

CPR

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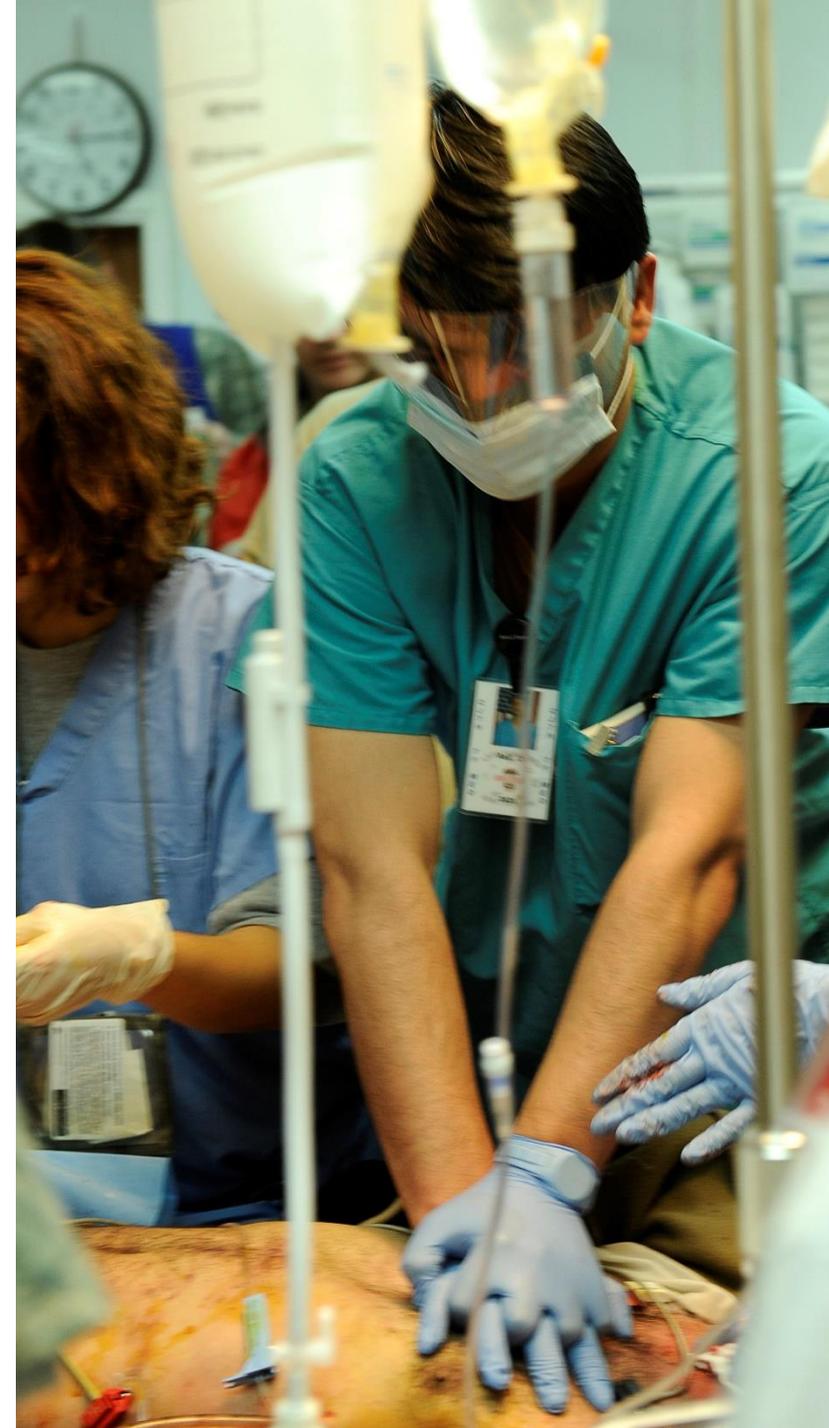


Figure 10. AHA Chains of Survival for pediatric IHCA and OHCA.

IHCA



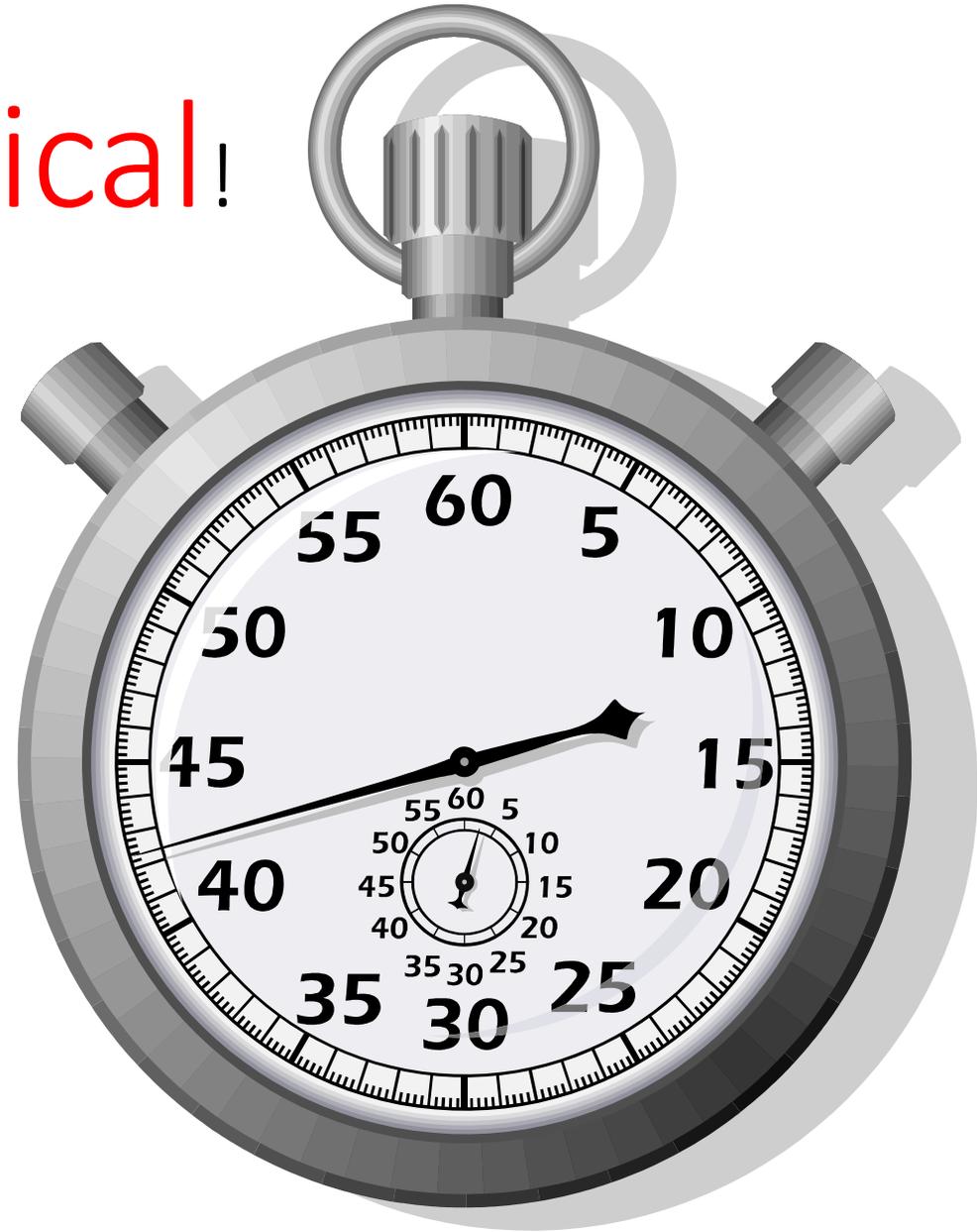
OHCA



Time is Critical!

- Brain damage begins in 4–6 min
- Brain damage irreversible in 8–10 min

Circulation must be restored within 4–6 minutes.



