

# AHA 2020

Dr. Ali Taherinia

Despite recent gains, **less than 40% of adults receive layperson-initiated CPR**, and fewer than 12% have an AED applied before EMS arrival.

## AHA Chains of Survival for adult IHCA and OHCA

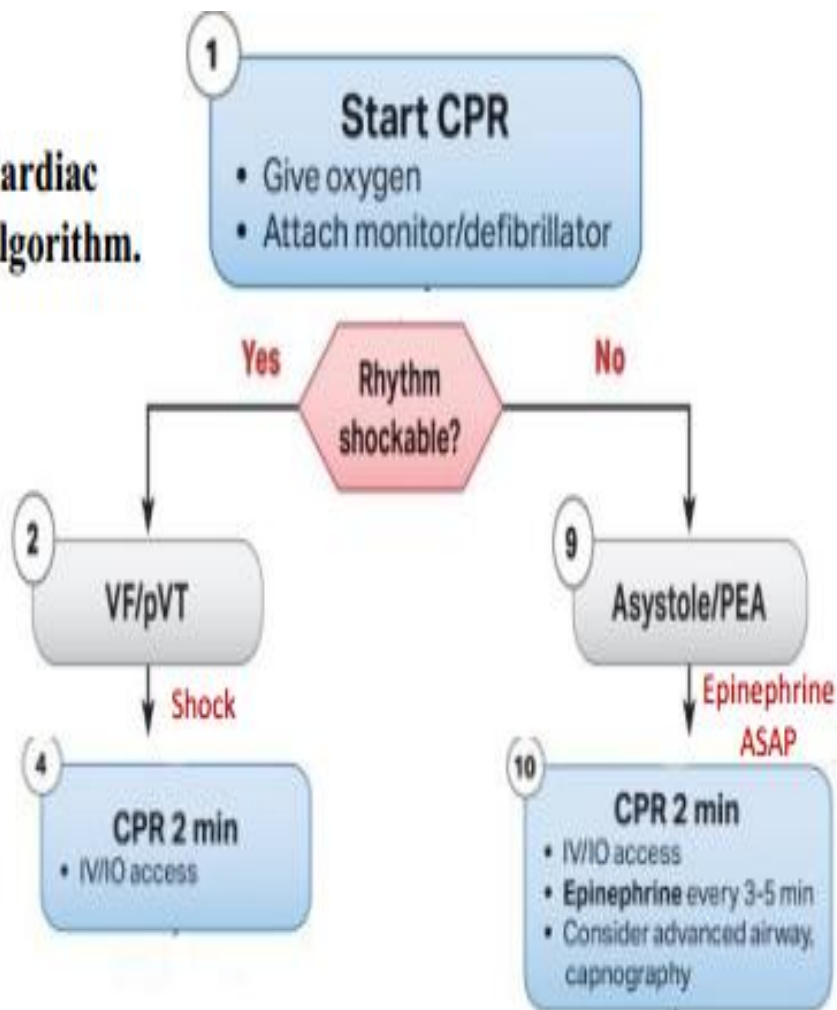
