

## Preface

# COVID-19 Pandemic: Direct and Indirect Cardiovascular Effects



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The COVID-19 pandemic has had a dramatic impact on the care of patients with cardiovascular disease throughout the world. COVID-19 has a myriad of direct effects on the myocardium, vasculature, and coagulation cascade, related to the proinflammatory and prothrombotic effects of the virus, leading to an increased risk of myocardial infarction, stroke, deep venous thrombosis, and pulmonary emboli within the first 2 to 4 weeks of contracting the disease. Patients with preexistent cardiovascular disease and/or cardiovascular risk factors, such as hypertension and diabetes, are particularly susceptible to suffer complications from COVID-19, including hospitalization and mortality. Among hospitalized patients with COVID-19, myocardial injury, as detected by elevated troponins, is highly prevalent (20%–40%) and linked to adverse prognosis.

The indirect effects of the pandemic in terms of disruption of health care processes and pathways of care have been as dramatic. Public health measures designed to mitigate the spread of the virus, such as lockdowns, cancellation or deferral of elective procedures, in-person appointments, and restrictive visitation policies, resulted in patients' reluctance to obtain both

elective and emergent medical care. This resulted in a reduction in the number of patients with ST-segment elevation myocardial infarction (STEMI) presenting to hospitals throughout the world and significant delays in those who did arrive. This led to a dramatic increase in mortality for patients with non-STEMI and STEMI with a higher rate of out-of-hospital cardiac arrest, cardiogenic shock, and late complications of acute myocardial infarction. These deleterious effects on cardiovascular outcomes have been documented in patients with and without COVID-19. In addition, there have been significant economic and psychologic impact on patients throughout the world.

In this issue of *Cardiology Clinics*, we review the direct and indirect effects of the COVID-19 pandemic on patients with cardiovascular disease. Dr Louis and Dr Aronow start with an excellent overview of the cardiovascular manifestations of COVID-19. Then, Dr Micheli and Dr Sandoval review the causes for troponin elevation and the prognostic significance in patients with COVID-19. Dr Ebinger and his group provide an outstanding review of the immunologic manifestations of COVID-19 infections and vaccines. Then,

two articles describe the impact of COVID-19 on acute coronary syndromes with and without ST-segment elevation. Patients with COVID-19 frequently required mechanical circulatory support, including both VA and VV ECMO, nicely reviewed by Dr Gorder and her colleagues. Dr Bortnick and her group review the extracardiac prothrombic effects of COVID-19.

We then shift focus to the indirect effects of the COVID-19 pandemic with a review by Dr Guddeti and Dr Garcia on the worldwide impact on the care of patients with acute myocardial infarction. This is followed by the impact on emergency care and out-of-hospital cardiac arrest in an outstanding article by Dr Bosson and Dr Shavelle. Dr Damluji and Dr Grines describe the impact of late presentation of acute myocardial infarction leading to an increase in mechanical complications. Next, Dr Hanneman and her group provide a detailed review the impact of myocarditis following COVID-19 vaccination, which continues to be a controversial topic. Finally, Dr Mammas and Dr Estabragh wonderfully summarize the

overall health care implications of the COVID-19 pandemic. We believe this outstanding collection of articles regarding both the direct and indirect effects of the COVID-19 pandemic will help us to improve the care of cardiovascular patients.

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