High blood viscosity can predict higher risk of death in hospitalized COVID-19 patients

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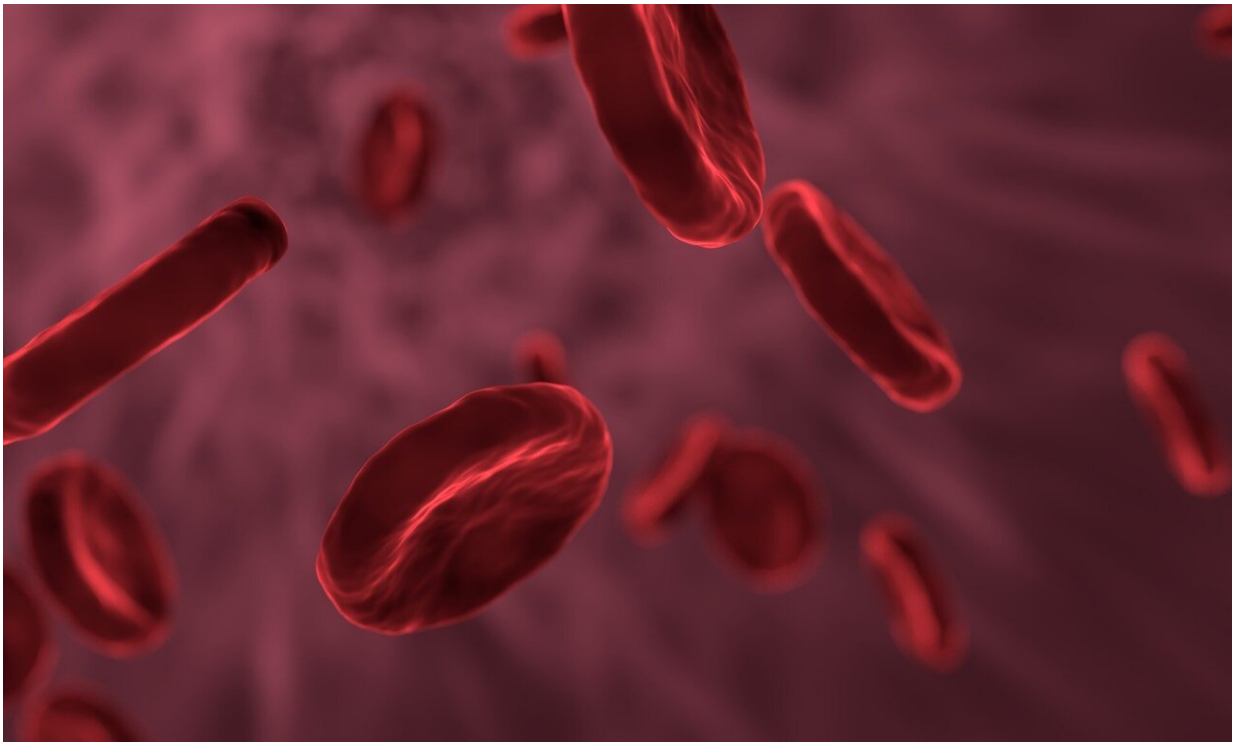

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A large-scale study is the first to evaluate blood viscosity in the prediction of mortality in COVID-19 patients. A simple calculation of blood viscosity was more robust in the identification of hospitalized patients at risk for dying from COVID-19 complications when compared to common measures of inflammation and the blood clotting biomarker

D-dimer. The study is published in the *Journal of the American College of Cardiology*.

Patients hospitalized with COVID-19 with high estimated blood viscosity are at higher risk of death from complications. High blood viscosity impairs flow to small vessels and increases the risk of blood clots. This measure of blood thickness can be used as a predictor of mortality.

Doctors typically measure hematocrit and globulins (difference between total protein and albumin) in all patients for diagnosis and monitoring treatment of hospitalized patients; however, they do not measure blood viscosity directly. A validated estimate of blood viscosity can be derived from the hematocrit and globulins. In this study, the estimate of blood viscosity was more strongly associated with mortality in COVID-19 patients than other commonly used risk stratification measures. This is an easy calculation that could be added to electronic medical records or lab forms and can improve chances for survival in hospitalized COVID-19 patients.

Researchers looked at records of 5,621 COVID-19 patients from six hospitals in the Mount Sinai Health System between February 27, 2020, and November 27, 2021. All had clinical and laboratory-verified diagnoses of COVID 19 and were identified within 48 hours of hospitalization and followed until hospital discharge or death.

The study found that hospitalized patients who had high blood viscosity had a 60 percent higher death rate with blood viscosity measured under high flow conditions such as the arteries and 32 percent higher mortality with blood viscosity measured at low flow such as the microcirculation (blood circulation in the smallest vessels), than patients with a low blood viscosity.

Blood viscosity is elevated by acute phase reactants (fibrinogen, macroglobulins) that have been associated with acute COVID-19 infections. Blood viscosity is an integrated measure of these acute phase reactants and the cellular components that can increase during infection. When the blood viscosity is high, physicians may consider therapeutic heparin for patients, hydration, or intensification of glucocorticoids to lessen the severity of the acute phase response to COVID-19.

"This study demonstrates the importance of checking for blood viscosity in COVID-19 patients early in hospital admission, which is easily obtained through routine lab work. Results can help determine the best treatment course for at-risk patients and help improve outcomes," says Robert Rosenson, MD, Professor of Medicine (Cardiology) at the Icahn School of Medicine at Mount Sinai and Director of Cardiometabolic Disorders for the Mount Sinai Health System. "We are currently investigating the effects of therapeutic heparin to reduce the risk of complications during acute COVID-19 infections, which may greatly benefit those with high blood viscosity."

More information: Daein Choi et al, Association of Blood Viscosity with Mortality among Patients Hospitalized with COVID-19, *Journal of the American College of Cardiology* (2022). DOI: 10.1016/j.jacc.2022.04.060

Provided by The Mount Sinai Hospital

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