September 17: Impact of COVID-19 on the Heart

In today's issue, Northwestern Medical Group and Bluhm Cardiovascular Institute Cardiologist ***Sadiya S. Khan, MD****, shares information about the impact of COVID-19 on the heart.*

While the novel coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2 is a respiratory virus that causes an influenza-like illness, emerging data suggest involvement of the cardiovascular system in risk of and complications associated with COVID-19. It is now well-established that individuals with pre-existing cardiovascular disease or cardiovascular risk factors, such as obesity, hypertension or diabetes, have worse outcomes with COVID-19.

Conversely, COVID-19 itself has been associated with a broad spectrum of cardiovascular sequelae, including acute coronary syndromes, heart failure, arrhythmias and venous thromboembolism. However, there is significant debate regarding the frequency, severity and clinical impact of direct and indirect myocardial injury due to infection with SARS-CoV-2.

Evidence suggesting direct involvement of the myocardium has been documented through autopsy reports and identified in small studies with noninvasive imaging. Among 39 patients who died of COVID-19 in Germany between April 8 and April 18 who underwent an autopsy (median age of 85), 24 patients (62%) were identified to have presence of the virus (detectable SARS-CoV-2 RNA) in the interstitial cells within the cardiac tissue. However, this was identified in the absence of clinical or histologic evidence of myocarditis preceding death.

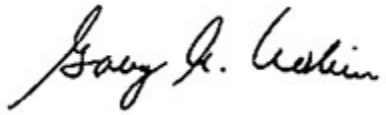
Noninvasive imaging with cardiac magnetic resonance imaging in patients with a known history of COVID-19 has identified several abnormalities, including myocardial edema (elevated T2 signal) and myocardial scar (late gadolinium enhancement). The clinical significance of these findings remains uncertain, and longer-term studies of the impact of these findings are needed. Several studies also have demonstrated evidence of indirect myocardial injury with elevation of cardiac biomarkers during acute infection with SARS-CoV-2. Levels of biomarkers, including troponin and brain natriuretic peptide (BNP), have been associated with worse outcomes during hospitalization and increased risk of death.

Given the systemic effects of COVID-19 associated with hyperinflammation, cytokine storm and even progression to septic shock, evidence of myocardial demand-related injury may reflect the severity of illness similar to other causes of septic shock and multi-organ failure. Evidence is now emerging that COVID-19 is more of an endothelial disease targeting small vessels throughout the body and has been associated with venous thromboembolism and microvascular thrombi that may be caused by perturbations in plasminogen activator inhibitor-1 (PAI-1). Whether screening

for this broad spectrum of cardiovascular abnormalities is warranted is not clear, especially in those who have no symptoms.

If you have a patient who is experiencing cardiovascular complications from COVID-19 and would benefit from a consultation, **Bluhm Cardiovascular Institute** has physicians across the health system who can help. Click the link above to learn more.

Thank you to all NM physicians and clinicians for your ongoing commitment, collaboration and leadership in providing exceptional *Patients First* care.



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