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Editorial

Management of acute myocardial injury in patients with confirmed or suspected COVID-19

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The Coronavirus Disease-2019 (COVID-19) pandemic has made the healthcare system rethink its approach to even the most basic practices. The same holds true for cardiovascular medicine, where protocols and quick decision making are required for time-sensitive and life-threatening clinical scenarios. At times like these, we are compelled to think outside the box and use alternate, easily accessible, safe and multidisciplinary approaches.

COVID-19 can affect the heart in multiple ways and recent reports indicate that acute myocardial injury and subsequent troponin and/or ST segment elevation are common findings and risk predictors among these patients. COVID-19 can induce oxygen demand or supply mismatch, plaque rupture, myocardial inflammation, and microvascular constriction or thrombosis, leading to coronary myocardial injury, i.e. type 1 or 2 myocardial infarction (MI), or non-coronary myocardial injury, i.e. myocarditis, stress-induced cardiomyopathy, and thrombotic microangiopathy (TMA) [1,2]. A recent case series showed high prevalence of non-coronary myocardial injury in patients presenting with ST elevation [3].

Quick and effective triaging of confirmed/suspected COVID-19 patients is of utmost importance to maximize patient care, while minimizing the exposure of skilled personnel and equipment. Considering the above implications, we propose a comprehensive protocol to manage myocardial injury in suspected/confirmed infection (Fig. 1). The protocol incorporates the ACC/SCAI recommendations for management of acute coronary syndromes in COVID-19 patients [1,2], but goes one step beyond, providing a global approach for the management of myocardial injury at the point of care where critical triaging and decision-making take place.

Both suspected and confirmed COVID-19 patients with acute myocardial injury are treated similarly. The cardiovascular team does the initial evaluation and triaging through tele-consult if possible. Triaging is based on a combination of history/risk factors, ECG pattern, cardiac biomarkers (levels and trend), focused perfusion (contrast) echocardiography (FPE), or coronary computed tomography angiography if available. FPE plays a central role in triaging as it provides critical information at bedside regarding the presence and distribution of wall motion abnormalities (WMA) and myocardial perfusion. It is quick, focuses on contrast-enhanced WMA and perfusion, and allows to better

https://doi.org/10.1016/j.atherosclerosis.2020.06.008 Received 4 June 2020; Accepted 11 June 2020 Available online 16 June 2020 0021-9150/ © 2020 Elsevier B.V. All rights reserved. assess whether there is ongoing myocardial ischemia/injury [4]. Patients with definite or probable regional WMA in a coronary distribution are treated as MI, while those with WMA outside of a coronary artery distribution, are considered as non-coronary myocardial injury, i.e myocarditis, stress cardiomyopathy or TMA. WMA pattern and perfusion can further differentiate myocarditis (normal microvascular perfusion with a focal or global WMA) from TMA (WMA and perfusion confined to one/two segments) or stress cardiomyopathy (mid/apical WMA with/without perfusion abnormalities). For patients with MI, contrast-enhanced WMA combined with myocardial perfusion can assist in differentiation of type 1 (acute atherothrombosis resulting in reduced perfusion and WMA in a coronary territory) from type 2 (demand/supply mismatch with WMA in a coronary territory, but preserved or slightly reduced perfusion).

Type 2 MI (including coronary spasm) and stable non-ST elevation MI are treated conservatively, whereas unstable non-ST elevation MI follows an early invasive strategy, provided that the benefit from revascularization exceeds the risk of respiratory failure, adverse outcomes and COVID-19 exposure. For STEMI, the reperfusion approach is based on patient's clinical, electrical, and hemodynamic stability, bleeding risk, time delays, and severity of COVID-19 disease. Even though primary percutaneous coronary intervention (PCI) remains the treatment of choice, some deviations can be considered. STEMI can be considered for thrombolysis after carefully considering the bleeding risk and age in patients with critical illness/severe pneumonia or anticipated delays in percutaneous reperfusion. Rescue PCI can be considered if thrombolysis fails after considering the patient's respiratory status and prognosis. In STEMI patients with critical illness or severe pneumonia, conservative therapy can be considered after balancing the bleeding risk, severity of lung injury, and reperfusion benefit [1,2]. Thrombolysis should be considered only in patients with high likelihood for STEMI, to avoid unnecessary, and potentially harmful, thrombolysis of non-coronary ST-elevation syndromes.

In conclusion, we believe that a comprehensive protocol-based triaging and decision making at the point of care in COVID-19 patients presenting with acute myocardial injury is warranted to limit provider anxiety and confusion, provide a pathway for streamlined management of these challenging patients, while simultaneously minimizing the exposure of medical personnel to this highly contagious virus.







CV: Cardiovascular, ED: Emergency department, CCTA: Coronary computed tomography angiography, TIMI: Thrombolysis in myocardial infarction, PCI: Percutaneous coronary intervention

Fig. 1. Pathways for triaging and management of confirmed/suspected COVID-19 patients with myocardial injury.

Institutions caring for COVID-19 patients would benefit from a heart team-like approach, developing a combined cardiology/critical care team that meets daily to optimize diagnostic and therapeutic strategies. Undoubtedly, the COVID-19 pandemic poses enormous pressure on health care systems worldwide, but at the same time it brings an opportunity to review and revisit patient care pathways to make them faster, smarter and more cost-effective [5].

Declaration of competing interest

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Yiannis S. Chatzizisis*, Ganesh Gajanan Cardiovascular Division, University of Nebraska Medical Center, Omaha, NE, USA E-mail address: ychatzizisis@icloud.com (Y.S. Chatzizisis).

Deepak L. Bhatt

Heart and Vascular Center, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA

George Dangas

The Zena and Michael A. Wiener Cardiovascular Institute, Mount Sinai Hospital, Icahn School of Medicine, New York City, New York, USA

Thomas Porter

Cardiovascular Division, University of Nebraska Medical Center, Omaha, NE, USA

^{*} Corresponding author. Cardiovascular Division, University of Nebraska Medical Center, 982265 Nebraska Medical Center, Omaha, NE, 68198, USA.