### IHCA

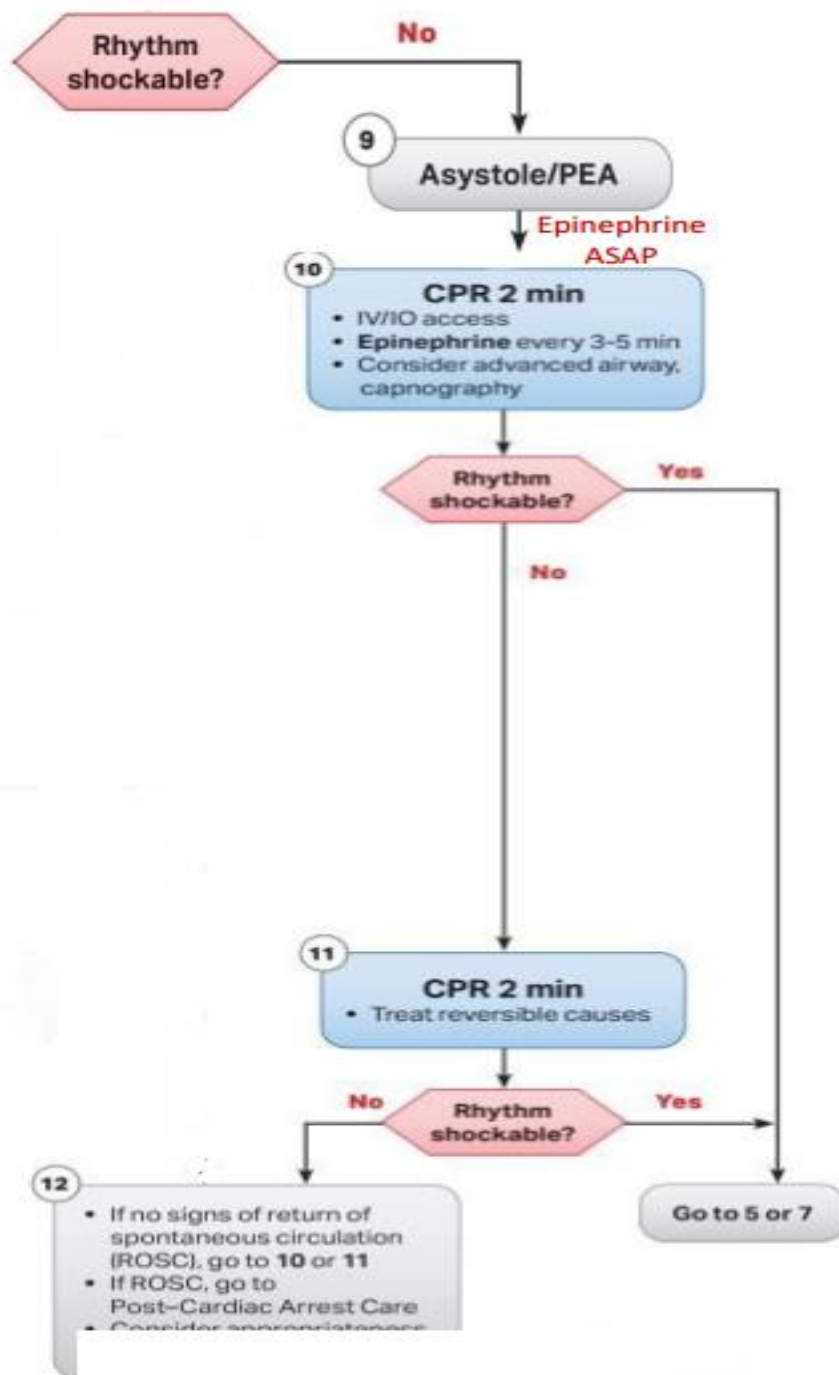


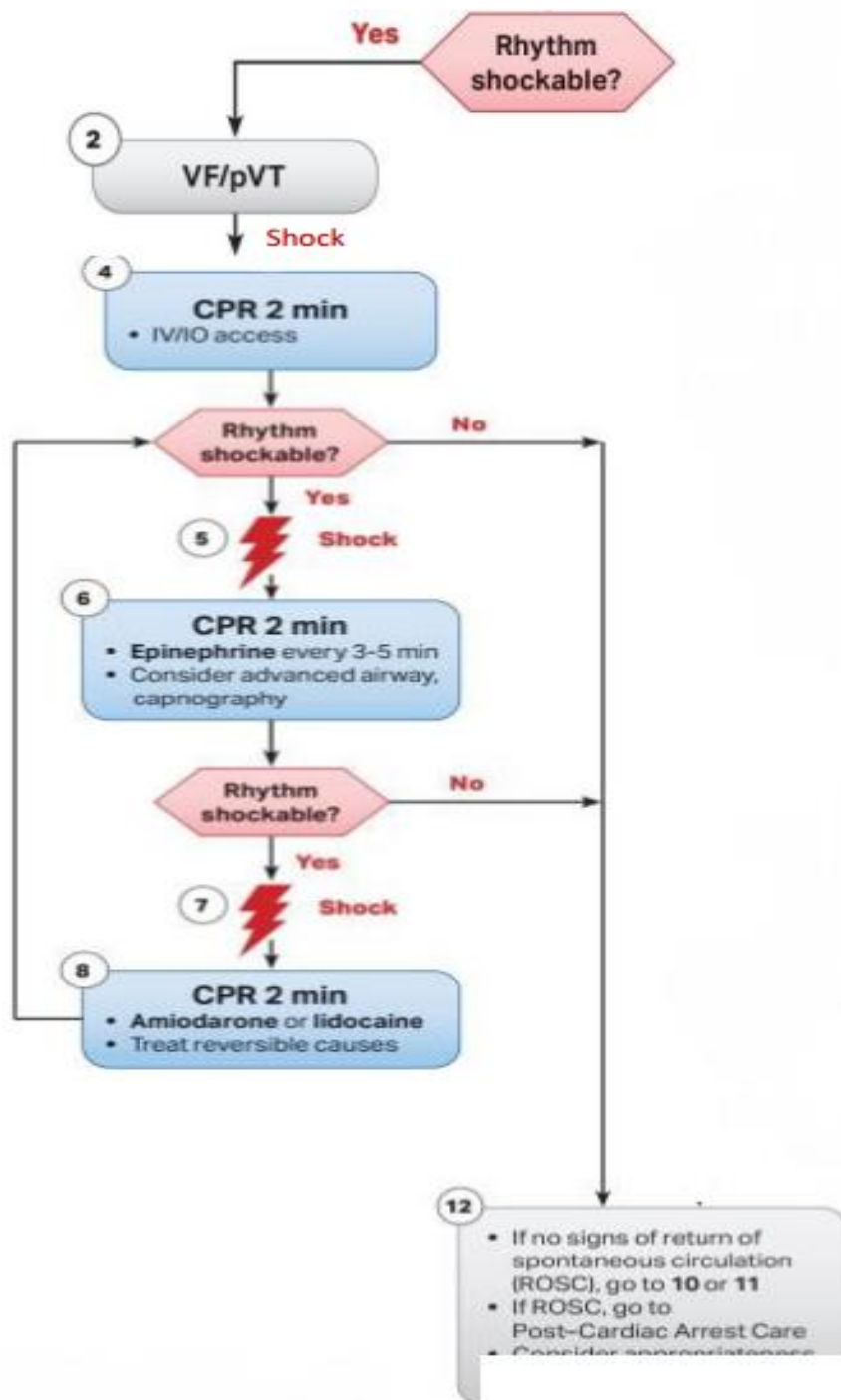
### OHCA



## Adult Cardiac Arrest Algorithm.









### 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<sub>2</sub> is low