Guidance for Basic and Advanced Life Support in COVID-19 Adult Patients

Background

- American Heart Association (AHA) guidelines do not address the challenge of providing resuscitation in the setting of COVID-19, wherein rescuers must balance the immediate needs of the victims with their own safety.
- COVID -19 is highly transmissible, particularly during resuscitation.
- Hypoxemic respiratory failure secondary to ARDS, myocardial injury, ventricular arrhythmias and shock predispose these patients to cardiac arrest.

Competing Interests

- The administration of CPR involves performing numerous aerosol-generating procedures, including chest compressions, positive pressure ventilation, and establishment of an advanced airway.
- During those procedures, viral particles can remain suspended in the air with a half-life of approximately 1 hour and can be inhaled by those nearby. Resuscitation efforts require numerous providers to work in close proximity to one another and the patient.
- These are high-stress emergent events in which the immediate needs of the patient requiring resuscitation may result in lapses in infection-control practices.
- We must balance the competing interests of providing timely and high-quality resuscitation to patients while simultaneously protecting rescuers.

General Principles:

- **Consider the appropriateness of starting and continuing resuscitation**
  - Cardiopulmonary resuscitation diverts rescuer attention away from other patients. The mortality for critically ill COVID-19 patients is high and rises with increasing age and comorbidities, particularly cardiovascular disease.
  - Therefore, it is reasonable to consider the likelihood of success against the risk to rescuers and patients from whom resources are being diverted.

- **Advance Directives and Risk Stratification**
  - Address goals of care with COVID-19 patients (or proxy) in anticipation of the potential need for increased levels of care.
  - Risk stratification and policies should be communicated to patients (or proxy) during goals of care discussions.
  - Discussion can be repeated if patient deteriorates after admission.

- **ECMO**
  - There is insufficient data to support extracorporeal cardiopulmonary resuscitation (E-CPR) for COVID-19 patients.

- **Reduce provider exposure to COVID-19**
  - Before entering room, all rescuers should don PPE to guard against contact with both airborne and droplet particles.
  - Limit personnel in the room to only those essential for patient care.
  - Consider mechanical chest compression devices.
  - Clearly communicate COVID-19 status to any new provider before they begin care.

- **Minimize aerosolization during ventilation:**
  - Before intubation, use a bag-mask device with a HEPA filter and a tight seal or oxygenation with non-rebreathing face mask, covered by a surgical mask.
  - If intubation is delayed, consider manual ventilation with a supraglottic airway or bag-mask with a HEPA filter.
  - Attach a HEPA filter securely, if available, to any manual or mechanical ventilation device in the path of exhaled gas.
  - Leave intubated patient connected to ventilator if possible.
  - After shocking a ventricular arrhythmia, patients in cardiac arrest should be intubated at the earliest opportunity.
  - Pause chest compressions to intubate.
  - Once on a closed circuit, minimize disconnections to reduce aerosolization.

- **In-Hospital Cardiac Arrest (IHCA)**
  - Prearrest: Closely monitor for signs and symptoms of clinical deterioration to minimize the need for emergent intubations that put patients and providers at higher risk.
  - Patients should receive standard basic and advanced life support.
  - Close the door, when possible, to prevent airborne contamination of adjacent indoor space.

- **Ventilator Settings**
  - 100% oxygen
  - Rate 10/min.
  - Asynchronous ventilation
  - Pressure Control (Assist Control) and limit pressure as needed to generate adequate chest rise (6 mL/kg ideal body weight)
  - Adjust:
    - Trigger to “off” to prevent the ventilator from auto-triggering
    - PEEP to balance lung volumes and venous return
    - Alarms to prevent alarm fatigue

- **Prevent Unplanned Extubation**
  - Profound risk of failed resuscitation coupled with aerosolization.
  - Protect and secure all tubing and connection points at all times.

- ***Non-intubated* Prone Patient**
  - Attempt to place in supine position for continued resuscitation.

- ***Intubated* Prone Patient**
  - Avoid turning the patient to the supine position unless able to do so without risk of equipment disconnections, inadvertent extubation.
  - Place defibrillator pads in the AP position.
  - Provide CPR in prone patient with hands in the standard position over T7-10 vertebral bodies.

