

# COVID-19 pandemic and cardiovascular disease: the double sentence

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**This editorial refers to ‘Impact of the COVID-19 pandemic on in-hospital mortality in cardiovascular disease: a meta-analysis’, by A. Cannata et al. doi:10.1093/eurjpc/zwab119.**

Coronavirus disease 2019 (COVID-19) pandemic affected every level of our healthcare systems, especially hospitals, which faced a huge human and logistical burden. To face the exponential growth of COVID-19 patients, national or local authorities declared lockdowns and urged people to avoid seeking medical care for unnecessary situations. This translated into reductions of hospital admissions, including for acute problems such as myocardial infarctions. During the first lockdown, for instance, studies reported a ~20–30% decrease in admissions for myocardial infarction in France or Denmark.<sup>1–3</sup> In New Zealand, despite a low incidence rate of COVID-19 infections during the first wave, hospitalizations for acute coronary syndrome also decreased by 28%, especially due to fewer admissions for non-ST-segment elevation acute coronary syndromes.<sup>4</sup> It is also noteworthy that rates of admission for acute coronary syndromes during COVID-19 pandemic were comparable to pre-pandemic levels in countries that established strict controls of the epidemics.<sup>5,6</sup> Reasons for the reduction in admissions for acute coronary syndromes are probably multifactorial, but less engagement in stressful situations due to lockdown is a frequently proposed explanation. Beyond admission rates during a pandemic situation, there remains the question of the fate of patients still admitted, especially those hospitalized with cardiovascular diseases that account for a large proportion of admissions.

Cannata et al.<sup>7</sup> report in the *Journal* the results of a meta-analysis comprising studies investigating in-hospital mortality of people admitted with cardiovascular disease but without severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection during the first wave of the pandemic compared to a pre-pandemic period. Comprising data from more than 27 000 individuals, their study showed a 62% higher risk (relative risk) of in-hospital mortality during the pandemic period. In absolute numbers, mortality amounted to

10.4% during the COVID-19 first wave compared to 5.7% during the pre-pandemic period. This is in line with large studies conducted at the level of a country. For instance, in Denmark, a study including 1 113 705 hospital admissions found that the mortality rate ratio amounted to 1.28 during the first lockdown.<sup>3</sup> The meta-analysis by Cannata et al., including studies from different countries and continents, adds to the evidence that the pandemic had, and probably still has in certain settings, a substantial impact on the organization of hospitals to maintain their level of care to that of the pre-pandemic context. Consequently, this represents the first ‘sentence’ due to COVID-19 pandemic for a number of patients with cardiovascular disease in need of hospital care. This shall inform a range of healthcare professionals and administrators on the effects of reorientating a substantial part of hospital personal and logistics during such an endeavour.

One of the main findings of the study is the fact that there exists an apparent link between a high decline in admission rate (>50%) and an increased in-hospital mortality rate. This result is derived from three studies (two conducted in Italy and one in India), representing about a third of the sample. As postulated by the authors in their limitations, this could have arisen due to patients’ selection bias, the more fragile and sicker patients having been admitted during the lockdown. That could also partially explain the main finding of the study with a strikingly high mortality rate during the COVID-19 period. Nevertheless, the risk estimate remained consistent when performing sensitivity analyses, in particular when stratifying by type of cardiovascular diseases with potential differential outcomes (their [figure S1](#)). To better assess any selection bias, additional studies should include hospital case-mix and illness severity.<sup>8</sup>

Furthermore, we should bear in mind that comparison between different countries, health care systems or, even, hospitals within the same country has important limitations. Cannata et al. stratified by countries (their [figure S5](#)), but the analysis lacked power to detect any variation. It is also expected that healthcare systems can prove to be resilient with improvement in care by redirecting resources

to non-COVID-19 patients over the time. This has been shown in a national Danish study with an 8% reduction in in-hospital mortality rate between the first and second waves.<sup>3</sup>

As our knowledge on the direct and immediate impacts of COVID-19 pandemic on health care systems will accrue in the coming months and years, epidemiological and basic research—supported by funding agencies, especially to allow following cohorts of patients—shall also investigate the long-term effects of COVID-19 infection on cardiovascular risk factors and disease.<sup>9</sup> Indeed, evidence accumulates on persistent symptoms months after a COVID-19 infection, including in people not hospitalized.<sup>10</sup> Capturing the pathophysiological and population effect of SARS-CoV-2 infection on development of cardiovascular disease is paramount to avoid a second 'sentence' for patients and ensure that all therapeutic and preventive measures currently in place continue to maintain their effects.

In conclusion, the study by Cannata *et al.* highlights the fragility of our healthcare systems when confronted to such a systemic threat with direct impacts on the health of hospitalized patients. Further initiatives should focus on better preparing our hospitals to face diverse medical conditions in a pandemic situation and, in the context of COVID-19 pandemic, mitigating the potential long-term effects of COVID-19 on cardiovascular health.

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