or decreasing, reassess 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

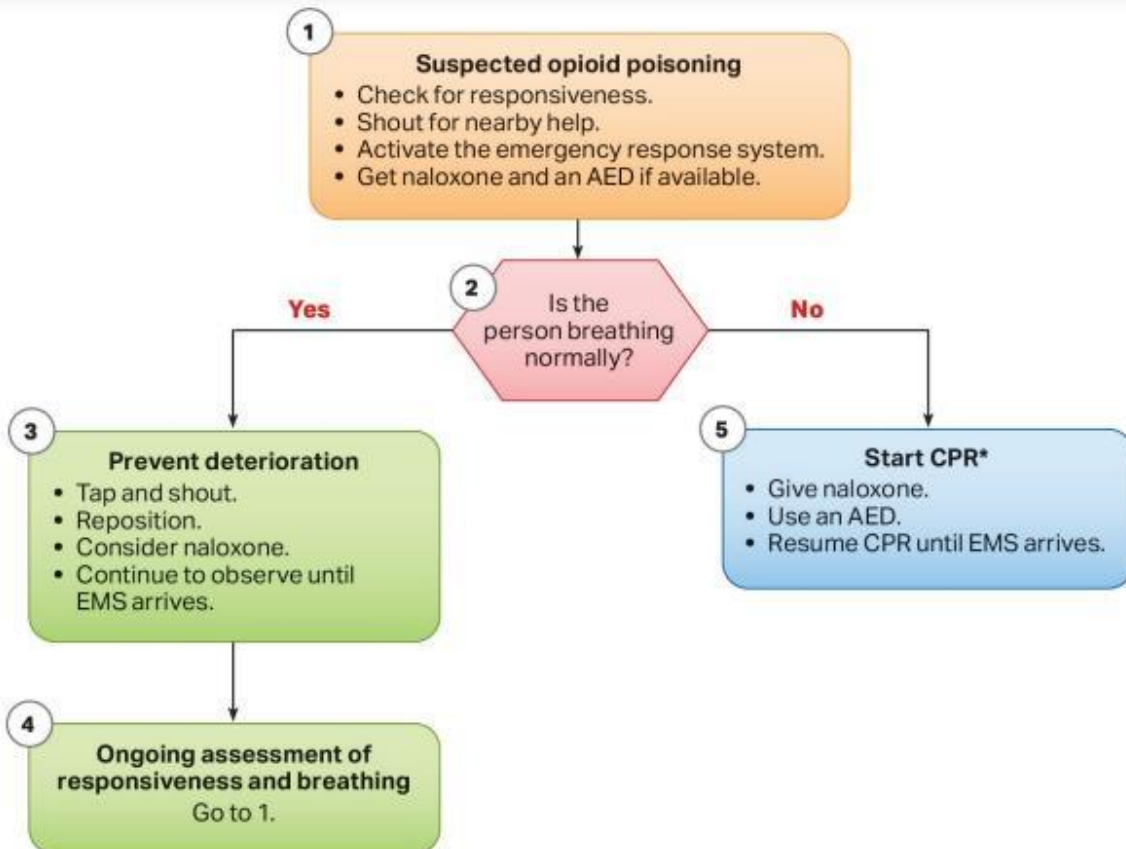
### Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO<sub>2</sub> (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**