Basic Life Support



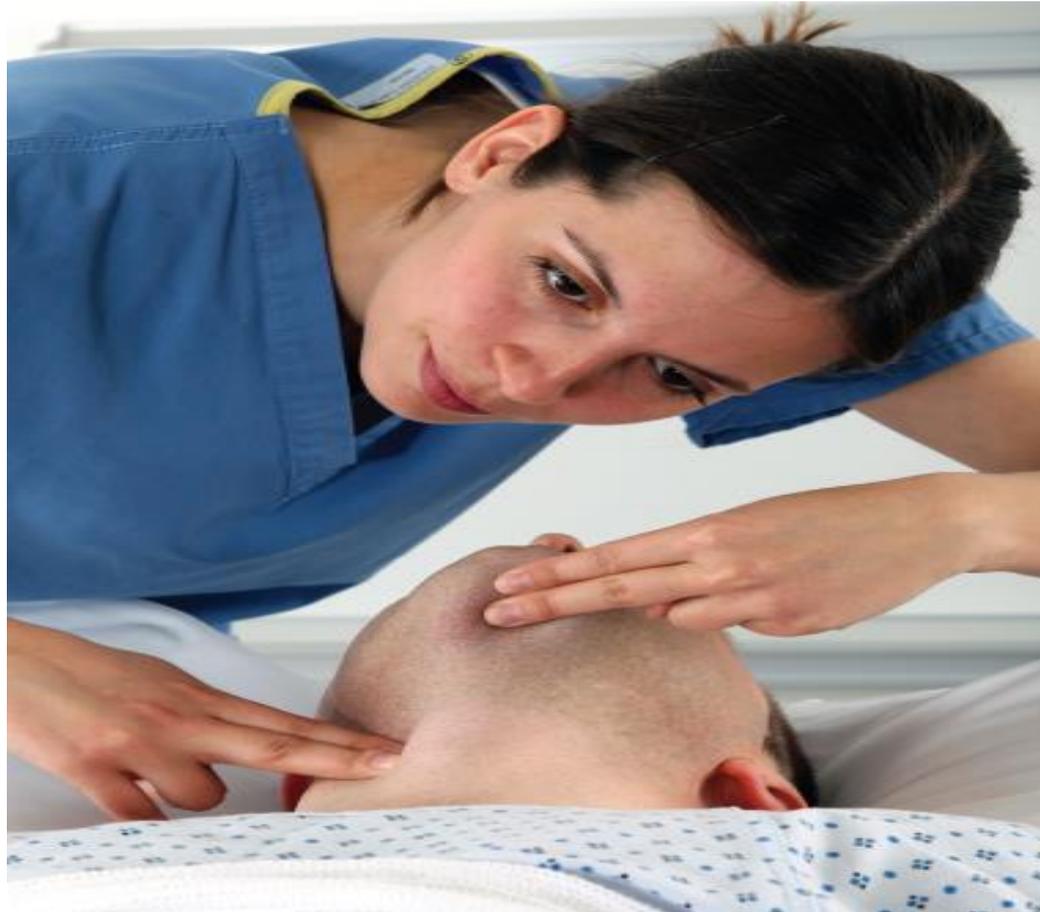
Components of BLS

- Ensure safety
- Check for response
- Activate EMS
- Chest compressions
- Check airway and ventilate
- Defibrillate

Check response of victim



Check pulse



CPR is as easy as

C-A-B



Compressions

Push hard and fast
on the center of
the victim's chest



Airway

Tilt the victim's head
back and lift the chin
to open the airway

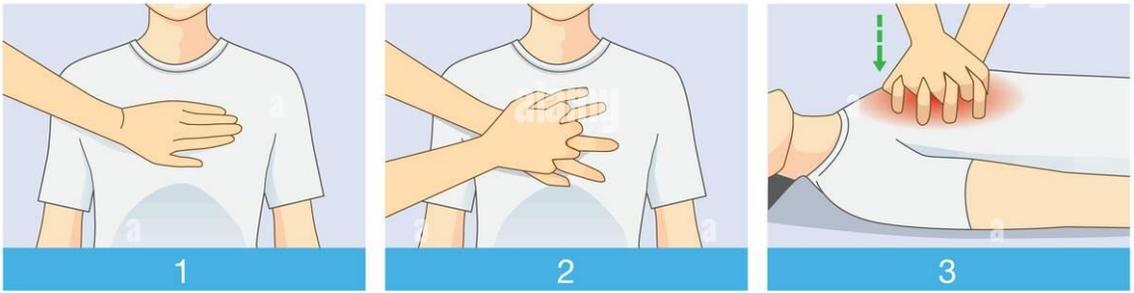


Breathing

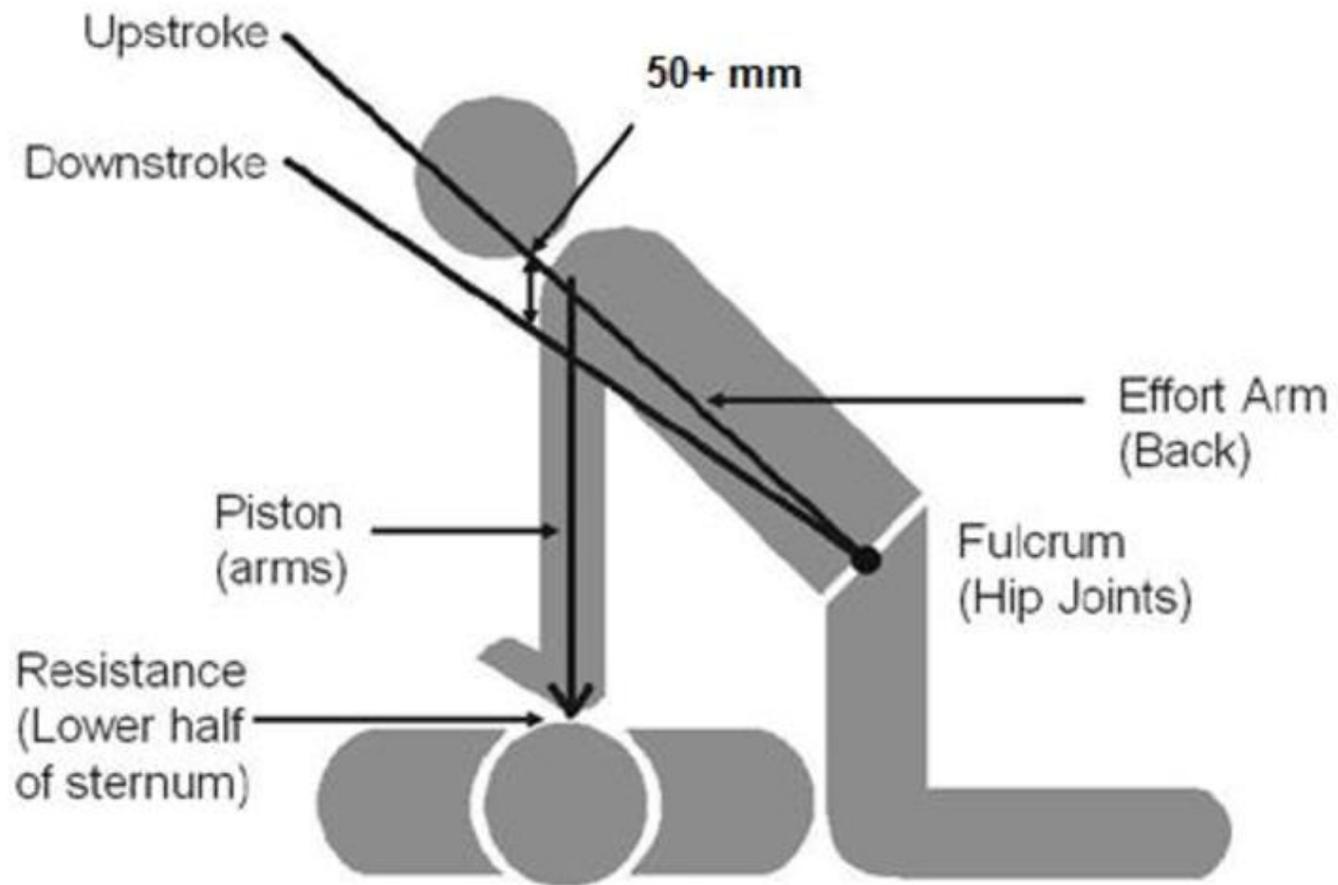
Give mouth-to-mouth
rescue breaths

Chest compression

Proper Techniques for Chest Compressions.



