

سنة ١٤٤٠ هـ

سنة ١٤٤٠ هـ



Clinical Simulation Group
Department of Emergency Medicine
Tehran University of Medical Sciences



Cardiopulmonary Life Support

Presented by:

Hojat Vahedi, M.D

Emergency Medicine Associate Professor

TUMS

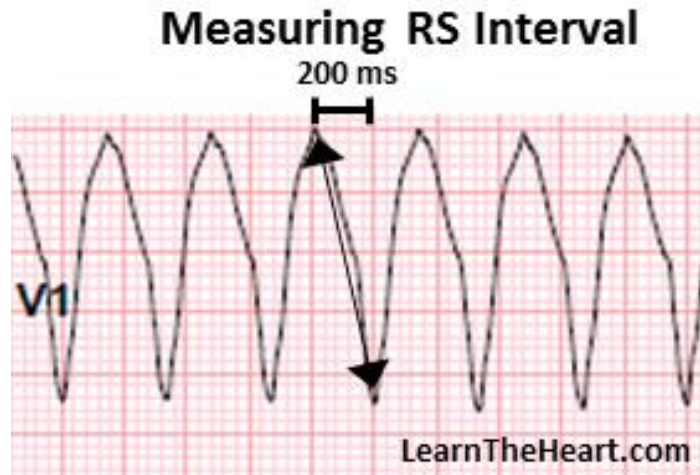
Chain of Survival



- Immediate **recognition** of cardiac arrest and **activation** of the emergency response system
- Early **CPR** with an emphasis on chest compressions
- Rapid **defibrillation**
- Effective **advanced life support**
- Integrated **post– cardiac arrest care**

ACLS: Rhythm Based Management

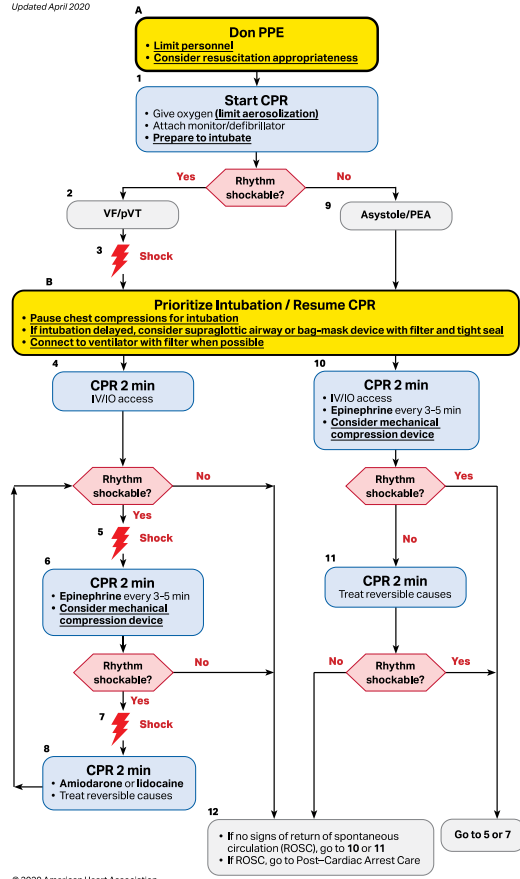
- Arrest
 - Pulseless VT
 - VF
 - PEA
 - Asystole
- Tachycardia
- BradyCardia





