COVID-19: long-term effects on the community response to cardiac arrest?

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In *The Lancet Public Health*, Eloi Marijon and colleagues suggest that out-of-hospital cardiac arrest (OHCA) might be affected directly and indirectly by the COVID-19 pandemic.[1] The authors used the Paris-Sudden Death Expertise Center registry to compare OHCA case incidence and patient characteristics from a 6-week period during the COVID-19 pandemic in Paris and its suburbs (March 16 to April 26, 2020) with corresponding periods over the preceding 8 years. The rapid publication of this Article shows the value of cardiac arrest registries and other disease registries in highlighting changes in practice and informing policy interventions.

During the 6-week pandemic period in Paris, OHCA incidence approximately doubled from a baseline of 13·42 (95% CI 12·77–14·07) to 26·64 (25·72–27·53) per million inhabitants. The incidence of OHCA rose in parallel with the incidence of COVID-19 related hospital admissions. Similar patterns in OHCA incidence have been observed in the Lombardy region of Italy[2] and California, USA.[3] Importantly, in the study by Marijon and colleagues, OHCA incidence decreased towards baseline near the end of the 6-week period in line with a decrease in COVID-19 incidence.

Putative mechanisms by which COVID-19 might cause cardiac arrest include vascular inflammation, myocarditis, cardiac arrythmias, and thromboembolism.[4] However, in the present study, only 33% of the increase in OHCA cases were directly attributable to COVID-19, making indirect effects a substantial component. Indirect effects could arise from fear and anxiety reducing or delaying presentation for non-COVID-19 related conditions such as acute coronary syndromes, one of the commonest antecedents to cardiac arrest.[3,5] Social isolation can worsen mental health increasing self-harm and substance use precipitating cardiac arrest. A better understanding of the causes of the excess cardiac arrest numbers will be important to help plan public health interventions to reduce OHCA incidence.

Across study periods, patient characteristics were similar, but important differences in event characteristics were observed. In the COVID-19 period, around 13% (460 [90·2%] *vs* 2336 [76·8%]) more cases occurred inside the home than in the non-pandemic period. Fewer patients presented with shockable rhythm (46 [9·2%] *vs* 472 [19·1%]), received bystander cardiopulmonary resuscitation (CPR; 239 [47·8%] *vs* 1165 [63·9%]), and public access defibrillation (2 [0·4%] *vs* 33 [3·0%]). Ambulance response times were longer and the proportion of OHCAs where the ambulance crew started or continued resuscitation was lower than usual (53·1% *vs* 66·2%) during the pandemic period.

Of concern, fewer patients survived to hospital admission (67 [12·9%] of 521 *vs* 695 [22·8%] of 3052) and fewer survived to hospital discharge (16 [3·1%] of 517 *vs* 164 [5·4%] of 3052). The finding that the proportion of OHCAs with resuscitation attempt was lower than usual might partly account for the lower survival rate. Whether this observation is explained by a higher proportion of patients presenting with signs of irreversible death, do not attempt resuscitation orders, or changes in ambulance crew behaviour due to fear of infection or perceptions that the health system was overwhelmed is worthy of further exploration.

Another important finding is lower rates of bystander CPR and public access defibrillation, similar to findings in Lombardy.[2] The community response to OHCA plays a key role in optimising patient outcomes, increasing survival by 2–4 times.[6] Despite ongoing efforts to improve this community response, there continues to be important international variation in performance. Across international cardiac arrest registries, bystander CPR rates range from 19·1% to 79·0%, and public access defibrillation use ranges from 2·0% to 37·4%.[7]

The reason for the observed decline in bystander CPR is unclear. Some potential causes might naturally resolve as society leaves lockdown and the proportion of OHCA events that occur in the home decreases and community responder schemes are reactivated. Other causes, such as the often-cited concern of contracting an infection through delivery of CPR, are likely to increase in prevalence.

The International Liaison Committee on Resuscitation treatment recommendations for resuscitation in COVID-19 seek to balance the potential risk of infection transmission to the rescuer against the harm to the patient if resuscitation is delayed or withheld.[8,9] These

recommendations highlight that particularly when cardiac arrest occurs in the home, those available to provide immediate CPR and defibrillation are likely to already be exposed to COVID-19 if the recipient has it. Simple interventions such as placing a cloth or mask over the patient's mouth and providing chest compression only resuscitation allow resuscitation to be started with minimal delay.[10]

Health-care providers are advised to wear personal protective equipment for aerosol generating procedures when attempting CPR in patients with suspected or confirmed COVID-19.[9,10] It is possible that this additional measure contributed to the observed treatment delays. However, in this study in Paris, fewer than 10% of all patients who had an OHCA had known or suspected COVID-19.[1] Policy makers will, at some point, need to consider the ongoing need for COVID-19 resuscitation guidelines based on disease incidence within the local health-care system.

Over subsequent months, there is a need for further studies to identify the medium-term effect of COVID-19 on OHCA. There is a risk that the COVID-19 pandemic could undo the substantial progress that has been made in optimising the community response to OHCA. Identification and quantification of this risk might highlight the urgent need for public health interventions to rebuild public confidence in responding to OHCA. Otherwise, the indirect health impact of COVID-19 on OHCA could persist for many years into the future.

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