



A Review on Post COVID-19 Effects

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Article info

Received 01 January 2021

Revised 03 February 2021

Available Online 13 February 2021

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Abstract

The whole world is under threat, due to the pandemic situation of COVID-19. According to the data, more than 30 million people were infected and over 1 million died all over the world. The clinical data states that, people recovered from COVID develop long-term effects on their body. More than 4 million people in US, UK and Sweden had symptoms after recovery from COVID, which was termed as post-acute COVID-19. The serious effects were observed like pulmonary dysfunction, myocardial inflammation and impaired mental health. There were serious heart and kidney related issues, which were observed. However, the people are in great danger, those who are suffering from post COVID effects.

Keywords: Post-acute COVID-19; Pulmonary dysfunction; Myocardial inflammation; Impaired mental health; Post COVID effects

Introduction

COVID-19 is caused by severe acute respiratory syndrome. Though the recovery from COVID is increasing, recovered cases are diagnosed with long term consequences. It was observed that the patient suffering serious COVID infections, develop post-acute syndrome. According to the clinical report, the people with post-acute syndrome, develop general symptoms and specific organ dysfunction [1-5].

What is post-acute COVID-19?

Post-acute syndrome was well observed in patients, those who are recovering from serious COVID infection [1]. It was stated that, post-acute COVID extend more than 3 weeks from the onset of first symptoms and the chronic COVID will extend more than 12 weeks [6]. According to the survey, only 65% of US population had returned to their healthy state in 14-21 days after a positive test [6,7].

Even mild COVID-19 may result from long term symptoms. These symptoms include cough, fever, shortness of breath, chest pain, headaches, muscle pain,

gastrointestinal upset, rashes and depression and other mental disorders [6,8,9] (**Figure 1**).

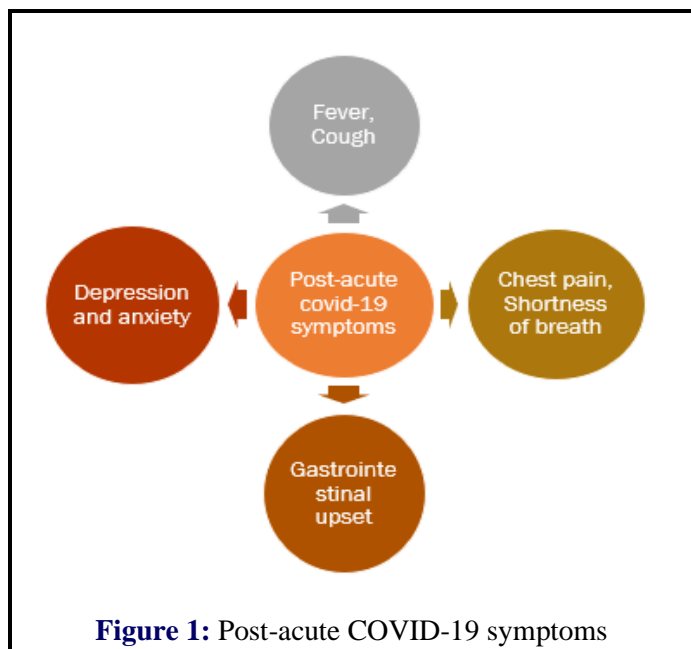
In short, though the patients had recovered from COVID, they had bad impact on their body.

The post COVID-19 has serious impact on various organs of the body. The table below shows, post COVID-19 effects on various organ systems (**Table 1**).

Respiratory system complications

As we know, COVID-19 is serious infection caused by SARS-CoV-2, which mainly infects respiratory system. Breathlessness is common after acute COVID-19. The patients recovered from acute COVID-19, are at high risk to develop long term impairment of lung. As everyone knows, this virus affects various body systems, the lungs are affected most. The effects on respiratory system includes mucous membrane damage, haemorrhage, pulmonary consolidation and alveolar fibrosis [10].

There are various test for measuring lung function, which includes spirometry, x-ray and CT scans.



British Thoracic Society states that, chronic cough last for more than 8 weeks. [611]. Till that time before serious cough infection, it should be managed by simple breathing exercises.

Due to high levels of LDH during acute illness increases the risk of pulmonary fibrosis [12]. The clinical data states that, patients who develop fibrosis after recovery, generally have serious infections during hospitalization [12]. High levels of CRP and IL-6 at the time of illness, may lead to formation of fibrosis during recovery [12,13].

Though the patients are recovering from COVID, people are under great danger in developing serious issues related to respiratory system.

Table 1: Post COVID-19 impact on various organs.

S. No.	Organ system	Post COVID-19 effects
1	Respiratory system	Long term impairment of lungs, alveolar fibrosis.
2	Cardiovascular system	Myocardial infraction, pericarditis, heart failure
3	Nervous system	Anxiety, depression, trauma, seizures, encephalitis
4	Excretory system	Kidney damage, proteinuria

Cardiovascular system complications

Cardiopulmonary complications include serious conditions like myocardial infraction, pericarditis and

dysrhythmias [6]. These problems are common in patients with pre-existing cardiovascular diseases.