Chest compression





DEPTH

Compressions should be 2 in (5 cm) to 2.4 in (6 cm)



Graphic by Amy M Chung



RATE

Perform chest compressions at a rate of 100 to 120/min



Graphic by Amy M Chung



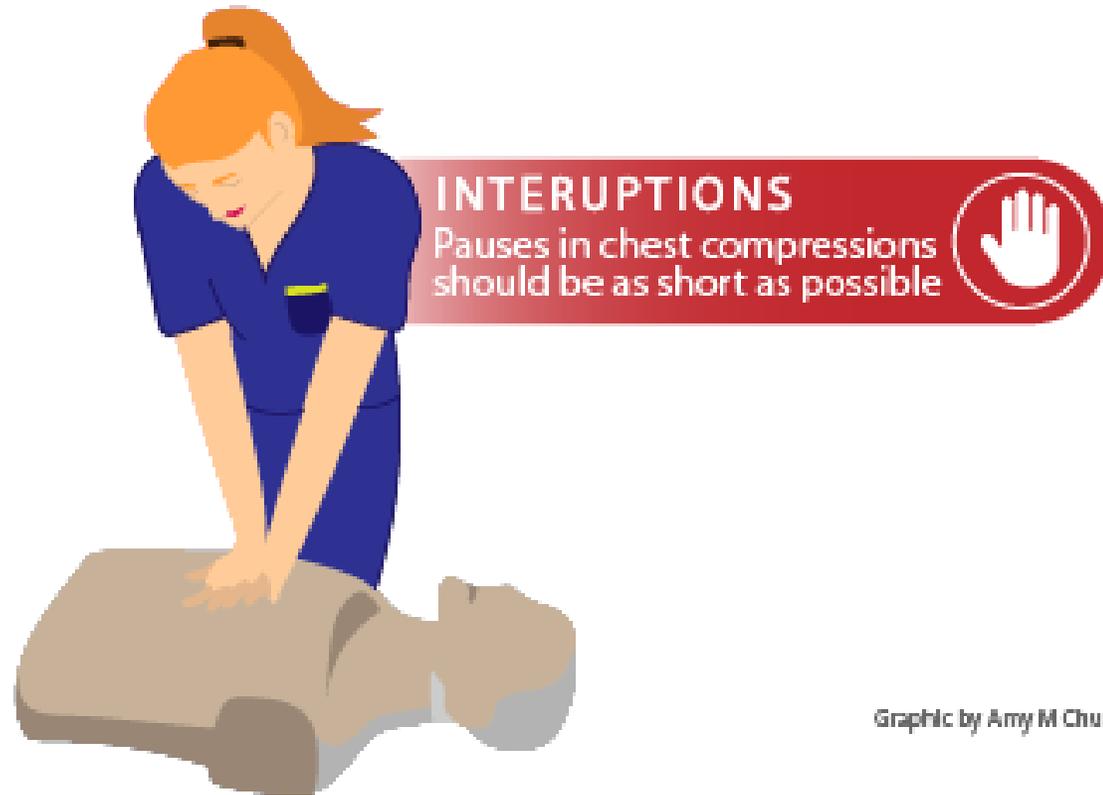
RECOIL

Avoid leaning on the chest between compressions



Graphic by Amy M Chung

Minimize the frequency and duration of any interruption



Ventilation

- Give two ventilations after every 30 compressions, discontinuing compression during the ventilation for patients without an advanced airway
- Give each ventilation over no more than one second



Compression-only CPR

- When a sole lay rescuer is present
- Rescuers are reluctant to perform mouth-mouth ventilation
- Known or possible infection with covid 19
- CO CPR is not recommended for children or arrest of non cardiac origin

Hands-Only CPR

*for adults who suddenly
collapse*

STEP 1:
CALL
9-1-1



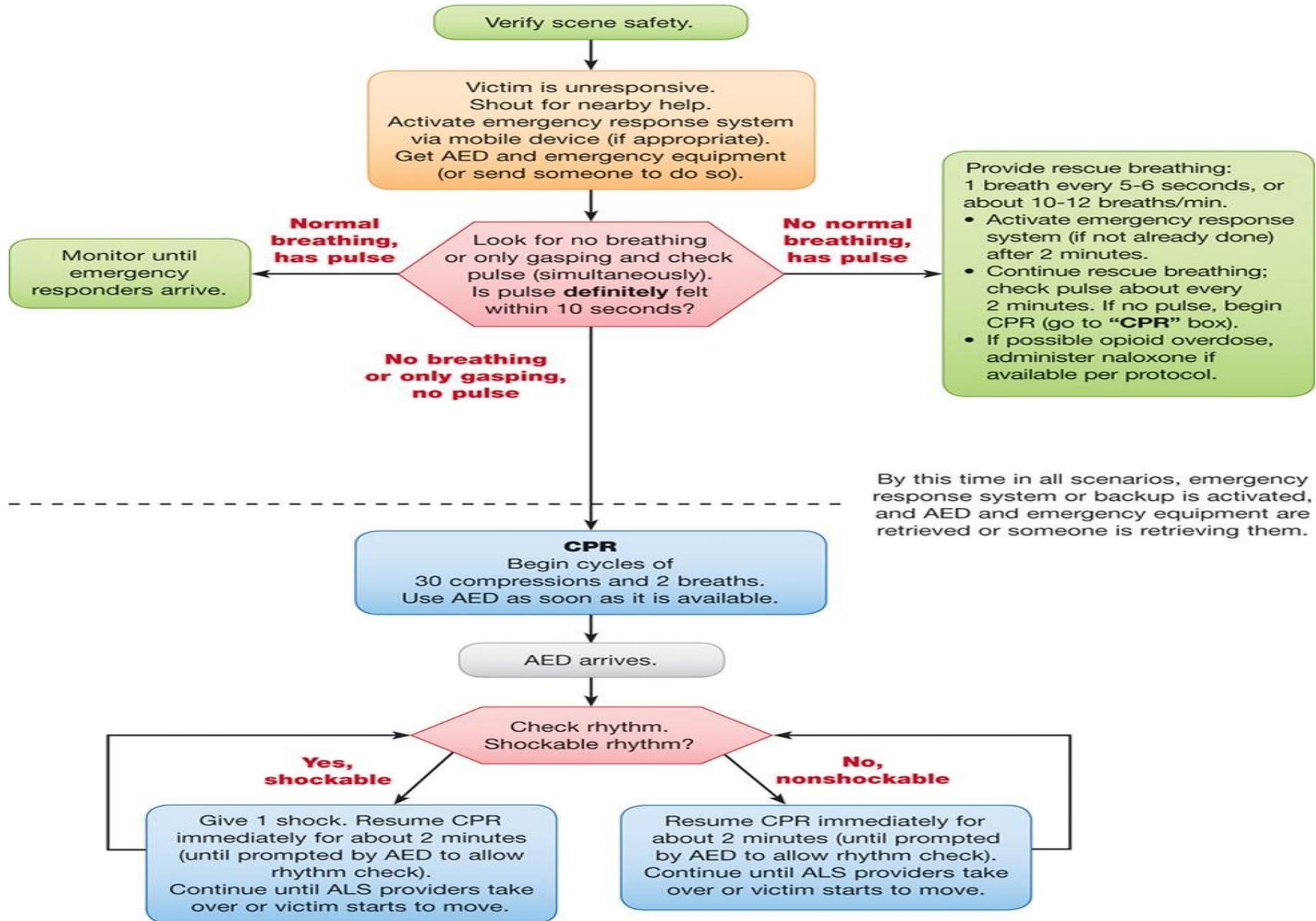
STEP 2:
Push Hard
& Fast in
Center of
Chest

Continue until help arrives!