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

Updated April 2020

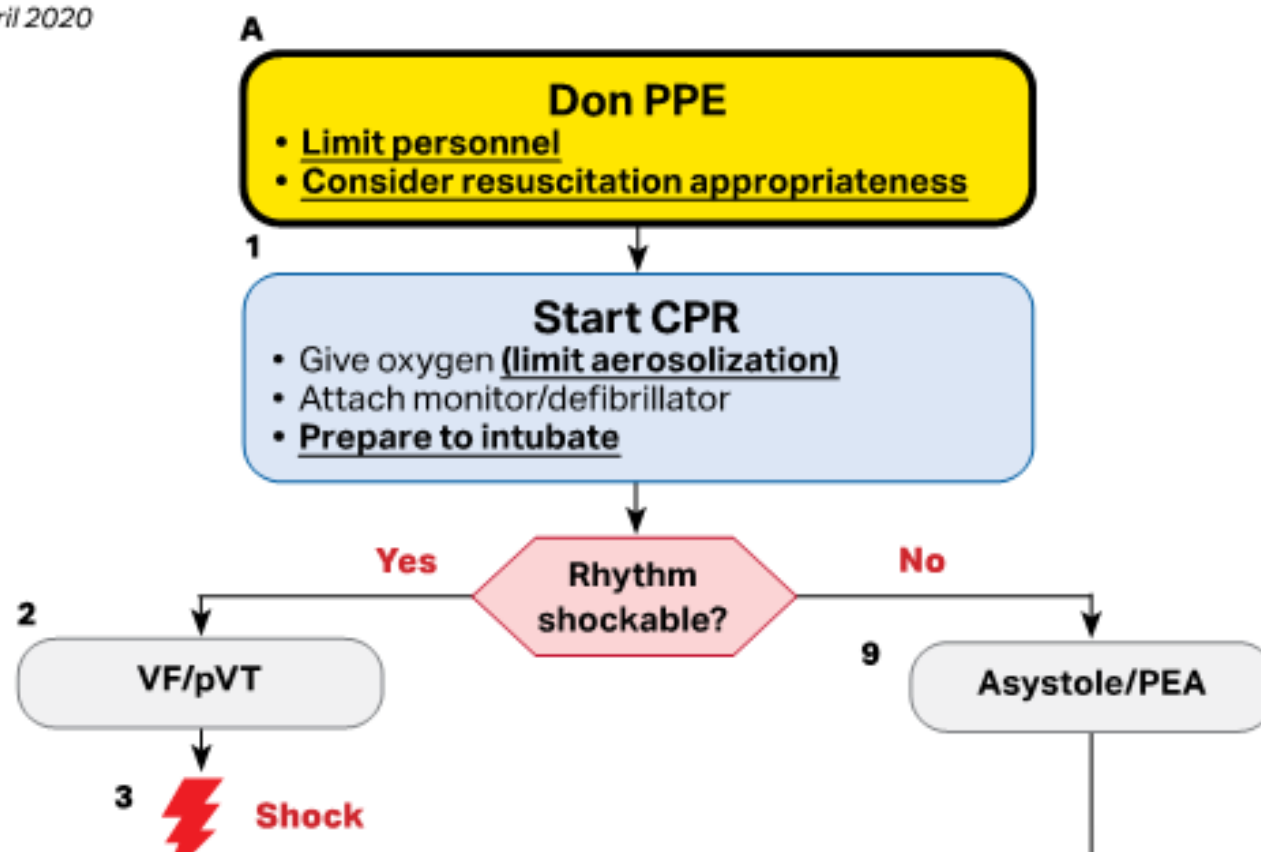


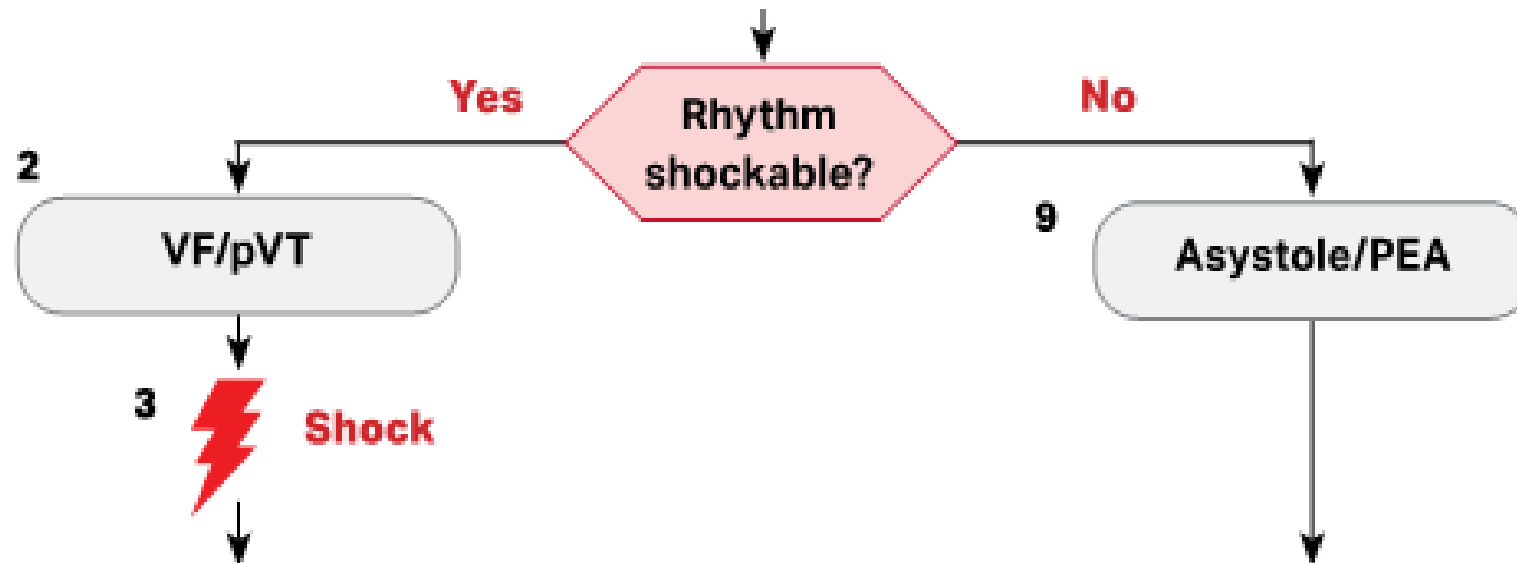
© 2020 American Heart Association

- | |
|--|
| CPR Quality |
| <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> - If PetCO₂ <10 mm Hg, attempt to improve CPR quality. • Intra-arterial pressure <ul style="list-style-type: none"> - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality. |
| Shock Energy for Defibrillation |
| <ul style="list-style-type: none"> • 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 |
| <ul style="list-style-type: none"> • 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 |
| <ul style="list-style-type: none"> • 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) |
| <ul style="list-style-type: none"> • Pulse and blood pressure • Abrupt sustained increase in PetCO₂ (typically ≥40 mm Hg) • Spontaneous arterial pressure waves with intra-arterial monitoring |
| Reversible Causes |
| <ul style="list-style-type: none"> • Hypovolemia • Hypoxia • Hydrogen ion (acidosis) • Hypo-/Hyperkalemia • Hypothermia • Tension pneumothorax • Tamponade, cardiac • Toxins • Thrombosis, pulmonary • Thrombosis, coronary |

