

Severe COVID-19 associated with heart issues

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Credit: American Heart Association

The number of people coronavirus disease 2019 (COVID-19) is rising with more cases in the U.S. (5M according to the Centers for Disease Control and Prevention, CDC) than any other country (20M confirmed cases worldwide, according to the World Health Organization, WHO).

Initially thought to be an infection causing disease of the lungs, inflammation of the vascular system and injury to the heart appear to be common features of this novel [coronavirus](#), occurring in 20% to 30% of hospitalized patients and contributing to 40% of deaths. The risk of death from COVID-19-related heart damage appears to be as or more important than other well-described risk factors for COVID-related mortality, such as age, diabetes mellitus, chronic pulmonary disease or prior history of cardiovascular disease.

"Much remains to be learned about COVID-19 infection and the heart. Although we think of the lungs being the primary target, there are frequent biomarker elevations noted in infected patients that are usually associated with acute heart injury. Moreover, several devastating complications of COVID-19 are cardiac in nature and may result in lingering cardiac dysfunction beyond the course of the viral illness itself," said Mitchell S. V. Elkind, M.D., MS, FAHA, FAAN, president of the American Heart Association, the world's leading voluntary organization focused on heart and brain health and research, and attending neurologist at NewYork-Presbyterian/Columbia University Irving Medical Center. "The need for additional research remains critical. We simply don't have enough information to provide the definitive answers people want and need."

Compared with other major viral outbreaks in recent memory, including [severe acute respiratory syndrome](#) (SARS-CoV-1) in 2002-2003, the pandemic of COVID-19, which is caused by a novel coronavirus termed severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), appears to be less fatal, but it spreads more easily. Adults over age 60 are likely more susceptible to contracting the infection and more likely to die when they do. However, researchers do not yet know why older people are more likely to get sick.

While the majority of COVID-19 patients appear to recover well, a

smaller number experience severe, exaggerated inflammation throughout the body, known as a cytokine storm. This systematic inflammation, which is carried through and affects the entire vascular system, is seen in the most severe cases and at the advanced stage of the illness. It can lead to widespread blood clotting, organ failure and/or damage to the heart or other organs. Similarly generalized inflammation likely contributes to a condition known as Multisystem Inflammatory Syndrome in Children, seen in a small number of children with COVID-19 who displayed Kawasaki disease-like symptoms. Symptoms of this syndrome are fever, abdominal pain, gastrointestinal complaints and rash. Myocarditis and meningitis can occur, and patients may have circulatory collapse and respiratory failure.

COVID-19 (SARS-CoV-2) enters cells by binding to the angiotensin-converting enzyme 2, or ACE2, a component in the body's vascular system that controls blood pressure and may contribute to the development of cardiovascular issues. The relationship between viral entry and ACE2 had led to controversy surrounding the use of drugs which interfere with the renin-angiotensin-aldosterone system, thereby increasing the level of ACE2 and theoretically increasing susceptibility to infection. However, credible animal models of viral infection have shown that higher ACE2 levels may be protective by providing a backlog of receptors to offset those lost during the infection. And [human studies](#) have not shown greater susceptibility to or severity of infection among those taking drugs that affects ACE2.

In March, the American Heart Association, the Heart Failure Society of America and the American College of Cardiology jointly recommended continuation of angiotensin converting enzyme inhibitors (ACE-i) or angiotensin receptor blocker (ARB) medications for all patients already prescribed those medications for indications such as heart failure, hypertension or ischemic heart disease. The statement—which remains valid today—indicates that patients with cardiovascular disease who are

diagnosed with COVID-19 should be fully evaluated before adding or removing any treatments, and any changes to their treatment should be based on the latest scientific evidence and shared-decision making with their physician and health care team.

Nearly a quarter (23%) of people hospitalized for COVID-19 have experienced serious cardiovascular complications. Studies have shown 8% to 12% of all COVID-19 patients have acute cardiac injury. There are also case studies that indicate COVID-19 may lead to heart attacks, acute coronary syndromes, stroke, blood pressure abnormalities, clotting issues, diffuse myocarditis (heart muscle inflammation) and fatal arrhythmias (irregular heartbeats). Based on studies of similar viruses, researchers speculate that heart complications are possible even after recovery from COVID-19. Two recent small German studies found heart muscle abnormalities months after patients had recovered.[6] While the incidence of these complications is not fully known, and it remains unclear how much cardiac injury is due to direct COVID-19 infection of the heart muscle or a result of immune mediated cardiac dysfunction following a profound viral illness, the virus does have a critical influence on the cardiovascular system.[7] There is concern that SARS-CoV-2 may have lasting or even delayed effects on the cardiovascular and nervous systems, a possibility that requires further investigation.

Previously, the American Heart Association warned of the potential harm to the [heart](#) from use of the antiviral and antimalarial agent hydroxychloroquine as a COVID-19 treatment. At that time, the Association indicated further evaluation is necessary to justify routine use of hydroxychloroquine as a treatment—that remains the case today. More research is needed before hydroxychloroquine can be recommended for COVID-19. People should not take any forms of hydroxychloroquine or chloroquine, or azithromycin, without a full evaluation by their doctor and a careful assessment of the potential harms. The U.S. Food and Drug Administration has recommended

against further study of these treatments given concerns about harms from the medications.

More information: Zachary M. Most et al. The Striking Similarities of Multisystem Inflammatory Syndrome in Children and a Myocarditis-like Syndrome in Adults: Overlapping Manifestations of COVID-19, *Circulation* (2020). [DOI: 10.1161/CIRCULATIONAHA.120.050166](https://doi.org/10.1161/CIRCULATIONAHA.120.050166)

Provided by American Heart Association

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