

Cardiovascular disease and COVID-19: a consensus paper from the ESC Working Group on Coronary Pathophysiology & Microcirculation, ESC Working Group on Thrombosis and the Association for Acute CardioVascular Care (ACVC), in collaboration with the European Heart Rhythm Association (EHRA)

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ABSTRACT

The cardiovascular system is significantly affected in coronavirus disease-19 (COVID-19). The vascular response to cytokine production and the interaction between SARS-CoV-2 and ACE2 receptor may lead to a significant reduction in cardiac contractility and subsequent myocardial dysfunction. Microvascular injury, endothelial dysfunction and thrombosis resulting from viral infection or indirectly related to the intense systemic inflammatory and immune responses are characteristic features of severe COVID-19. The disease is characterized by cytokine storm, resulting in endothelial inflammation/dysfunction, micro- and macro-vascular thrombosis, which may damage organs other than the lung. Human studies have offered an alarming view of the risks of severe complications in elderly patients and in those with underlying cardiovascular disease or who are at high cardiovascular risk due to one or more risk factors such as hypertension, diabetes mellitus, hypercholesterolemia, or obesity. Moreover, recent studies revealed that some biological changes induced by COVID-19 throughout the organs are long-lasting. Consistent with this finding, a large number of patients who have been infected with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) continue to experience symptoms after the acute phase of the acute infection, that can evolve over time and persist for months. While still being defined, these effects are referred to as Post-Acute Sequelae of SARS-CoV-2 infection or “Long COVID”. Viral reservoirs or lingering fragments of viral RNA or proteins contribute to the condition. Moreover, systemic inflammatory response to COVID-19 has the potential to increase myocardial fibrosis which in turn may impair cardiac remodelling. Post-acute COVID-19 is a matter of major concern for patients affected by cardiovascular disease, given that the presence of underlying cardiovascular comorbidities in patients with COVID-19 is associated with high mortality and COVID-19 can cause cardiovascular disorders, including myocardial injury, arrhythmias, acute coronary syndrome (ACS), and venous thromboembolism. Nevertheless, to meet the urgent need for effective treatment and preventative strategies, rigorous efforts should be made to investigate and integrate biological and clinical findings related to COVID-19 in cardiovascular disease. The urgent need for effective treatments has resulted in the implementation of potential therapies lacking strong scientific evidence. Today there are several clinical trials investigating treatments and preventative measures for COVID-19. In conclusion, the identification of new biomarkers of cardiovascular complications, and development of effective treatments for COVID-19 infection are of crucial importance.