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

Updated April 2020

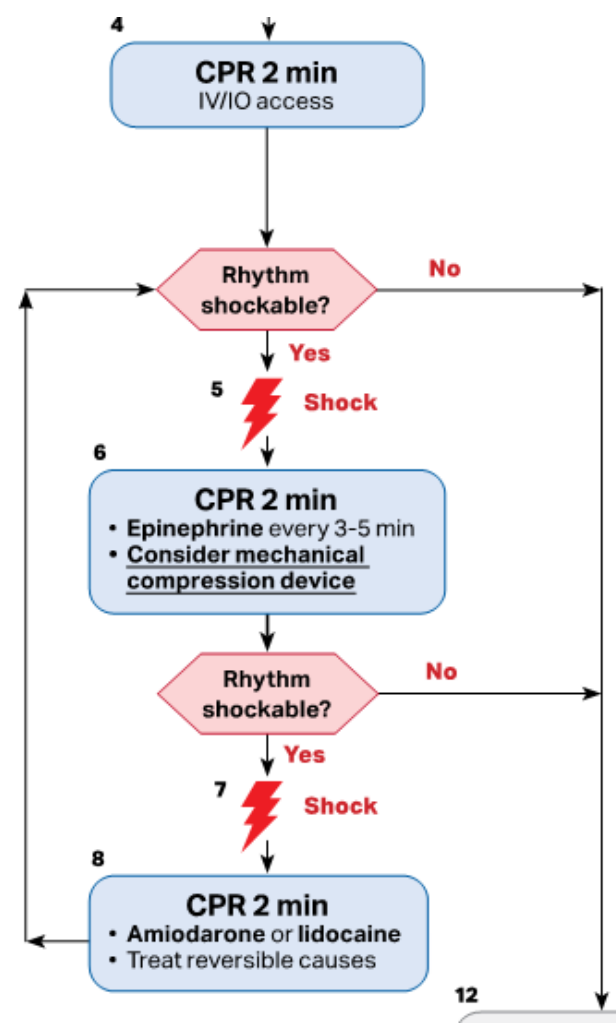


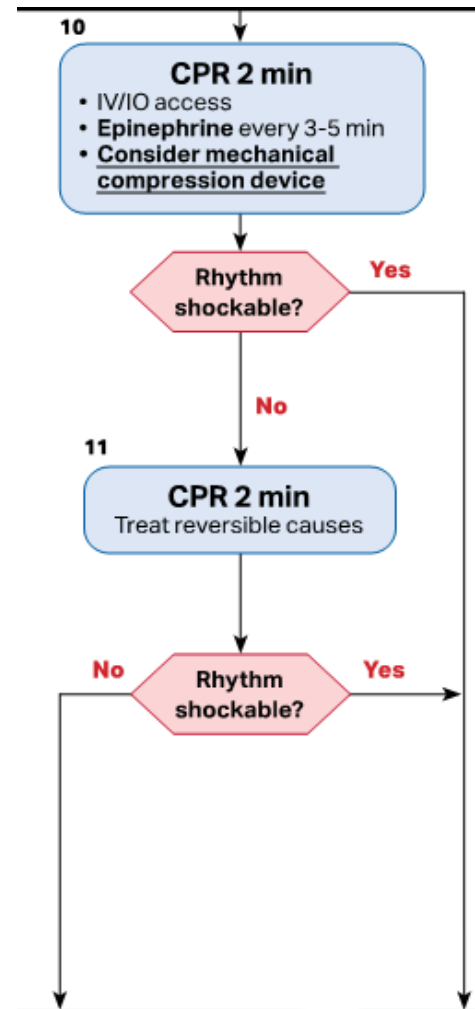


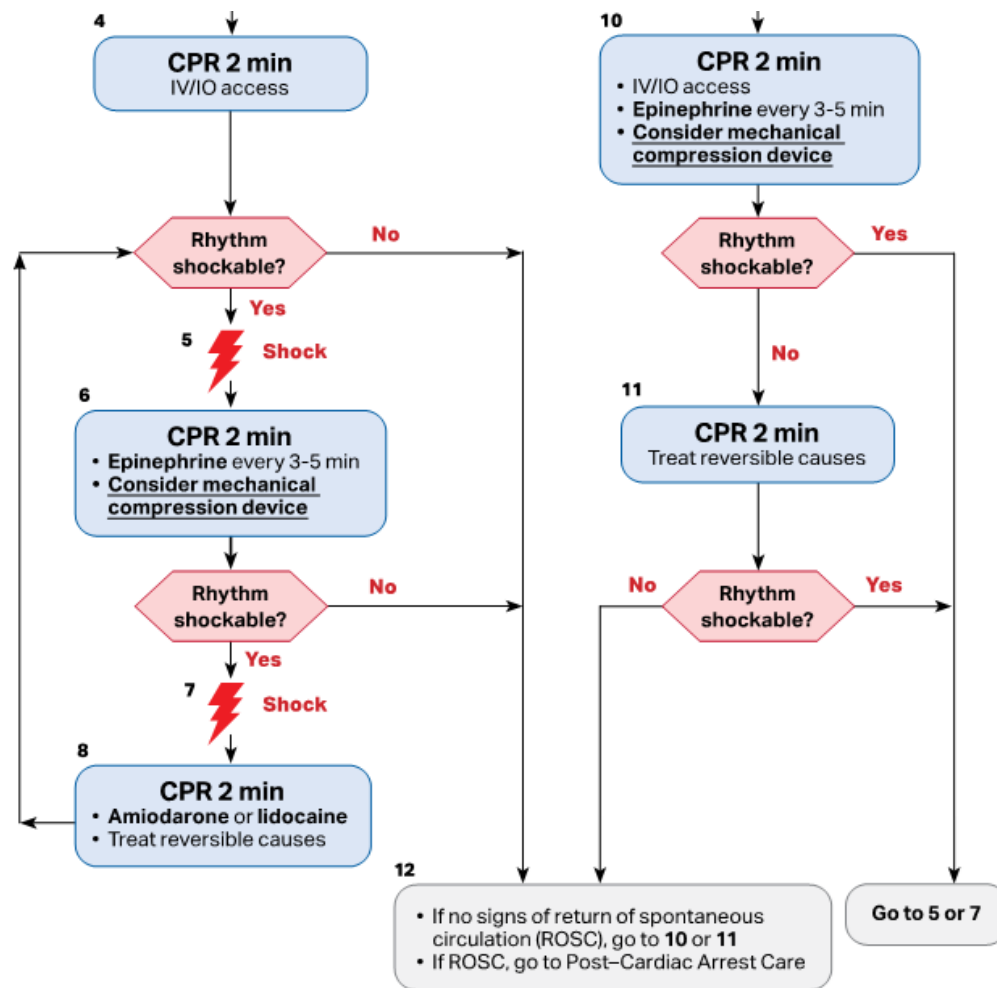
B

Prioritize Intubation / Resume CPR

- Pause chest compressions for intubation
- If intubation delayed, consider supraglottic airway or bag-mask device with filter and tight seal
- Connect to ventilator with filter when possible









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 $PETCO_2 < 10$ 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 PETCO₂ (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



Key Challenges to Improve CPR Quality

- Recognition
 - Failure to recognize gasping as sign of cardiac arrest
 - Unreliable pulse detection
- Initiation of CPR
 - Low bystander CPR response rates
 - Incorrect dispatch instructions
- Compression rate
 - Slow compression rate
- Compression depth
 - Shallow compression depth



Key Challenges to Improve CPR Quality

- Chest wall recoil
 - Rescuer leaning on the chest
- Compression interruptions
 - Excessive interruptions for:
 - Rhythm/pulse checks
 - Ventilations
 - Defibrillation
 - Intubation
 - IV access
 - other



Key Challenges to Improve CPR Quality

- Ventilation
 - Ineffective ventilations
 - Prolonged interruptions in compressions to deliver breaths
