European Resuscitation Council COVID-19 Guidelines

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Section 1

Introduction

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Introduction

The World Health Organization has declared COVID-19 a pandemic. The disease is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and is highly contagious. A recent systematic review that included 53,000 patients indicates that 80% of patients have mild disease, 15% have moderate disease and about 5% have severe disease requiring intensive care unit (ICU) admission. In this review the fatality rate was 3.1%. Among 136 patients with severe COVID-19 pneumonia and in-hospital cardiac arrest at a tertiary hospital in Wuhan, China, 119 (87.5%) had a respiratory cause for their cardiac arrest. In this series of patients, the initial cardiac arrest rhythm was asystole in 122 (89.7%), pulseless electrical activity in 6 (4.4%) and ventricular fibrillation/ pulseless ventricular tachycardia (VF/pVT) in 8 (5.9%). In a case series of 138 hospitalised COVID-19 patients, 16.7% of patients developed arrhythmias and 7.2% had acute cardiac injury. Thus, although most cardiac arrests in these patients are likely to present with a non-shockable rhythm caused by hypoxaemia (although dehydration, hypotension and sepsis may also contribute), some will have a shockable rhythm, which may be associated with drugs causing prolonged-QT syndrome (e.g. chloroquine, azithromycin) or caused by myocardial ischaemia. In the series of 136 cardiac arrests from Wuhan, four (2.9%) patients survived for at least 30 days but only one of these had a favourable neurological outcome.
Risks associated with cardiopulmonary resuscitation (CPR) in patients with COVID-19

Mechanisms of transmission of SARS-CoV-2

The main mechanism of disease transmission of SARS-CoV-2 is by respiratory secretions either directly from the patient or by touching contaminated surfaces. Respiratory secretions are called either droplets (> 5–10 microns in diameter) or airborne particles (< 5 microns). Droplets fall onto surfaces within 1–2 metres of the patient’s respiratory tract while airborne particles can remain suspended in the air for prolonged periods.4

Personal protective equipment (PPE)

The minimum droplet-precaution personal protective equipment (PPE) comprises:

• Gloves
• Short-sleeved apron
• Fluid-resistant surgical mask
• Eye and face protection (fluid-resistant surgical mask with integrated visor or full-face shield/visor or polycarbonate safety glasses or equivalent).

The minimum airborne-precaution PPE comprises:

• Gloves
• Long-sleeved gown
• Filtering facepiece 3 (FFP3) or N99 mask/respirator (FFP2 or N95 if FFP3 not available)*
• Eye and face protection (full-face shield/visor or polycarbonate safety glasses or equivalent). Alternatively, powered air purifying respirators (PAPRs) with hoods may be used.

* The European Standard (EN 149:2001) classifies FFP respirators into three classes: FFP1, FFP2, and FFP3 with corresponding minimum filtration efficiencies of 80%, 94%, and 99%. The US National Institute for Occupational Safety and Health (NIOSH) classifies particulate filtering facepiece respirators into nine categories based on their resistance to oil and their efficiency in filtering airborne particles. N indicates not resistant to oil; R is moderately resistant to oil; and P is strongly resistant to oil – ‘oil proof’. The letters N, R or P are followed by numerical designations 95, 99, or 100, which indicate the filter’s minimum filtration efficiency of 95%, 99%, and 99.97% of airborne particles (<0.5 microns).5,6
Some healthcare systems are facing shortages of personnel and equipment, including ventilators, to treat critically ill patients during the COVID-19 pandemic. Decisions on triage and allocation of healthcare resources, including the provision of CPR and other emergency care must be made by individual systems based on their resources, values and preferences. However, the position of the ERC is that it is never acceptable to compromise the safety of healthcare professionals.

The International Liaison Committee on Resuscitation (ILCOR) has undertaken a systematic review addressing 3 questions 7:

1. Is the delivery of chest compressions or defibrillation an aerosol-generating procedure?
2. Do the delivery of chest compressions, defibrillation or CPR (all CPR interventions that include chest compressions) increase infection transmission?
3. What type of PPE is required by individuals delivering chest compressions, defibrillation or CPR in order to prevent transmission of infection from the patient to the rescuer?

The evidence addressing these questions is scarce and comprises mainly retrospective cohort studies 8,9 and case reports.10-15

In most cases, delivery of chest compressions and defibrillation are lumped together with all CPR interventions, which means that there is considerable confounding in these studies. Aerosol generation by chest compressions is plausible because they generate small but measurable tidal volumes.16 Chest compressions are similar to some chest physiotherapy techniques, which are associated with aerosol generation.17 Furthermore, the person performing chest compressions is close to the patient’s airway.

The ILCOR systematic review did not identify evidence that defibrillation generates aerosols. If it occurs, the duration of an aerosol generating process would be brief. Furthermore, the use of adhesive pads means that defibrillation can be delivered without direct contact between the defibrillator operator and patient.

The ILCOR treatment recommendations are:

- We suggest that chest compressions and cardiopulmonary resuscitation have the potential to generate aerosols (weak recommendation, very low certainty evidence).
- We suggest that in the current COVID-19 pandemic lay rescuers* consider compression-only resuscitation and public-access defibrillation (good practice statement).
- We suggest that in the current COVID-19 pandemic, lay rescuers who are willing, trained and able to do so, may wish to deliver rescue breaths to children in addition to chest compressions (good practice statement).
• We suggest that in the current COVID-19 pandemic, healthcare professionals should use personal protective equipment for aerosol-generating procedures during resuscitation (weak recommendation, very low certainty evidence).

• We suggest that it may be reasonable for healthcare providers to consider defibrillation before donning aerosol generating personal protective equipment in situations where the provider assesses the benefits may exceed the risks (good practice statement)

*Comment - it is the view of the ERC that this applies to first responders as well as lay rescuers.

REFERENCES