Early defibrillation with AED



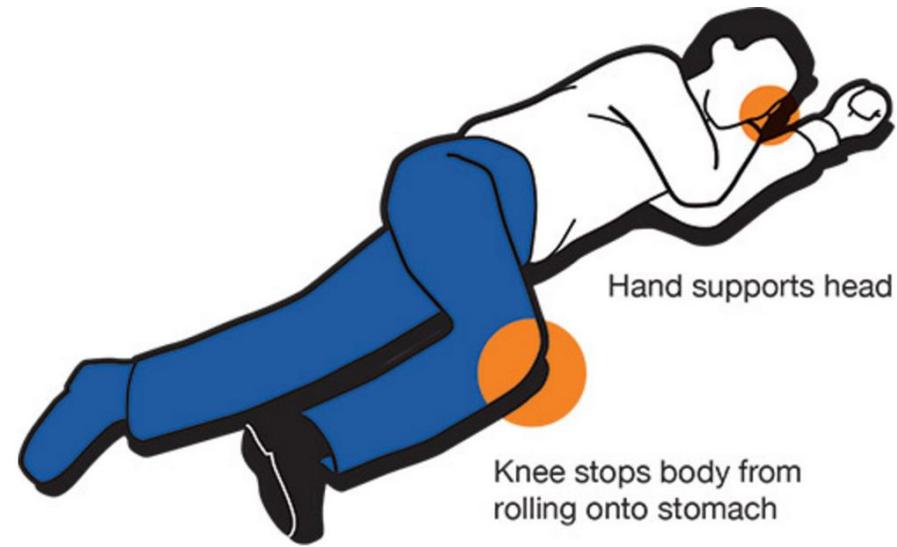
**BLS Healthcare Provider
Adult Cardiac Arrest Algorithm — 2015 Update**



Recovery position

The Recovery Position

Keep the Airway Clear



Stay with person. If you must leave them alone at any point, or if they are unconscious, put them in this position to keep airway clear and prevent choking.

Choking

- Choking is the mechanical obstruction of the flow of air from the environment into the lungs
- Choking prevents breathing, and can be partial or complete
Prolonged or complete choking results in asphyxia which leads to anoxia and is potentially fatal



Causes of choking

- Eating (especially eating and laughing at the same time, eating too fast, and failing to chew food well enough.)
- Alcohol and drug consumption (even a small amount affects awareness.)
- Trauma to the head and face (bleeding can cause choking)
- Small objects swallowed by children (beads, toys)

Treatment

- Encourage the patient to cough
- 2. Back slaps
- 3. Abdominal thrusts (HEILMICH'S MANUEVER)
- 4. Finger sweeping
- 5. Direct visual removal
- 6. C.P.R

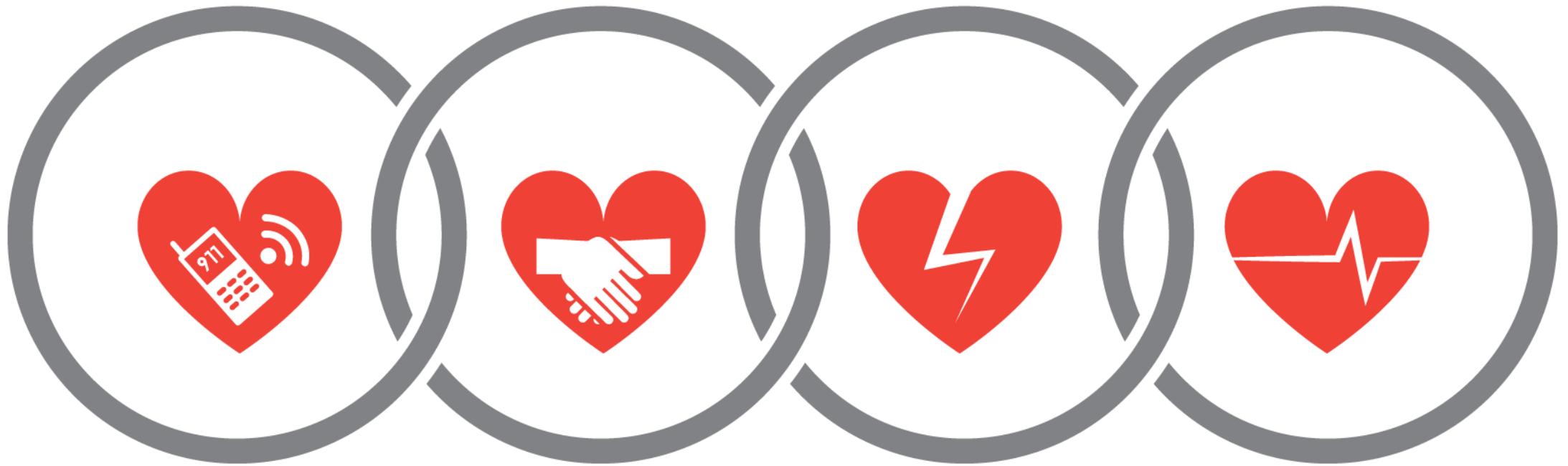
How To Do The Heimlich

- Stand behind the choking person and wrap your arm around his or her waist
- Place thumb side of the fist against middle of person's abdomen just above the navel and well below the ribs
- Press your fist into the person's abdomen with quick, upward thrusts
- Repeat abdominal thrusts until the object is coughed up

Hiemlich maneuver



THE SURVIVAL CHAIN



EARLY ACCESS

EARLY CPR

EARLY DEFIBRILLATION

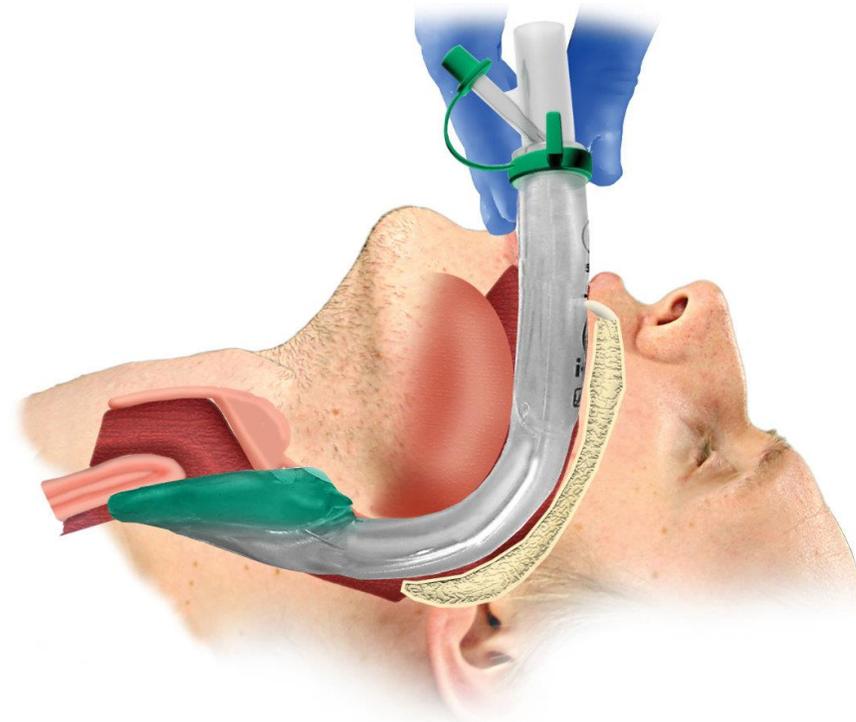
EARLY ADVANCED CARE

Advance Cardiac Life Support



Ventilation in ACLS

- ACLS guidelines support bag mask ventilation or a blindly placed supraglottic air way for ventilation rather than tracheal tube