 - Excessive ventilation (especially with advanced airway)
- Defibrillation
 - Prolonged time to defibrillator availability
 - Prolonged interruptions in chest compressions pre- and post-shocks
- Team Performance
 - Delayed rotation, leading to rescuer fatigue and decay in compression quality
 - Poor communication among rescuers, leading to unnecessary interruptions in compressions

COVID-19 and Adult CPR

If an adult's heart stops and you're worried that they may have COVID-19, you can still help by performing Hands-Only CPR.



American
Heart
Association.

Step 1



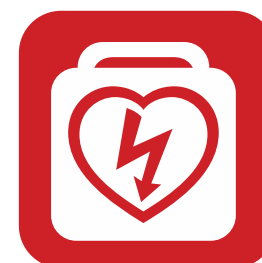
Phone 9-1-1
and get an AED.

Step 2



Perform Hands-Only CPR.
Push hard and fast on the center
of the chest at a rate of 100 to
120 compressions per minute.

Step 3



**Use an AED as soon
as it is available.**



- We suggest the use of **amiodarone** or **lidocaine** in adults with shock-refractory VF/pVT .
- We suggest against the ~~routine use~~ of magnesium in adults with shock-refractory VF/pVT.
- The confidence in effect estimates is currently too low to support an ALS Task Force recommendation about the use of prophylactic antiarrhythmic drugs immediately after ROSC in adults with VF/pVT cardiac arrest.



- We suggest against the use of point-of-care echocardiography for prognostication during CPR (weak recommendation, very low-certainty evidence)



Thanks