Covid-19 and Cardiovascular Studies

Javeria Farooq*

Research Coordinator, Department of Biological and Biomedical Sciences, The Aga Khan University, Karachi, Pakistan

***Corresponding Author:** Javeria Farooq, Research Coordinator, Department of Biological and Biomedical Sciences, The Aga Khan University, Karachi, Pakistan.*

The first case of coronavirus infection (COVID-19) emerged In Wuhan, China and spread across all the world globally. COVID-19 was announced as pandemic by World Health Organization in March 2020. Firstly, it was assumed that novel corona virus effects lungs only but as it spread, reports of other complications and effect on other body system including cardiovascular system appeared [1]. Different theories were presented about a link cardiovascular disease and COVID-19. Various research studies conducted and showed a strong association between COVID-19 infection and cardiovascular diseases [2].

These clinical studies and case reports covered different aspects of COVID-19 effects on cardiovascular system. Large Number of research studies were conducted to explore the increase risk factor of COVID-19 in patients with pre-existing cardiovascular disease while some focused on cardiac complications resulting due to COVID-19 infection. Studies found that patients with pre-existing cardiovascular disease have an increased risk of severe COVID-19 infection with worse clinical outcomes [3]. Hypertension, hyperlipidemia and cardio-cerebrovascular are the most common comorbidities with COVID-19 requiring hospitalization. It was evaluated that hypertensive patients have high risk of mortality as compared to non-hypertensive patients [4]. On the other hand, clinical studies found COVID-19 infection might result in cardiovascular complications including heart failure, acute myocardial injury, arrhythmias and venous thromboembolism [5]. Studies explored that cardiac damage by COVID-19 might be associated with abundance of ACE2 expression in cardiovascular, lung, and kidney tissues. The literature showed that ACE 2 plays a major role in maintaining of the normal regulation of cardiovascular system. It is known that SARS-CoV-2 enters in cardiac and lung cells through binding with ACE2 receptors. This binding results in alteration of ACE2 signaling pathways, inhibiting the degradation of angiotensin II, resulting in accumulation of angiotensin II leading to its increased proinflammatory effects, damage to cardiac, pulmonary tissue, their function and increased tissue fibrosis [6].

In addition, numerous studies were conducted to discover the association of COVID-19 and medications used by cardiovascular patients and some evaluated the adverse effects of drugs used as trial treatment for COVID-19. The most hyped and controversial drug theory emerged was about use of Renin-angiotensin-aldosterone system (RAAS) inhibitors including angiotensin-converting enzyme inhibitors (ACEI) and angiotensin receptor blockers (ARB). These are frequently prescribed drugs in patients of hypertension and cardiovascular disorders. Two hypothesis were presented, one theorized that use of ACEI/ARB inhibit the ACE1 pathway and enhance the effect of ACE2 pathway and entry of more SARS -Cov-2 causing intense infection and severity of COVID-19 infection while other hypothesis proposed that ACEI/ARB inhibits the harmful ACE1 pathway activated by COVID-19 and enhances ACE2 receptor upregulation and activation of angiotensin (1-7) resulting in vasodilation and anti-proliferative effect and might be useful in reducing ACE-1 receptor-mediated damage by COVID-19 [7]. Several studies were conducted to find an evidence-based answer and it was found that use of ACEI/ARB is safe and can be prescribed in COVID-19 patients [8]. The other popular drug combination tested for treatment of COVID-19 infection was chloroquine/hydroxychloroquine and azithromycin. It is well documented that these both drugs prolong QT interval [9]. Many antiviral

drugs can cause cardiac toxicity. arrhythmia or other cardiovascular disorder. Use of antiviral drug for COVID-19 treatment can cause heart damage and arrhythmias [10].

Considering all these research studies, it's very important that patients with pre-existing cardiovascular disease should not do any alterations in their prescribed treatments and on the other hands physicians and cardiologist should be very cautious for risk factors of COVID-19 infection in their regular cardiac patients, before prescribing any trial treatment of COVID-19 infection and should monitor the COVID-19 patients for any possible drug interaction and complications risks.

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