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Editorial

Cardiac Arrest in the COVID-19 Era

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The COVID-19 pandemic has affected all aspects of our society. Cost-benefit analyses of many issues that seemed uncontroversial just two months ago, may now need to be completely altered. This is very clear in the healthcare sector. COVID-19 patients are overloading many hospital wards and challenging the intensive care unit (ICU) bed capacity especially. ICUs have expanded their capacity all over the world, but even with abundant resources this may not be enough. We therefore must re-evaluate many of our usual procedures to get most out of our intensive care resources.

Resuscitated comatose out of hospital cardiac arrest (OHCA) patients usually require intensive care for days. In general, about one in ten of all patients with OHCA will survive to hospital discharge, but the prognosis varies a lot depending on the initial presentation. While more than half of the patients with initial shockable rhythm (ventricular tachycardia or ventricular fibrillation) that receive bystander cardiopulmonary resuscitation (CPR) will survive with good neurological function, this is certainly not the case for most patients with initial non-shockable rhythm (asystole and pulseless electrical activity (PEA)).[1] In Canada in 2006 Morrison et al. demonstrated that less than 1% of patients with OHCA will survive if there is no return of spontaneous circulation (ROSC) after three cycles, no shocks are administered, and the arrest was not witnessed by emergency medical-services personnel.[2] Similarly, only 3 of 9499 Danish OHCA patients without ROSC on hospital arrival and without prehospital shock from a defibrillator survived for 30 days.[3] It is thus possible to predict a poor prognosis from simple prehospital parameters. Although not always known, comorbidity and age may add significantly to the prognostic evaluation. Furthermore, resuscitation may often be initialized without hesitation in nursing homes in many countries. This procedure may be open to question, even though the outcome is not completely futile.[4]

Similarly, only about 20% of in-hospital cardiac arrest (IHCA) patients will survive.[5] In contrast to the OHCA cases, the comorbidity is often well known in the IHCA patients and it is known to affect the outcome. Therefore, attention to a patient's age and comorbidity is very important before resuscitation of an IHCA. Preferably, the patient's wish could be noted during admission to the hospital, so that it is available in case of an IHCA.

These considerations have suddenly become more relevant to all of us as the COVID-19 pandemic dramatically increases the competition for every available ICU bed. But it is not only the ICU beds that are at stake here. Giving basic or advanced life support to a patient with an IHCA or OHCA may expose the layperson or healthcare worker to COVID-19 infection. Extreme care should be taken to apply preventive measures to laypersons or healthcare workers, as patients requiring CPR and/or intubation bear a high risk of droplet release.

Survival after OHCA has increased several-fold in many countries during the last two decades, probably mainly due to an increased number of resuscitation attempts by both laypersons and professional caregivers.[6] It is likely, but not proven, that chest compressions may results in aerosol generation from the victim and that this may transfer a potential COVID-19 infection to the layperson or healthcare worker. Airway handling, whether rescue breathing by mouth to mouth in basic life support or by intubation as part of advanced life support, may increase this risk considerably, while defibrillation alone probably only adds minimal risk. Furthermore, in the out of hospital setting, adding rescue breathing to simple chest compressions may only add little in terms of rates of survival or favorable neurologic function.[7] Finally, the putting on of personal protective equipment (PPE) takes time and delaying defibrillations and chest compressions by just

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a couple of minutes may have a devasting effect on the chance of survival with a favorable neurological outcome. And there may be a short supply of high-quality PPE, so it needs to be used intelligently.

The International Liaison Committee on Resuscitation is currently in discussion about their recommendations regarding these issues – see https://costr.ilcor.org/document/covid-19-infection-risk-to-rescuers-from-patients-in-cardiac-arrest for details. While waiting for their recommendations it seems reasonable, during this pandemic, to encourage public access defibrillation and compression-only resuscitation of adults for laypeople, and to suggest that healthcare professionals always use adequate PPE whenever a COVID-19 infection may be suspected. The highest priority for the use of N95 respirators (FFP2/3 masks) are healthcare workers performing aerosol-generating procedures, including swabbing, intubation and aspiration respectively.[8]

Universal testing for COVID-19 may also be of value. It may prove to be essential in the months to come to test every single patient after OHCA in order to decide the best further measures (i.e. later transfer to a specific COVID-19 ICU if available; further testing of health personnel etc.). As testing for COVID-19 increases around the world, the COVID-19 status of an IHCA patient is more and more likely to be known – in the case of an OHCA about three of four incidents occur at home, where it is likely the lay rescuer has lived in close proximity with the victim, and therefore knows their relevant medical history. These precautions may be less relevant in the future, when, hopefully, the pandemic declines.

An additional problem in times when medical services are overloaded by COVID-19 related emergencies may be a delayed response times and the late arrival of ambulances when attempting to rescue, pick up and transfer a patient to a hospital, which may also have an impact on survival rates and the problems caused by comorbidities.

Conflict of interest

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