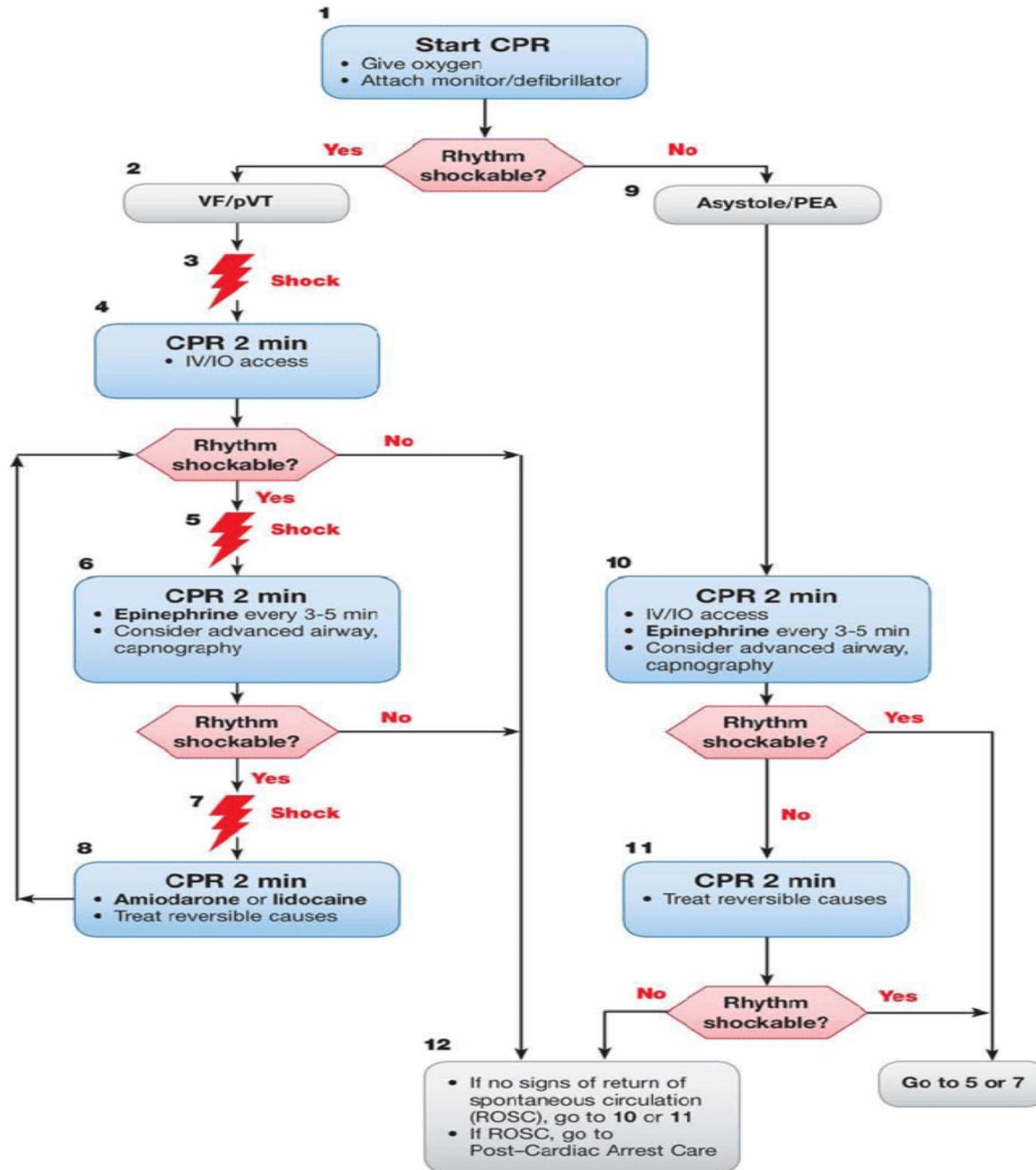


Ventilation in ACLS

- If the patient ventilated with BMV the compression to ventilation ratio should be 30:2
- If the patient is intubated , ventilation should be ten non synchronized ventilation per min

Monitoring of chest compression quality

- Mechanical device that provide real time feedback of chest compression
- End tidal carbon dioxide measurement > 20 mmhg
- Diastolic blood pressure using invasive arterial pressure monitoring



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

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.

Advanced Airway

- 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

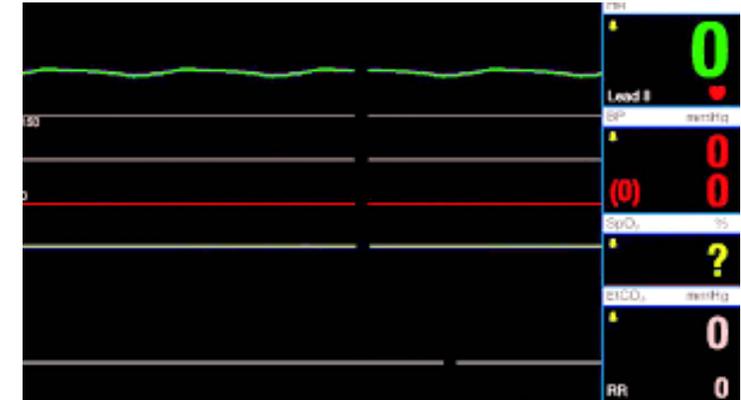
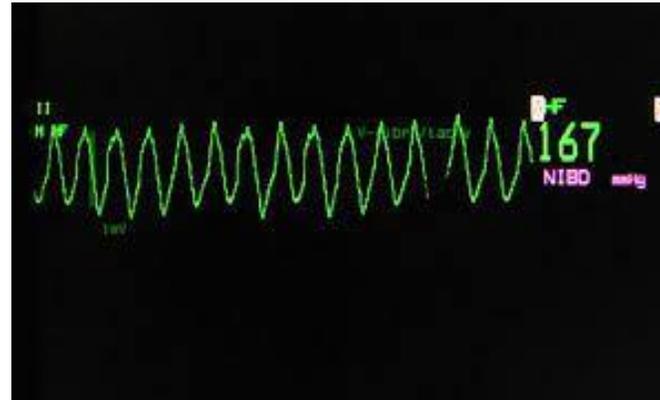
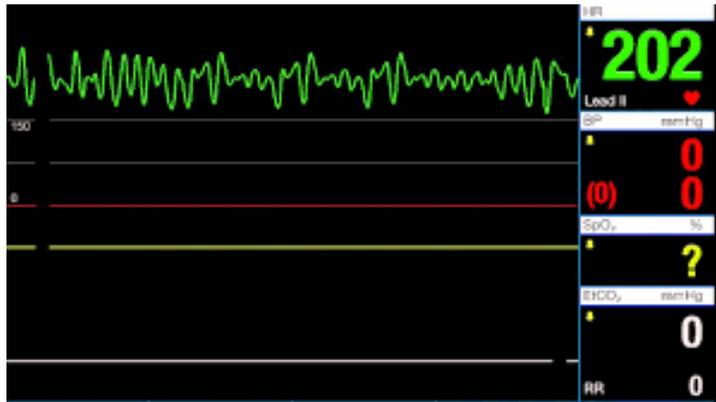
Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO_2 (typically ≥ 40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

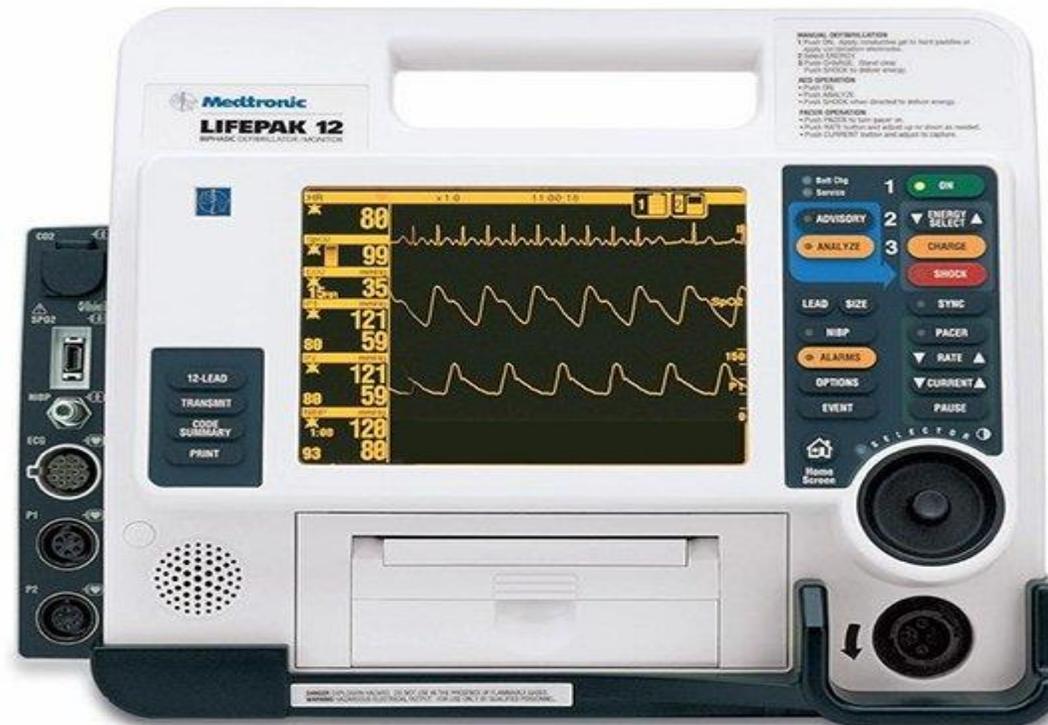
Cardiac monitoring



Defibrillator



- Biphasic maximum dose (120-200 j) , monophasic (360 j) and asynchronous



Drugs

- Amiodarone : initial : 300 mgr(undiluted)rapid bolus, and additional 150 mgr if needed , then if we have suitable response 1 mgr/min for 6 hours and 0.5 mgr/min for 18 hours



