



## Cardiovascular Considerations in COVID-19 Pandemic

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The coronavirus disease 2019 (COVID-19) is a new, unknown virus, that was first detected in December 2019, in Wuhan city of China (1,2). The primary manifestation of the disease was with flu-like symptoms and pneumonia, followed by hypoxia which required hospitalization or even stay in the intensive care unit (ICU) (3). Due to high transmission rate, the COVID-19 pandemic spread rapidly across the globe (4).

The death toll from the COVID-19 disease as of end of 2020 was reported more than 1.7 million (5). Although the primary course of treatment was carried out by pulmonologists and infectious specialists, gradually-increased reports on cardiovascular complications in these patients were also received (6).

Considering the overlap of some symptoms of cardiovascular disease with the primary respiratory symptoms of COVID-19, the specialists have faced a new challenge and hence have raised the alarm regarding the diagnosis of COVID-19 in patients with hemodynamic instability or suspected cardiovascular complications. The real challenge, however, surfaced when the pandemic spread; and as the number of diagnostic tests for COVID-19 increased, more asymptomatic cases with typical cardiovascular symptoms were detected. The problem then was committing asymptomatic patients to cardiac wards that were not quarantined, which risked the health of other patients and the medical staff with the COVID-19 (7,8). Cardiovascular manifestations of COVID-19 are different with patients presenting with new onset cardiomyopathy, stress cardiomyopathy, myocardial infarction, or even nonspecific myocardial injury.

Some case series studies suggested an outbreak of the acute cardiac injury, as increased troponin levels by 8% to 17%, heart failure by 23%, and in severe cases, the prevalence of arrhythmia by 44% were also observed (8-12).

In one of the case reports, a patient with the history of exposure to COVID-19 presented with chest compression but not with any respiratory symptoms or fever. The patient had a normal coronary angiogram. The next day she

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progressed to cardiogenic shock. The echocardiography reported a reduced left ventricular ejection fraction (LEEF) to 30%, severe left ventricular hypertrophy, and severe right ventricular failure.

In another case report, the patient presented with one week of cough, pleuritic chest pain, and oxygen saturation (sO<sub>2</sub>) of 93%. Over the course of several hours, his respiratory status rapidly deteriorated, and the patient required extracorporeal membrane oxygenation treatment. In the following day, the echocardiography report revealed the LEEF was 20% and the patient went into cardiogenic shock caused by COVID-19 (13).

Another case study reported a 53 year-old man who complained of severe fatigue with no symptoms of cough, fever, or any other pulmonary symptoms. The sO<sub>2</sub> was 98% and the chest X-ray was reported normal. The electrocardiography showed diffuse ST elevation and laboratory data showed increased cardiac troponin and N-terminal pro- brain natriuretic peptide (NT-proBNP). The patient had a normal coronary angiogram. As the patient sought medical attention at the time of coronavirus global epidemic, polymerase chain reaction (PCR) on throat swabs was positive. The magnetic resonance imaging (MRI) revealed the complications of myocarditis. And the EF was reported 30% (14).

Other reports have shown dilated cardiomyopathy or acute cellular rejection (heart transplant rejection) due to the COVID-19 infection (13).



The increased prevalence of arrhythmias has been reported among the COVID-19 patients, leading to many cases of deaths (15). Apart from hypoxia and electrolyte disorders, the medication used against COVID-19 can cause long QT syndrome seen in the electrocardiography and subsequent arrhythmia (16).

A multicentre, Italian study on admissions for acute myocardial infarction in CCUs showed a 48.4% reduction in both ST-segment elevation myocardial infarction (STEMI) and non-STEMI admissions. The reduction was higher for women than men. The STEMI case complications and fatality rate during the pandemic were substantially increased (17).

Regardless of association between cardiovascular disease and COVID-19, most of patients who present with exacerbated heart failure or ischemic heart disease may not be infected with the coronavirus. That is important that all centers have recommendations for a systematic approach for care of the patients with any cardiovascular symptoms during the COVID-19 pandemic. There are some recommendations for AMI managements in the COVID-19 era(18, 19).

### Take-Home Message

Regarding the ever-increasing number of reports concerning heart complications in the COVID-19 patients and the overlap of symptoms of respiratory and cardiac issues, the cardiovascular assessment of all COVID-19 patients with rapid symptom progression or the patients with suspected heart symptoms seems necessary.

Moreover, during the global pandemic of the COVID-19, in all patients with typical cardiac manifestations, COVID-19 has been rolled out. Regarding this, the use of personal protective equipment (PPE) in close contacts with cardiovascular patients should be considered (20).

### Ethical Issues

Not applicable.

### Conflict of Interests

The authors declare that they have no conflict of interests..

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