

Heart risk factors, not heart disease itself, may increase odds of COVID-19 death

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Seeking to clarify connections between pre-existing heart disease and

COVID-19, a study of critically ill patients has found their risk of dying from COVID-19 may stem not directly from heart disease, but from the factors that contribute to it.

People with heart disease have been, and continue to be, at higher risk of developing severe COVID-19, according to the Centers for Disease Control and Prevention. The new study, published Tuesday in *Circulation: Cardiovascular Quality and Outcomes*, suggests [cardiovascular risk factors](#)—such as being older and whether a person smoked—were the main contributors to serious illness, rather than heart disease itself.

COVID-19 is known to cause organ damage through uncontrolled inflammation. Inflammation also is common in people with heart disease and stroke, and it's associated with smoking and other [cardiovascular disease](#) risk factors such as high blood pressure and diabetes.

To understand the connections, researchers looked at the records of 5,133 critically ill COVID-19 patients who were part of a collaborative study called STOP-COVID. The patients came from 68 hospitals across the U.S. and were admitted to ICUs between March 1 and July 1, 2020.

Of those, 1,174 had pre-existing cardiovascular disease, defined in the study as including [coronary artery disease](#) (plaque in the heart's arteries), heart failure (where the heart fails to pump effectively) or atrial fibrillation (a type of irregular heartbeat).

Having pre-existing cardiovascular disease initially appeared to be a risk factor for dying within 28 days of hospital admission for COVID, said senior author Dr. Salim Hayek. He's an assistant professor at the University of Michigan in Ann Arbor, where he's director of the Frankel Cardiovascular Center.

But when researchers separated out things associated with cardiovascular disease, such as age, [high blood pressure](#) and diabetes, the link between cardiovascular disease itself and death from COVID appeared to be statistically insignificant.

The researchers found the most important risk factors for death to be, in order, age, body mass index (a measure of obesity), race and ethnicity, and history of smoking.

The results suggest the increased risk of death among heart disease patients studied is less that they have plaque-lined arteries, and more that they have risk factors contributing to COVID-19's hyperinflammation, Hayek said. He acknowledged, however, that because the study had few people with heart transplants or severe cardiovascular disease, such as advanced [heart failure](#), the researchers could not draw conclusions about them.

In a second part of their analysis, the researchers looked at a biomarker for heart damage called troponin. Troponin is commonly used as a test for whether someone has had a heart attack. But, Hayek said, it also can indicate stress on the cardiovascular system or cardiac injury as the body struggles with a COVID-19 infection.

Among the 2,741 patients for whom troponin levels were available, "cardiac injury was a strong predictor of bad outcomes," Hayek said—regardless of whether the patient had cardiovascular disease. The higher the troponin level, the more likely a patient would die. "Essentially, what we're seeing here is that cardiac injury is a surrogate marker for the severity of the COVID-19 illness," he said.

Summing up, Hayek said, the first part of the study "highlights that it's not the pre-existing cardiac disease. And the second part highlights that cardiac injury is linked to worse outcomes." Together, that suggests the

cardiac injury is probably related to the stress of the acute COVID-19 illness rather than a sign of new complications of cardiovascular disease.

He said the study emphasizes that severe COVID-19 is a hyperinflammatory process—and that the inflammatory processes linked to cardiovascular risk also put people at risk of having severe COVID.

The study does not mean that someone with existing cardiovascular disease can ignore the problem, Hayek said. Instead, people need to think about those shared risk factors.

Dr. Tracy Y. Wang, a professor of medicine in cardiology at Duke University in Durham, North Carolina, agreed.

People with heart disease are still at higher risk of dying from COVID-19, said Wang, who was not involved in the research. But the study helps clarify what's harming people.

"It's not so much about the fact that they previously had heart disease," she said. "It's about their overall health status that makes them higher risk. So that distinction I think is really interesting."

The association between cardiac injury and death "seems like a bit of a no-brainer," she said. Severe COVID-19 causes damage everywhere, not just the heart. "Patients who die tend to have more organ hits, so to speak," she said. Troponin levels would be just one more marker of the fact that they're sick.

She noted that "a good chunk of these patients never had troponin measured," which makes it harder to draw conclusions.

But she said the findings, overall, offered a bit of a silver lining to patients.

"It's saying not all hope is lost even if you've had prior heart disease," she said. These results suggest that if researchers can learn how to limit levels of heart damage, "then we have a much better chance of having patients survive their ICU stay, and hopefully have better quality of life and longevity after this as well."

Regardless of whether they've been diagnosed with heart disease, people could think about the findings as a way of inspiring self-care, Wang said. "If you can practice good preventive therapy—see a doctor regularly, keep your diabetes under control, aim for a healthy weight, aim for an active lifestyle—the combination of all of those things should not only limit your risk of developing heart disease, that also would help keep your disease severity lower and your risk of adverse outcomes lower even if you were to contract COVID-19."

Hayek said he hoped the research would lead to a better understanding of the root links between heart disease, inflammation and infectious diseases, perhaps to tease out better markers that all the conditions might share.

"Because there is an overlap between inflammation and cardiovascular disease, understanding the link mechanistically will be of value not just for this pandemic, but for any severe infectious illnesses to which patients with [heart disease](#) are exposed," he said.

More information: Alexi Vasbinder et al, Relationship Between Preexisting Cardiovascular Disease and Death and Cardiovascular Outcomes in Critically Ill Patients With COVID-19, *Circulation: Cardiovascular Quality and Outcomes* (2022). [DOI: 10.1161/CIRCOUTCOMES.122.008942](https://doi.org/10.1161/CIRCOUTCOMES.122.008942)

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