Lidocaine

- Initial : 1-1.5 mgr/kg bolus , if refractory VF or PLVT repeat 0.5 to 0.75 mgr/kg every 5-10 min (Max Dose: 3 mgr/kg) follow with continuous infusion after return of perfusion (1-4 mgr/min)
- Interosseous dose is equal to IV dose
- Endotracheal dose (2-2.5 times the recommended IV dose in 5-10 cc NS)



Epinephrine

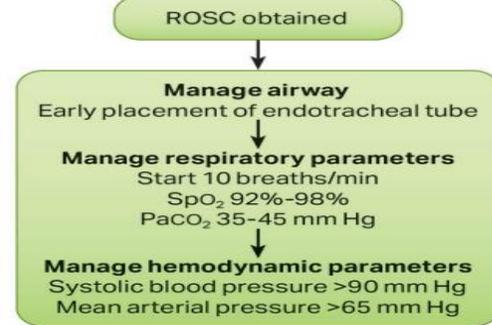
- 1 mgr every 3 to 5 min until return of spontaneous circulation
- Interosseous dose is equal to IV dose
- Endotracheal dose (2-2.5 times the recommended IV dose in 5-10 cc NS)



Return of spontaneous circulation(ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO₂ > 40
- Spontaneous arterial waves with intra arterial monitoring

Initial Stabilization Phase



Obtain 12-lead ECG

Consider for emergent cardiac intervention if

- STEMI present
- Unstable cardiogenic shock
- Mechanical circulatory support required

Follows commands?

No

Comatose

- TTM
- Obtain brain CT
- EEG monitoring
- Other critical care management

Yes

Awake

Other critical care management

Evaluate and treat rapidly reversible etiologies
Involve expert consultation for continued management

Continued Management and Additional Emergent Activities

Initial Stabilization Phase

Resuscitation is ongoing during the post-ROSC phase, and many of these activities can occur concurrently. However, if prioritization is necessary, follow these steps:

- Airway management: Waveform capnography or capnometry to confirm and monitor endotracheal tube placement
- Manage respiratory parameters: Titrate FIO₂ for SpO₂ 92%-98%; start at 10 breaths/min; titrate to PaCO₂ of 35-45 mm Hg
- Manage hemodynamic parameters: Administer crystalloid and/or vasopressor or inotrope for goal systolic blood pressure >90 mm Hg or mean arterial pressure >65 mm Hg

Continued Management and Additional Emergent Activities

These evaluations should be done concurrently so that decisions on targeted temperature management (TTM) receive high priority as cardiac interventions.

- Emergent cardiac intervention: Early evaluation of 12-lead electrocardiogram (ECG); consider hemodynamics for decision on cardiac intervention
- TTM: If patient is not following commands, start TTM as soon as possible; begin at 32-36°C for 24 hours by using a cooling device with feedback loop
- Other critical care management
 - Continuously monitor core temperature (esophageal, rectal, bladder)
 - Maintain normoxia, normocapnia, euglycemia
 - Provide continuous or intermittent electroencephalogram (EEG) monitoring
 - Provide lung-protective ventilation

H's and T's

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypokalemia/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

H's and T's

Treatable causes of cardiac arrest

- Hypoxia
- Hypovolemia
- Hydrogen ion (acidosis)
- Hypokalemia
- Hyperkalemia
- Hypothermia
- Thrombosis (pulmonary)
- Thrombosis (coronary)
- Tamponade
- Tension pneumothorax
- Toxins

Termination of resuscitative efforts



- Duration of resuscitative effort was more than 30 min without sustained perfusion rhythm
- Initial ECG rhythm of asystole
- Prolonged interval between estimated time of arrest and initiation of resuscitation
- Patient age and severity of comorbid disease
- Absent brainstem reflexes
- Very low Etco₂ (< 10) despite more than > 20 min cpr

CPR in covid infected patients



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



Cover your own
mouth and nose
with a face mask
or cloth.



Cover the
person's mouth
and nose with
a face mask or
cloth.

Step 3

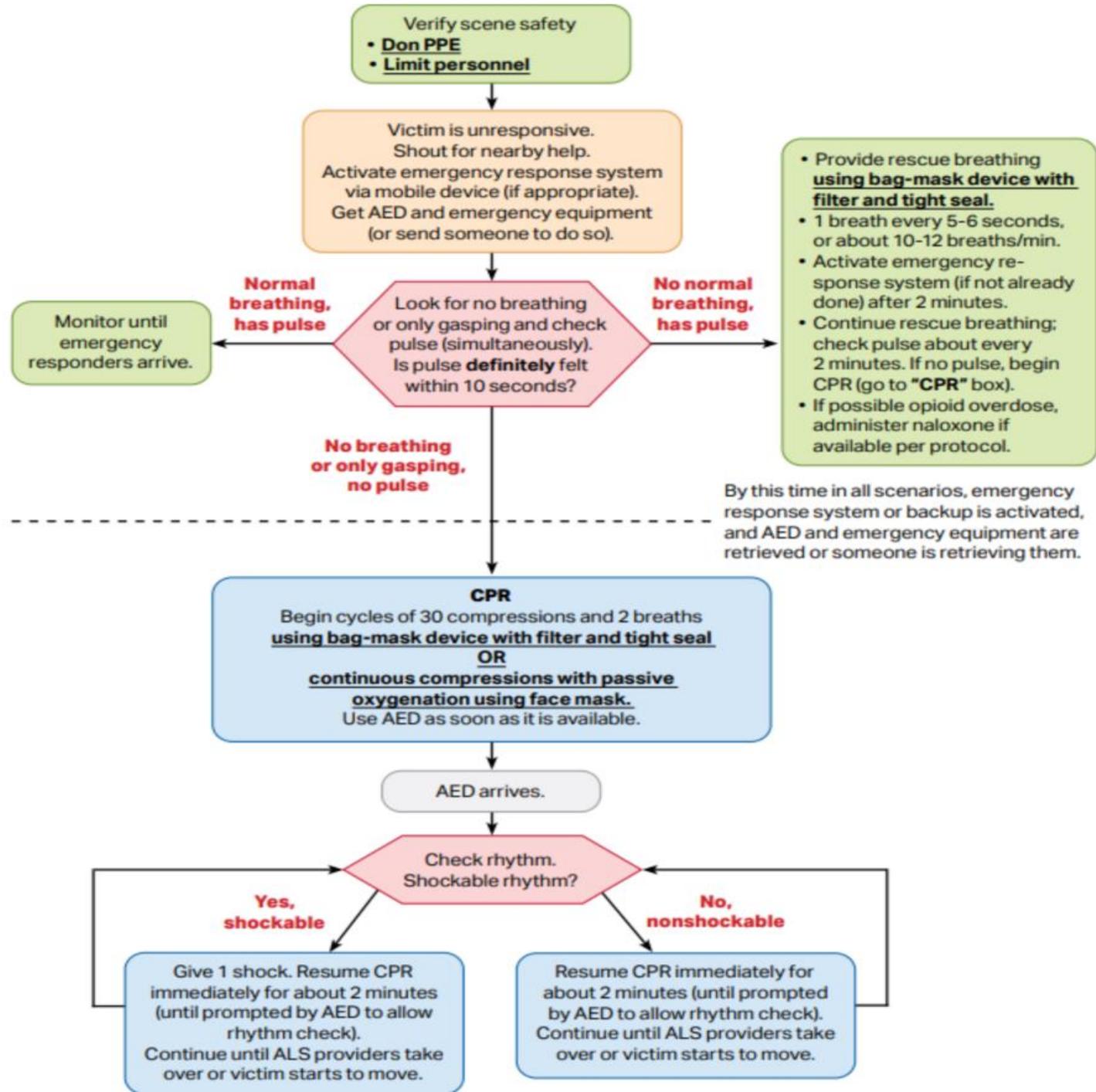


Perform
Hands-Only CPR.
Push hard and fast on
the center of the chest
at a rate of 100 to 120
compressions
per minute.

Step 4



Use an AED as
soon as it is
available.