Chest pain is very common in patient recovered from COVID. Left ventricular systolic dysfunction and heart failure are observed. The clinical data suggest that, COVID-19 has been demonstrated to interact with ACE-2. After the interaction it enters the host cells [14,15]. Due to the binding of SARS-CoV-2 with ACE-2, causes lung injury [14,16]. Due to the entry of virus there is increase in levels of angiotensin-2. And the increased ACE-2 receptor, increases the load of virus.

The cardiac complication in COVID is very dangerous issue, to those patients who had history of cardiovascular diseases and have long term effects after recovery.

Effect on mental health

There are many articles on COVID-19 and mental health, which states, individual reactions to the pandemic situation like anxiety and depression.

Data suggest that post-acute COVID-19 is mostly related to low mood, hopelessness and difficulty in sleeping [6]. The post-traumatic stress, which occurs mainly in healthcare workers [17]. The evidence indicates that, women, younger population and those who have poor quality of sleep are at high risk in developing mental health related issues [18]. The problems related to mental health are associated with poverty, discrimination and social exclusion [19]. Many survey have reported that after recovery from COVID, there is increased levels of anxiety and depression.

Impact on older patients

The infection of COVID-19 affects more severely in elderly patients [20]. Those who survive are under great danger in developing depression and delirium [11]. The post- COVID pain is very common in older patients [6,21]. The older population has poor immune system. So, the older patients after recovery from COVID have high risk of developing problems related to mental health, cardiovascular system and respiratory system.

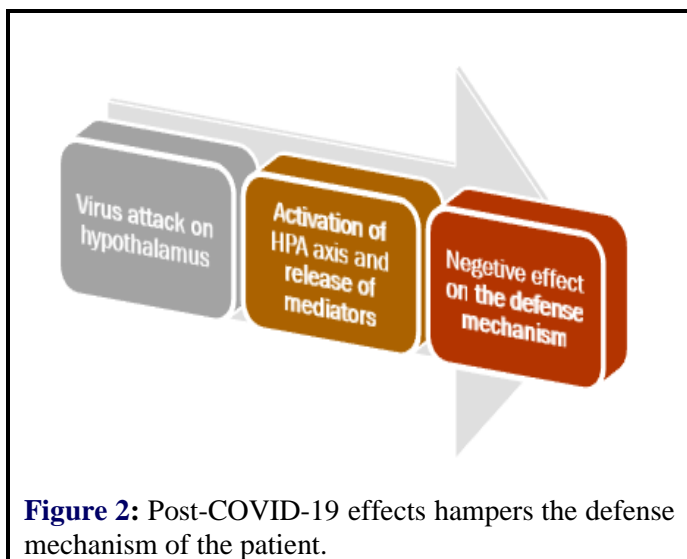
Impact on brain

It was observed that, ischaemic stroke, seizures, encephalitis and cranial neuropathies develop after the recovery from COVID-19 [6,22]. The common symptoms like headaches, dizziness and cognitive blunting are observed [6,9]. COVID-19 impact on nervous is long term.

The virus enter the brain through blood brain barrier. After entry of the virus into brain, meninges and choroid

plexus become infected. The hypothalamus is the target point of the virus and due to this there is contribution of poor immune system. Various cytokines regulated in COVID-19. These are powerful in activating hypothalamic-pituitary-adrenocortical (HPA) axis [23,24]. The HPA is activated by dysfunction of blood brain barrier [23,24]. Due to activation of HPA, there is release of norepinephrine and glucocorticoids. These mediators decrease the immune system by T cell apoptosis and natural killer cell deficiency. Because of these the defense mechanism of the body collapse (Figure 2).

As we know strong immunity is very to recover from any infection. But in case of COVID-19 complication of brain, the immune system is destroyed badly and has its long term effect after recovery from COVID.



Impact on kidney

Severe COVID-19 patients have been observed with the signs of kidney damage. Report suggests that 30% of the patients, which were hospitalized with COVID-19 in China and New York had develop kidney injury. Kidney problem in patients include high percentage of protein in urine. According to the survey, in 147 patients, 60% were diagnose with proteinuria and 48% patients were observed with haematuria [25]. It was observed that patients with AKI had higher mortality rate, compare to those who are without AKI [25,26].

According to the studies, the pre-existing kidney disease can become a risk factor especially in older patients [25].

After the recovery from COVID with kidney complication, there are long term effects on urinary system.

Conclusion

Many people all over the world were infected with COVID-19 and developed post-COVID effects. Though the recovery rate has increased, but people are facing with post-COVID effects. These impact more or less results from pre-existing cardiovascular, respiratory and urinary diseases. The long term effects are seen with the patients who recovered from serious infection. It has a dangerous effect on nervous system. The virus “severe acute respiratory syndrome coronavirus 2” (SARS-Co-V-2) has bad effect on all organ systems of the body.

Conflict of Interest

None

Funding

None

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This manuscript was peer-reviewed

Mode of Review: Single-blinded

Academic Editor: Dr. MA Jahangir

