovery". However, there are still many unanswered questions about the COVID-19, as no uniform data have been analysed to date. This may be due to the complexity of the symptoms and the pathophysiological differences in the disease. Future research may thus concentrate on the treatment of the long COVID syndrome as well as a more comprehensive and close monitoring of people recovering from novel coronavirus pneumonia. At the moment, only rehabilitation is effective in alleviating the syndrome's symptoms, and more clinical research is needed to determine the efficacy of various drugs.

It is clear that this global pandemic has introduced a new chronic disabling disease to humans, and because these diseases are chronic, they are likely to have long-term effects on patients as well as health systems, as well as a broad impact on economic productivity and human life expectancy. As a result, addressing the challenges posed by the long COVID requires a global long-term response strategy, with a pressing need for interdisciplinary interventions to establish individualised rehabilitation and therapy systems for different populations, such as age, identity, occupation, financial scale, and geography, to facilitate the full recovery of the post-epidemic population.

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