The STEMI phenomenon during the COVID-19 pandemic: what is beneath the tip of the iceberg?

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SARS-CoV-2, the causative agent of COVID-19, is associated with substantial cardiovascular risk and can be accompanied by acute coronary syndromes (ACS), takotsubo syndrome, myocarditis and spontaneous coronary artery dissection. The outbreak of the COVID-19 pandemic resulted in an enormous reorganisation of healthcare facilities, limiting access to emergency treatment and reducing or even halting elective procedures. ST-segment elevation myocardial infarction (STEMI) is a critical, time-dependent emergency and prompt referral for primary percutaneous coronary intervention (PPCI) is key for optimal management. Globally, a drop of ACS cases during the COVID-19 pandemic was noticed. High-quality data were initially reported from the International Study on Acute Coronary Syndromes–ST Elevation (ISACS-STEMI) COVID-19, which is a multinational multicentre retrospective registry aiming to provide a snapshot of incidence estimates and outcomes of STEMI during the COVID-19 pandemic. In their initial report, the authors described a reduction of PPCI procedures, delays in STEMI treatment and an increased in-hospital mortality in Europe during the COVID-19 pandemic compared with a pre-pandemic period.

De Luca and colleagues now report in the journal a follow-up study and the final results of the ISACS-STEMI COVID-19 Registry in which they have re-examined the incidence rates of patients with STEMI undergoing PPCI, delayed treatment (defined as ischaemia time over 12 hours and door-to-balloon time over 30 min) along with in-hospital mortality and short-term mortality (ie, within 30 days). The study cohort included a total of 16674 patients from 109 sites in Europe, Latin-America, Southeast Asia and North-Africa. Patients with STEMI undergoing PPCI from 1 March 2020 through 30 June 2020 (n=7630) were compared with patients from 1 March 2019 to 30 June 2019 (n=9044). The incidence of STEMI referrals was reduced to approximately 16% in 2020 compared with the pre-pandemic control period in 2019; especially among the elderly, a 20% reduction of PPCI procedures was observed. A significant decrease in STEMI cases was noted at almost all participating sites; in Europe, a greater reduction was observed during March–April 2020 than in May–June 2020, and in Southeast Asia and North Africa, the reduction was greater in May–June 2020 than in March–April 2020. Of note, the number of reduced PPCI procedures did not correlate with the peak of COVID-19 cases nor to deaths related to COVID-19. The COVID-19 pandemic was further associated with longer ischaemia time and increased door-to-balloon time, which likely contributed to the increased in-hospital mortality and 30-day mortality. COVID-19 positive patients with STEMI faced a dismal prognosis, with mortality rates over 25%.

Despite the inevitable limitations of a retrospective study, the investigators should be commended for compiling this comprehensive international database of information and the details and analysis presented provide insights into characteristics and sequelae of the first wave of the COVID-19 pandemic. The limitations of the study are the limited generalisability outside of Europe due to low numbers of centres included, and the relatively short follow-up period.

The COVID-19 pandemic, especially the first wave, has had major impact on treatment of acute conditions such as acute myocardial infarction (AMI) and stroke. Resource limitations due to the overwhelming number of COVID-19-related hospitalisations caused that catheterisation laboratories were converted to COVID-19 intensive care units. Additionally, prolonged triage by waiting time for COVID-19 test results might have caused delays in acute STEMI care. Moreover, several hypotheses have been established to explain the sudden drop in STEMI cases during the COVID-19 pandemic. These include strict governmental instruction to ‘stay at home’, the fear of contagion, and...
doubts to seek medical attention in an already overwhelmed healthcare system. Furthermore, social isolation from family members might have contributed to lower detection of AMI, especially among elderly, who are a high-risk population per se. COVID-19 mimics the clinical picture of STEMI (chest pain, dyspnoea and ECG changes) which could have contributed to misdiagnosis of true STEMI cases. Cardiac biomarkers can also be misleading—in particular, troponin can be elevated in critically ill patients with COVID-19. Consequently, catheterisation laboratories might have been less activated to balance the benefits and risks to minimise exposure of staff and to avoid unnecessary interventions.

The reduced number of STEMIs are a great concern. The missed opportunity to seek medical attention may ultimately translate into a higher number of long-term consequences given the lack of acute treatment and secondary prevention measures. Individuals who missed acute treatment may be at higher risk of heart failure, post-AMI angina, secondary mitral regurgitation, electrical instability, ischaemic cardiomyopathy and worse outcomes (figure 1). As numbers of infections with COVID-19 rise again, campaigns should encourage the public to seek medical care in case of chest pain because proper evaluation and timely management of acute cardiac conditions are imperative. Further studies, including a longer follow-up of patients, will allow for the accumulation of data to uncover the (potential) long-term sequelae of the missed STEMI cases—then we will see beneath the tip of this iceberg.

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