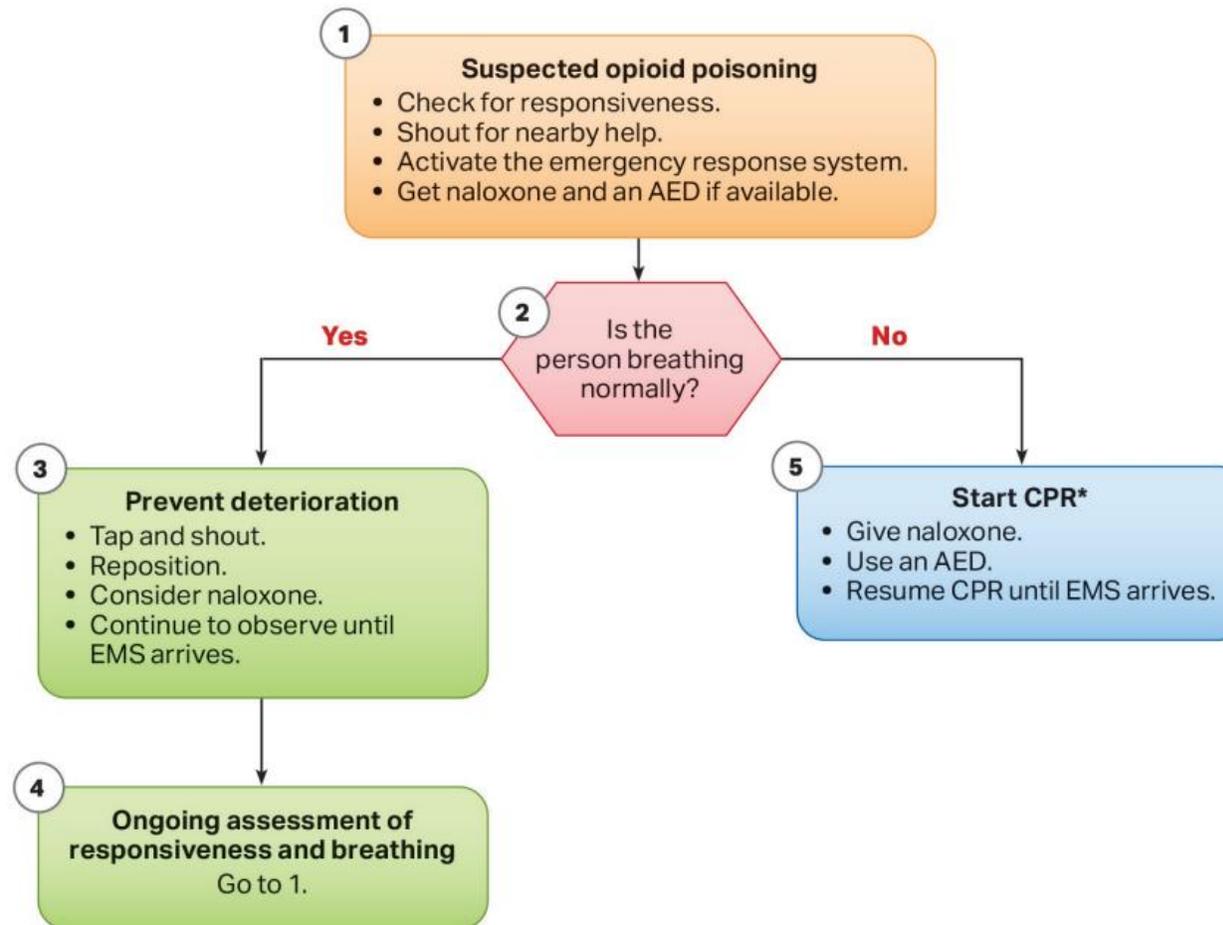


ACLS in covid 19

- PPE
- Minimize the number of clinicians performing CPR
- Use mechanical device to perform chest compression
- Use a air filter for BMV
- Use video laryngoscopy for intubation
- Avoid prolonged CPR
- Use a negative pressure room for CPR
- Chest compression can be initiated while a patient is prone and intubated
- Other cause for arrest such as PTE should be considered

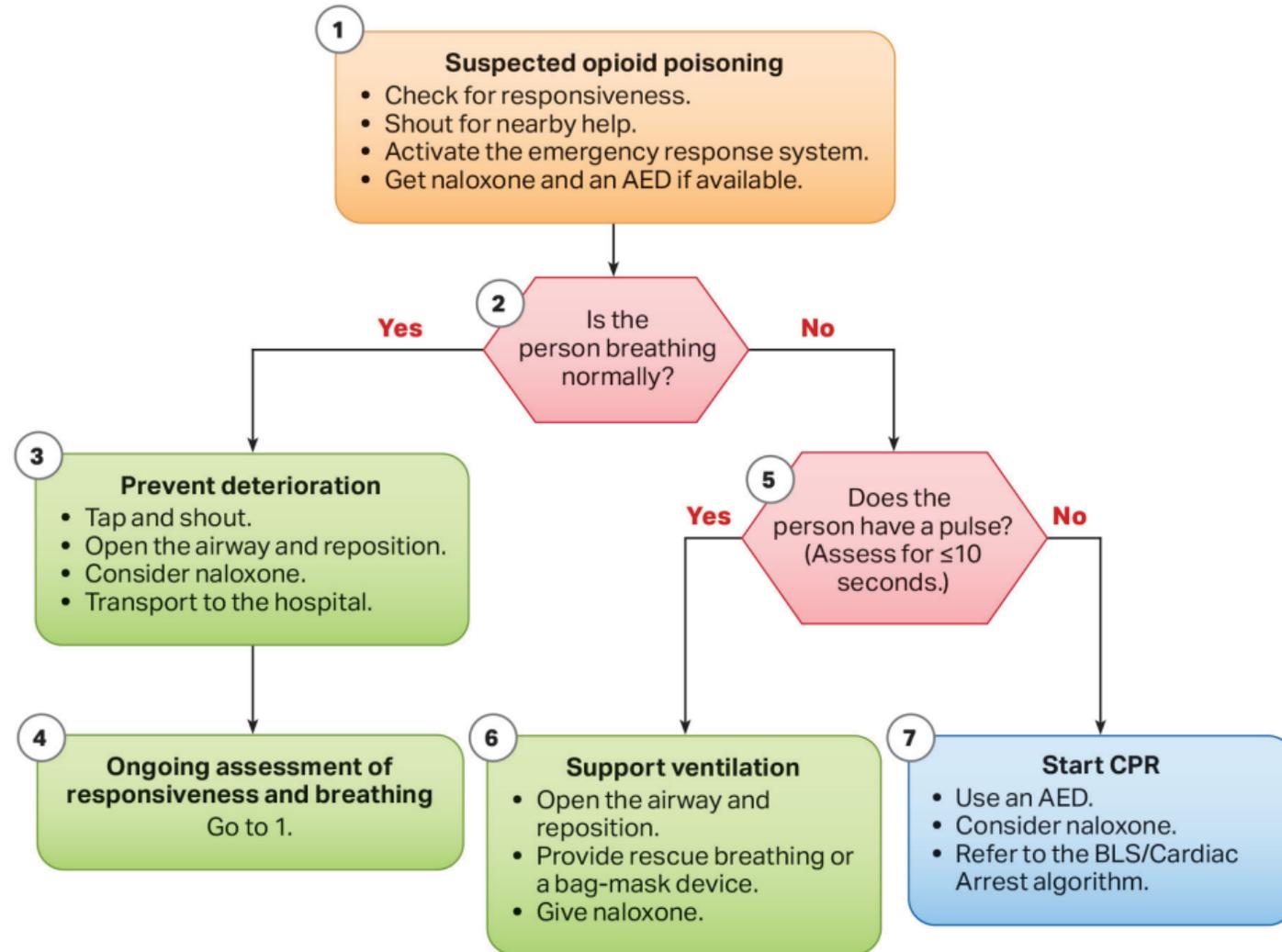


Figure 5. Opioid-Associated Emergency for Lay Responders Algorithm.