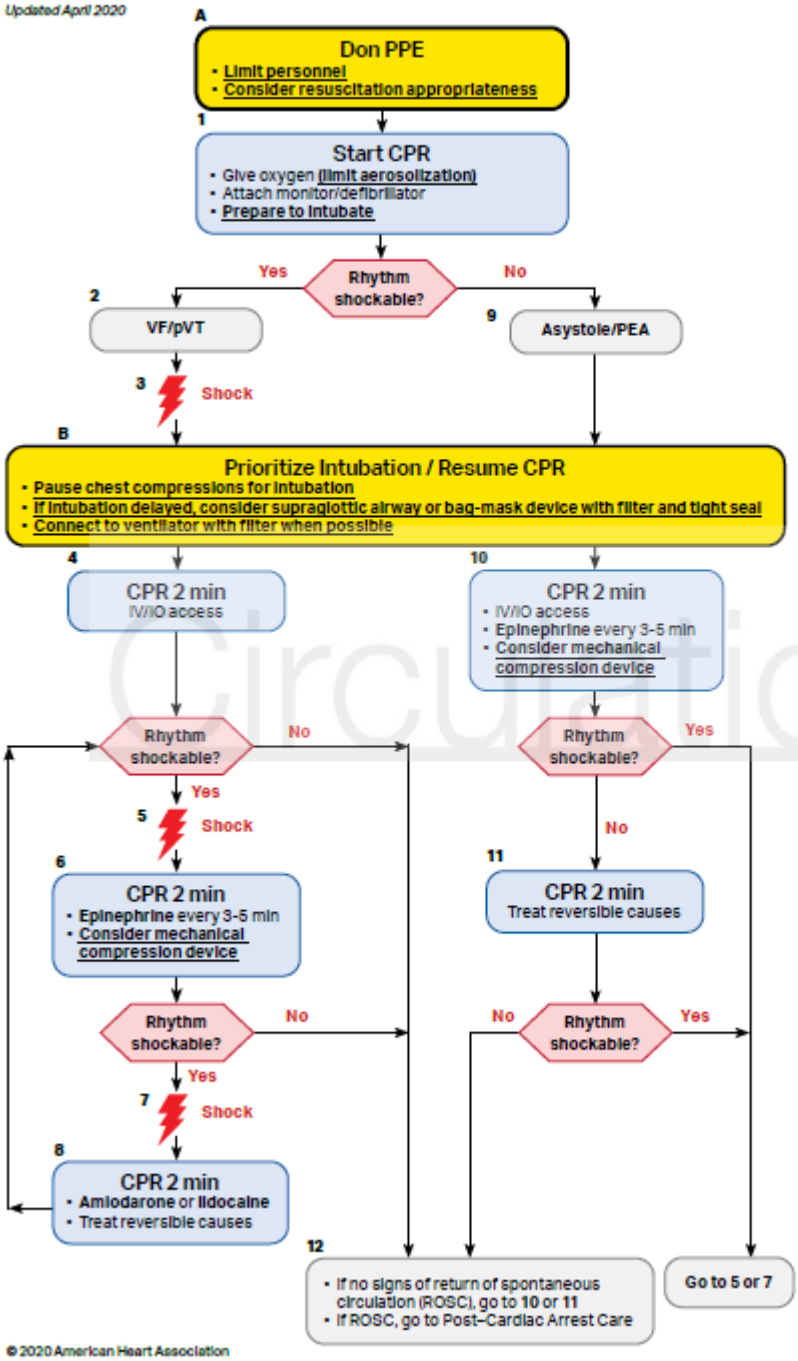
- **Maternal cardiac arrest:**
  - The tenets of maternal cardiac arrest are unchanged.
  - The physiologic changes of pregnancy increase the risk of acute decompensation in critically ill pregnant patients.
  - Assemble obstetrical and neonatal teams, wearing PPE, early.
  - Deliver baby within 4 minutes of resuscitation.

- **Bibliography:**

  - 10.1161/CIRCULATIONAHA.120.04763

ACLS Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020



CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100–120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If P_{ETCO_2} <10 mm Hg, attempt to improve CPR quality.
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Advanced Airway

- Minimize closed-circuit disconnection
- Use intubator with highest likelihood of first pass success
- Consider video laryngoscopy
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.
  or
  Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

© 2020 American Heart Association

Downloaded from http://ahajournals.org by on April 10, 2020

Circulation

Great Lakes Health System of WNY