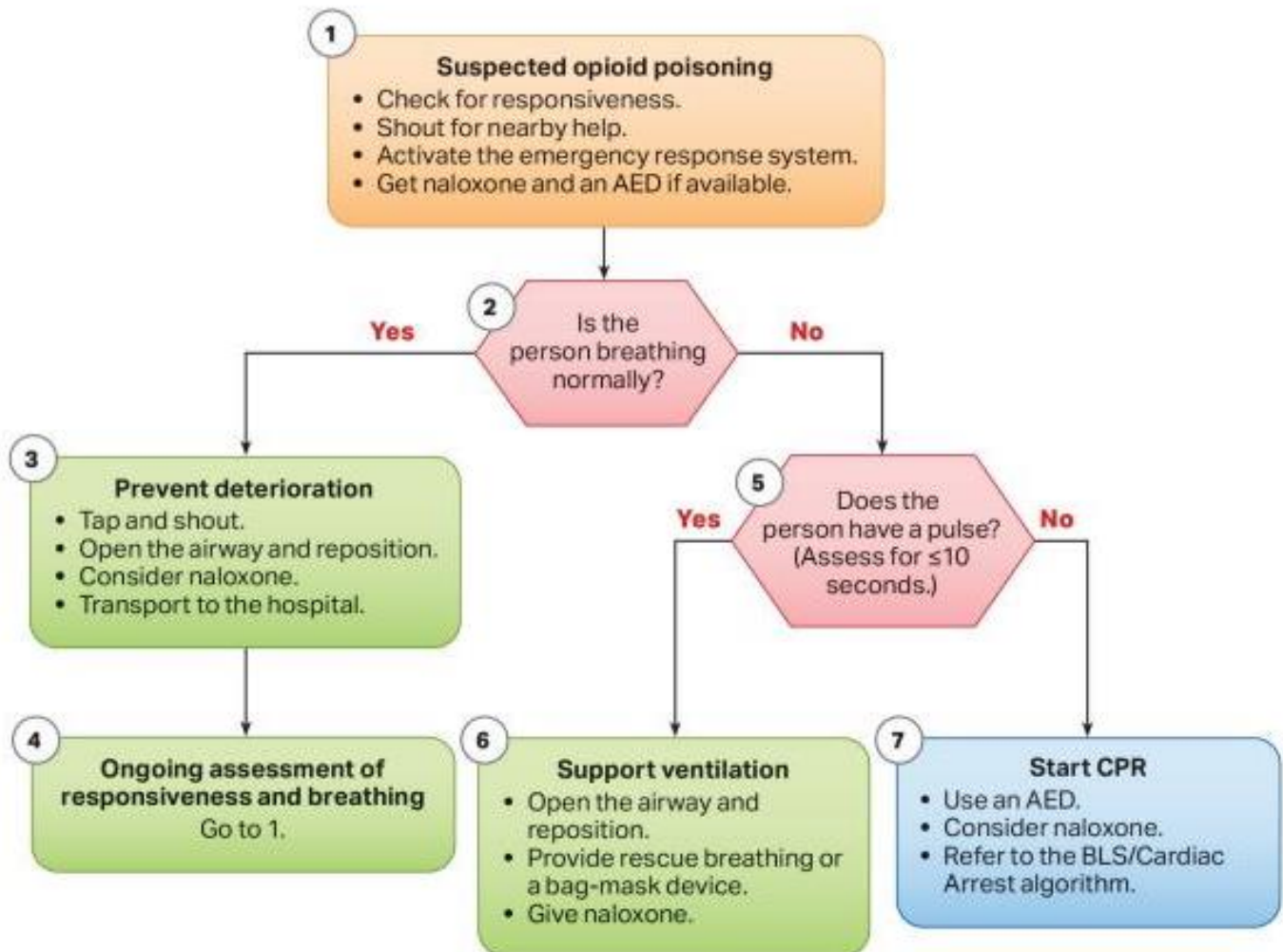
## Opioid-Associated Emergency for Lay Responders Algorithm



\*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.

