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EDITORIAL COMMENT

COVID-19 STEMI 2020

It's Not What You Know, It's How You Think*

Mladen I. Vidovich, MD,[a,b] David L. Fischman, MD,[c] Eric R. Bates, MD[d]

The coronavirus disease-2019 (COVID-19) pandemic has affected every aspect of cardiology practice. Importantly, the performance of primary percutaneous coronary intervention (PCI) in patients with ST-segment elevation myocardial infarction (STEMI) is increasingly challenging, given delays in emergency medical system availability and transfer times, suspension of pre-hospital activation of the cardiac catheterization laboratory, prolonged emergency department evaluations, and infection control requirements in the cardiac catheterization laboratory that delay time to treatment. All this is happening while the hospital systems are facing unprecedented staffing and space challenges (1–3).

In this issue of *JACC: Case Reports*, Loghin et al. (4) report on a young man who presented with symptoms consistent with acute hypoxic respiratory failure requiring mechanical ventilation. He was found to be COVID-19 positive. In the setting of fever and acidemia, he developed inferior ST-segment elevation. In the pre-COVID-19 era, this patient probably would have undergone emergency diagnostic coronary angiography and would not have been the subject of a case report. Not now. We live in the COVID-19 era, and how we approach STEMI has changed for the immediate future.

Loghin et al. (4) used a cognitive process to determine whether to perform emergency angiography instead of automatically activating the STEMI team. They established a low pre-test probability (29 years old, absence of atherosclerotic risk factors), used information from the chest computed tomography scan (absence of coronary calcification), demonstrated normal left ventricular ejection fraction and absence of wall motion abnormalities on echocardiography, and supported their decision with negative cardiac biomarkers (troponin and myoglobin). They made another important decision—they did not administer fibrinolytic therapy for what turned out to be a STEMI mimic.

COVID-19 has introduced new clinical and logistical challenges in the treatment of STEMI (5). We are learning that ST-segment elevation in the COVID-19 era may represent STEMI mimics; myocarditis, microvascular thrombosis, cytokine-mediated injury, and stress-induced cardiomyopathy are now clinical possibilities. Logistically, we now understand that the decision to proceed with angiography carries a significant risk for nosocomial spread of the virus endangering hospital staff. We are also learning that acute kidney injury is quite prevalent and highly associated with mortality in COVID-19 patients (6). One should think twice before administering intravenous contrast medium in these patients.

Consensus documents from our professional societies that are based on early COVID-19 observations have resurrected considering the use of fibrinolytic therapy for STEMI (7). In a setting of limited staffing and resources, and where time to treatment is expected to be significantly delayed, fibrinolytic therapy provides a more rapid and logistically easier approach to reperfusion therapy while reducing staff exposure

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From the [a]Division of Cardiology, Department of Internal Medicine, University of Illinois at Chicago, Chicago, Illinois; [b]Division of Cardiology, Jesse Brown VA Medical Center, Chicago, Illinois; [c]Division of Cardiology, Department of Internal Medicine, Thomas Jefferson University, Philadelphia, Pennsylvania; and the [d]Division of Cardiovascular Medicine, Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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to infection. However, contraindications to fibrinolytic therapy have to be absent, and STEMI mimics have to be excluded. The fibrinolytic strategy is probably most reasonable for hospitals without PCI capability or immediate availability. At PCI-capable hospitals with adequate staffing, primary PCI is still preferred (8,9).

Until there is universal availability of rapid testing (<5 min) for both the virus and the antibodies, our approach to STEMI will have to be modified. This is primarily the result of new infection control considerations that will have to be included in our daily workflow. The current door-to-balloon time quality metric should be suspended by hospital quality improvement committees as a measure of system performance because of the current diagnostic and logistical challenges in delivering STEMI care. In the American College of Cardiology National Cardiovascular Data Registry CathPCI Registry reporting form, noting a "system delay" as a reason for a prolonged door-to-balloon time will avoid any external quality of care penalties.

We now work in the era of COVID-19 STEMI care. The days of reflexively activating the STEMI team for immediate primary PCI have to be modified as we work through the challenges of STEMI mimics and delays in time to treatment.

ADDRESS FOR CORRESPONDENCE: Dr. Mladen I. Vidovich, University of Illinois at Chicago, 840 South Wood Street, Suite 935, Chicago, Illinois 60612. E-mail: miv@uic.edu. Twitter: @mividovich.

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