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EDITORIAL COMMENT

Updates on the Management of STEMI in 2021

Beyond COVID-19*

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In this issue of the *Journal of the American College of Cardiology*, Garcia et al¹ provide an analysis of the true impact of COVID-19 on the management and outcomes of patients with ST-segment elevation myocardial infarction (STEMI).

SEE PAGE 2236

This particular analysis represents an update of the previously published larger NACMI (North American COVID-19 STEMI) registry,² which was established at the very beginning of the pandemic and analyzed the prognostic impact of SARS-CoV-2 infection in 64 centers in the United States and Canada. The first data in 2020 demonstrated that COVID-19-positive patients were less likely to receive coronary angiography and primary percutaneous coronary intervention (PCI), with negative prognostic consequences: in fact, the primary outcome of major adverse cardiovascular events occurred in 36% of the patients with COVID-19, 13% of patients suspected to have COVID-19, and 8% of control patients ($P < 0.01$). However, mortality was halved among the patients undergoing primary PCI, even despite COVID-19 infection (28% vs 48% in patients medically managed). In addition, minority populations and patients with diabetes mellitus were more common in COVID cases, as well as high-risk features such as dyspnea, pulmonary infiltrates, and shock, preventing invasive management and worsening the outcomes.

In the present analysis, Garcia et al¹ provide an overlook on the evolution of the situation in 2021. They observed a change in the patients' characteristics over the time. When compared with 2020, the proportion of Caucasian patients was higher, atypical and respiratory symptoms and shock lowered and early invasive management increased over time, associated with a mortality decrease from 33% (Y2020) to 23% (Y2021) ($P = 0.008$). Among COVID-19-negative patients, clinical features and management were comparable to the pre-pandemic period.

These data stress the importance of maintaining an efficient STEMI network to warrant prompt access of patients to primary PCI, allowing improvement in the success of recanalization, myocardial salvage, and the outcomes.³⁻⁵ This conclusion was also supported by the Task Force of the European Society of Cardiology, who recommended that the COVID-19 pandemic should not compromise timely reperfusion of STEMI patients.⁶ The data from the NACMI registry¹⁻² suggest that in the initial phases of the COVID-19 pandemic, the need to assess positivity and to implement protective measures for health care personnel could have delayed access to reperfusion strategies in positive or suspected positive patients, increasing mortality ($P = 0.008$ vs control population). Moreover, the fear of contagion and the diversion of the ambulance transportation facilities for the management of infected patients could have increased the prehospital times, explaining the higher rates of shock at presentation. However, total ischemia time was not assessed in this registry. The running-in of the dedicated networks and the increased confidence of the operators with the procedures certainly contributed to the improvement reported by Garcia et al¹ in 2021, representing in the first available data to confirm the benefits of the efforts accomplished so far.

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In another recent larger registry, ISACS-STEMI (Primary Angioplasty for STEMI During COVID-19 Pandemic), including 109 centers located on 4 continents, De Luca et al⁷ reported a significant increase in door-to-balloon and total ischemia times in 2020 compared with data before COVID-19, which may have contributed to the higher in-hospital (6.5% vs 5.3%; $P < 0.001$) and 30-day mortality (8% vs 6.5%; $P = 0.001$) during the pandemic. In this study, suspected positive patients were not considered separately, and data in 2021 were not collected. In this registry, including only patients treated with primary PCI, the incidence of death was comparable to the COVID-19-negative patients of the NACMI registry. Nevertheless, in a subanalysis restricted to the COVID-19 cases, De Luca et al⁸ showed a remarkably higher in-hospital mortality (29% vs 5.5%; $P < 0.001$), definite in-stent thrombosis (8.1% vs 1.6%; $P = 0.004$), and heart failure (22.6% vs 10.6%; $P = 0.001$) among infected patients, despite having baseline characteristics and a reperfusion strategy that were comparable to negative patients. A similar increase in mortality in patients with STEMI and COVID-19 was also observed by Saad et al,⁹ who analyzed the Vizient Clinical Database in the United States.

In fact, in addition to the respiratory complications, SARS-CoV-2 infection has also been associated with an enhanced thrombotic risk, which is potentially mediated by endothelial damage, cytokine imbalance, and platelet activation, creating a prothrombotic environment that could favor the production and persistence of intracoronary thrombus, with negative consequences on reperfusion and outcomes.¹⁰

The 2021 analysis of the NACMI Registry¹ is also notable for reporting the first data on the role of COVID vaccination. Although these data were collected only in a small number of patients, the authors documented a significant benefit on the severity of the respiratory infection and a substantial improvement in survival. In fact, none of the COVID-19-positive vaccinated patients died, whereas mortality remained remarkably high (22%) in the unvaccinated subjects.

Thus, the present data reinforce the recommendations of scientific societies^{6,11} about the maintenance of the prepandemic standard of care for the management of patients with STEMI, even in case of SARS-CoV-2-infected patients, although for the latter additional attention should be focused on the strengthening of antithrombotic therapies and more strict monitoring. In addition, vaccination campaigns and providing adequate information about vaccinations to the population should be recommended and further empowered, as vaccinations are emerging as a potent instrument for the prevention of COVID-19 complications and the amelioration of the outcomes.

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