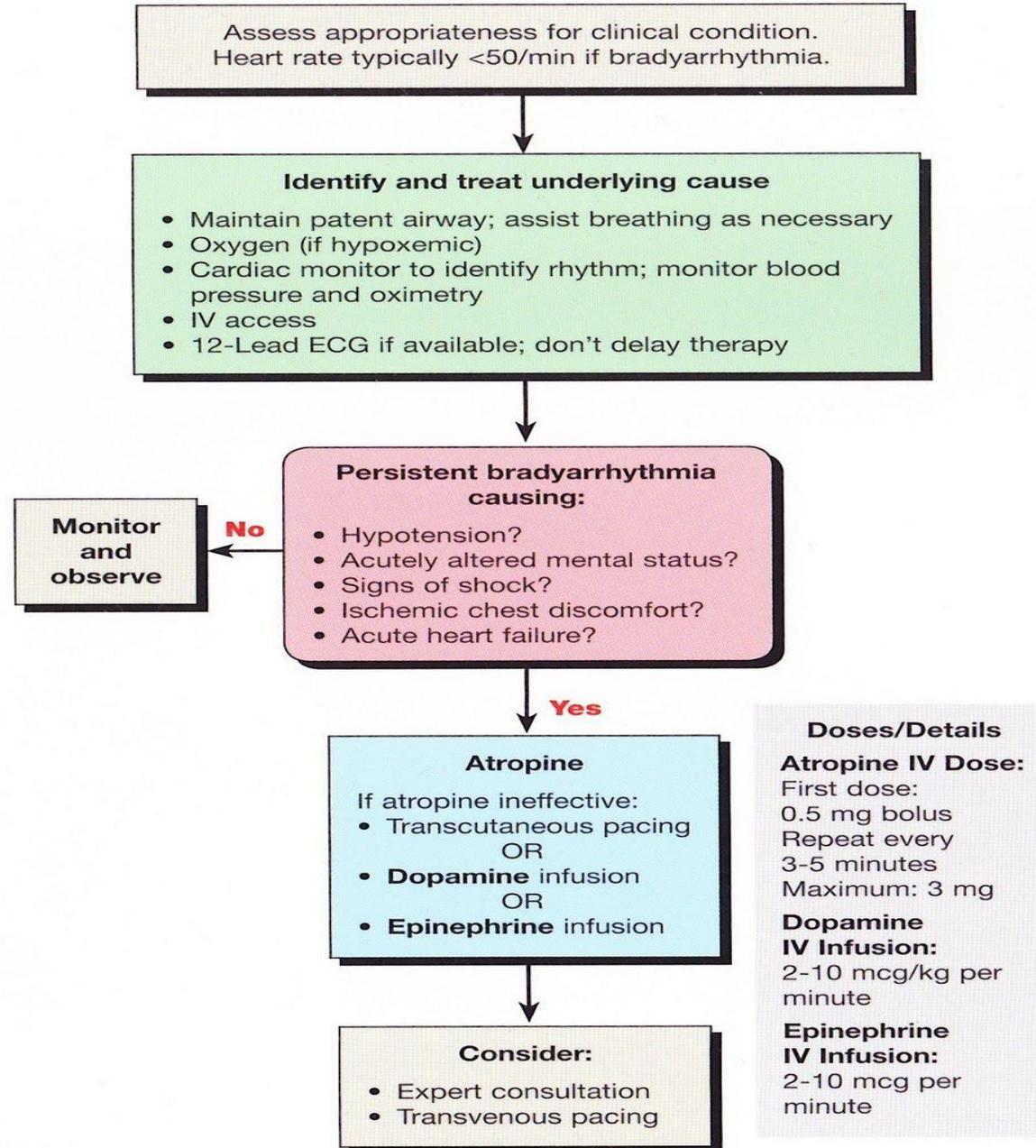


*For adult and adolescent victims, responders should perform compressions and rescue breaths for opioid-associated emergencies if they are trained and perform Hands-Only CPR if not trained to perform rescue breaths. For infants and children, CPR should include compressions with rescue breaths.

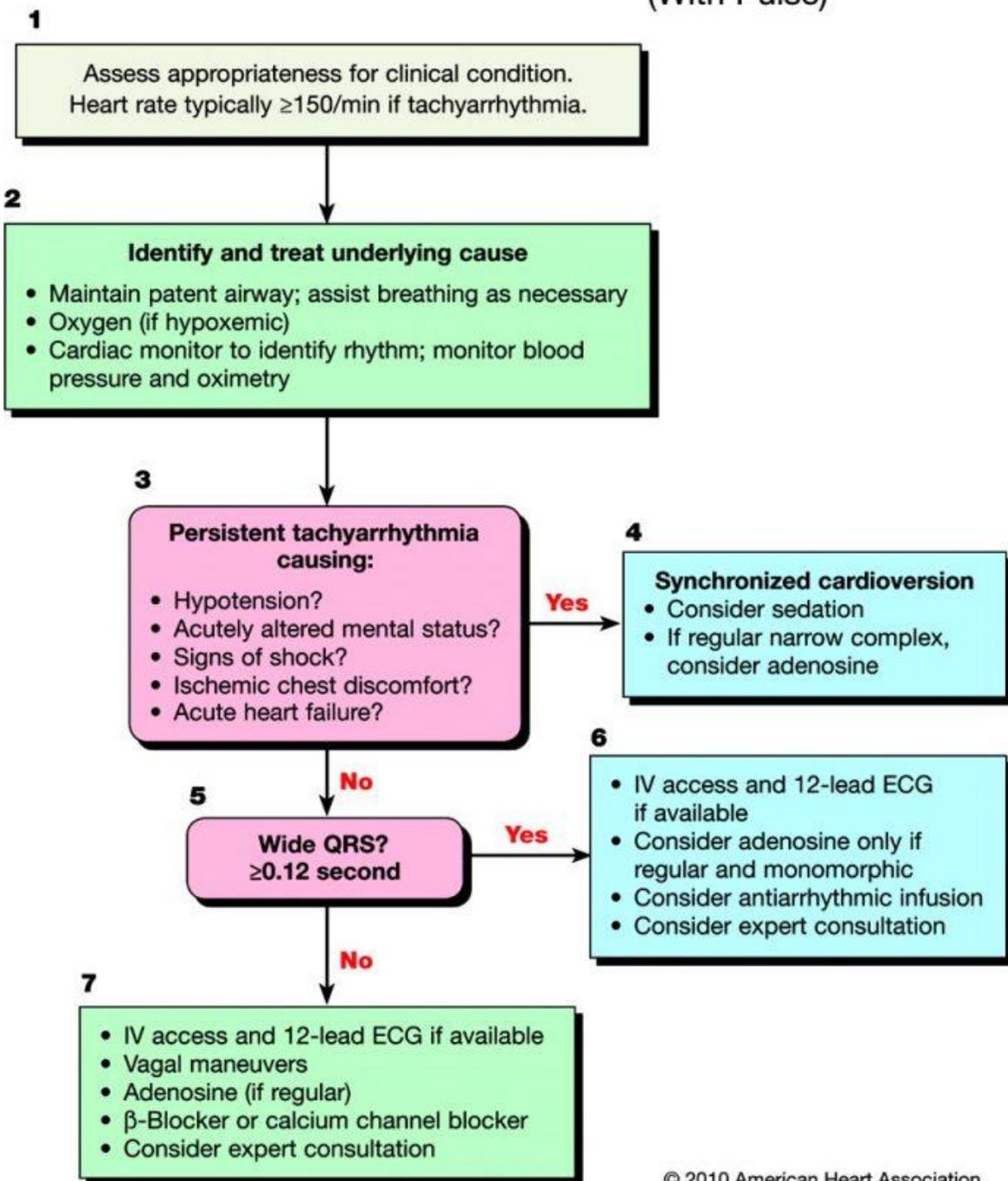
Figure 6. Opioid-Associated Emergency for Healthcare Providers Algorithm.



Bradycardia With a Pulse Algorithm



Adult Tachycardia (With Pulse)



Doses/Details

Synchronized Cardioversion

Initial recommended doses:

- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic or 200 J monophasic
- Wide regular: 100 J
- Wide irregular: defibrillation dose (NOT synchronized)

Adenosine IV Dose:

First dose: 6 mg rapid IV push; follow with NS flush.

Second dose: 12 mg if required.

Antiarrhythmic Infusions for Stable Wide-QRS Tachycardia

Procainamide IV Dose:

20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases $>50\%$, or maximum dose 17 mg/kg given. Maintenance infusion: 1-4 mg/min. Avoid if prolonged QT or CHF.

Amiodarone IV Dose:

First dose: 150 mg over 10 minutes. Repeat as needed if VT recurs. Follow by maintenance infusion of 1 mg/min for first 6 hours.

Sotalol IV Dose:

100 mg (1.5 mg/kg) over 5 minutes. Avoid if prolonged QT.