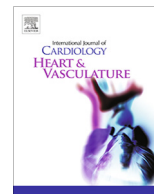




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## Editorial

## ST-elevation acute myocardial infarction during COVID-19 pandemic: Are we missing the boat?



### 1. Introduction

The well-known slogan “time is muscle” perfectly strengthens the need to achieve a sooner as possible myocardial revascularization in patients suffering from ST-elevation acute myocardial infarction (STEMI). In this clinical scenario, the strong impact of time delays on mortality has been established [1], and desirable reperfusion should be achieved within two hours from STEMI onset, possibly by primary percutaneous coronary intervention (pPCI) [2]. However, total ischemic time depends on three different phases: 1) symptom's onset-to-first medical contact (FMC), 2) FMC-to-catheterization laboratory door, and 3) door-to-balloon. Patient delays mainly influence the first phase, whereas system delays are generally responsible for time prolongation in the other two. Multiple patient-related factors can be the basis of a delayed FMC, such as the absence of chest pain [3], symptom underestimation, family network lacking, and intention to avoid hospitalization. Diagnostic uncertainties resulting in the need to perform additional tests and the absence of in loco 24/7 catheterization laboratory play a significant role in the second phase. Lastly, door-to-balloon time is dependent on the prompt availability of the interventional team workers and technical and procedural aspects.

The year 2020 has been indelibly characterized by Coronavirus-19 disease (COVID-19) pandemic, causing to date > 300.000 deaths worldwide. To reduce the spread of COVID-19, national governments instituted restrictions to promote social distancing (the so-called “lockdown”), inviting citizens to stay at home, unless urgent needs. In the last weeks during the COVID-19 pandemic, a dramatic reduction of STEMI admissions has been witnessed in Asia [4], Europe [5,6], and North America [7]. As expected, the decrease in hospitalizations for myocardial infarction has been associated with a parallel increase in hospital fatality and complication rates [8]. Several reasons can explain this phenomenon. On the one hand, causes can be searched into the health care system reorganization. In fact, due to the higher infectious rate, in some regions, like Lombardy (Italy), the local government has reduced the hospital with catheterization laboratories. Few hospitals acted as Hubs, and the remaining served as Spokes [9]: the result of this measure has been to concentrate a vast majority of patients with acute myocardial infarction in a limited number of hospitals. Anyway, the COVID-19 outbreak was associated with a remarkable decrease in pPCI also in regions less affected, where no changes occurred in the regional hub and spoke care system and

consequently in the management of acute coronary syndrome patients [10]. So, whether this modification had an impact on timely reperfusion strategies is currently unknown. On the other hand, the difference in adopted diagnostic protocols and recommendations can have influenced STEMI total ischemic time. For example, in China, also in STEMI patients with low risk of COVID-19, a specialist in infectious diseases had to be consulted urgently for the necessity of sending pharyngeal swab/sputum specimens/blood sample for the further exclusion [11]. In contrast, U.S. [12] and European [13] consensus statements did not mandatorily indicate COVID-19 screening, even in highly suspected patients.

On these premises, a disquieting scenario is taking shape: reduced STEMI admission with prolonged total ischemic time can have its root in patients' fear of being infected by Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) in case of hospitalization, resulting in a delayed FMC.

Coughlan and Colleagues [14] provide new insights on the topic in this issue of the Journal. Reporting evidence from their 24/7 pPCI center activity in the Republic of Ireland, the Authors documented a 36% reduction of patients presenting with STEMI during the lockdown as compared to a reference period in 2019. Moreover, total ischemic time was significantly increased during the lockdown (1550 vs. 485 min,  $P = 0.047$ ). This data, in line with previous findings, deserves attention, since the average time to achieve revascularization during COVID-19 pandemic has been beyond 24 h. Thus, this temporal delay can deeply compromise the benefit of myocardial revascularization. The strength of this study is to shed light on the phenomenon's mechanisms: patient delay appeared to be the most crucial factor driving the prolonged total ischemic time, documented by the increase in the time from symptoms' onset-to-FMC (1450 vs. 323 min,  $P = 0.037$ ). No significant differences in door-to-balloon have been observed (19 vs. 18 min,  $P = 0.87$ ), confirming that time spent to achieve personal protection equipment against COVID-19 for cardiac health interventionalist workers did not impact on total ischemic time. Although the Authors have reported no information concerning the observed delayed FMC, the hypothesis of the patient's fear of being admitted to the hospital is the most likely. On this wavelength, little evidence has been recently published [15], corroborating the need to keep high the attention on cardiovascular emergencies and urgencies, to provide adequate therapies. Education of patients to recognize symptoms of life-threatening cardiac conditions and seek appropriate care in a timely fashion remains pivotal during the COVID-19 pandemic to not miss the myocardial reperfusion boat.

## 2. Disclosure

None.

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