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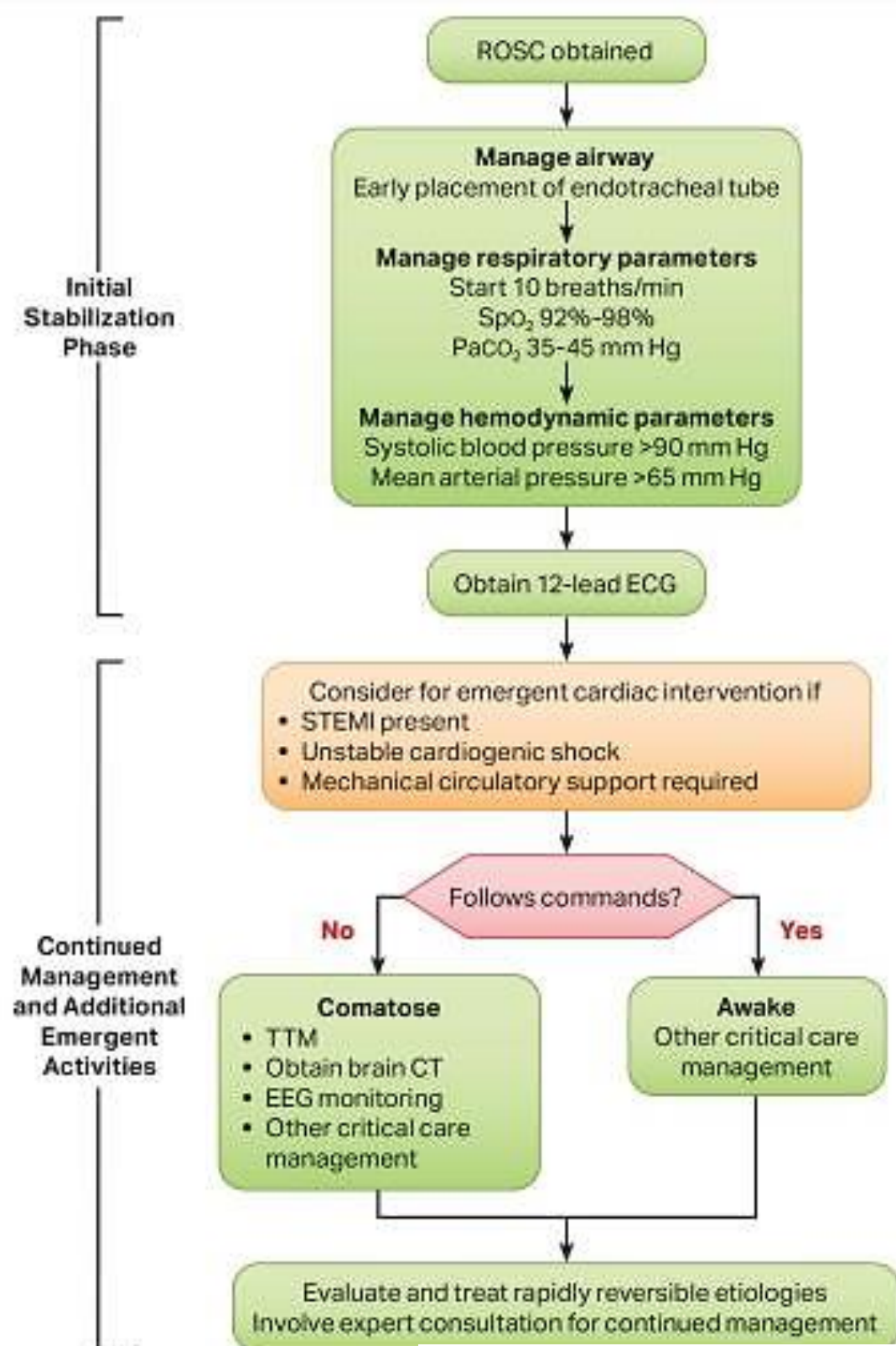
## Opioid-Associated Emergency for Healthcare Providers Algorithm





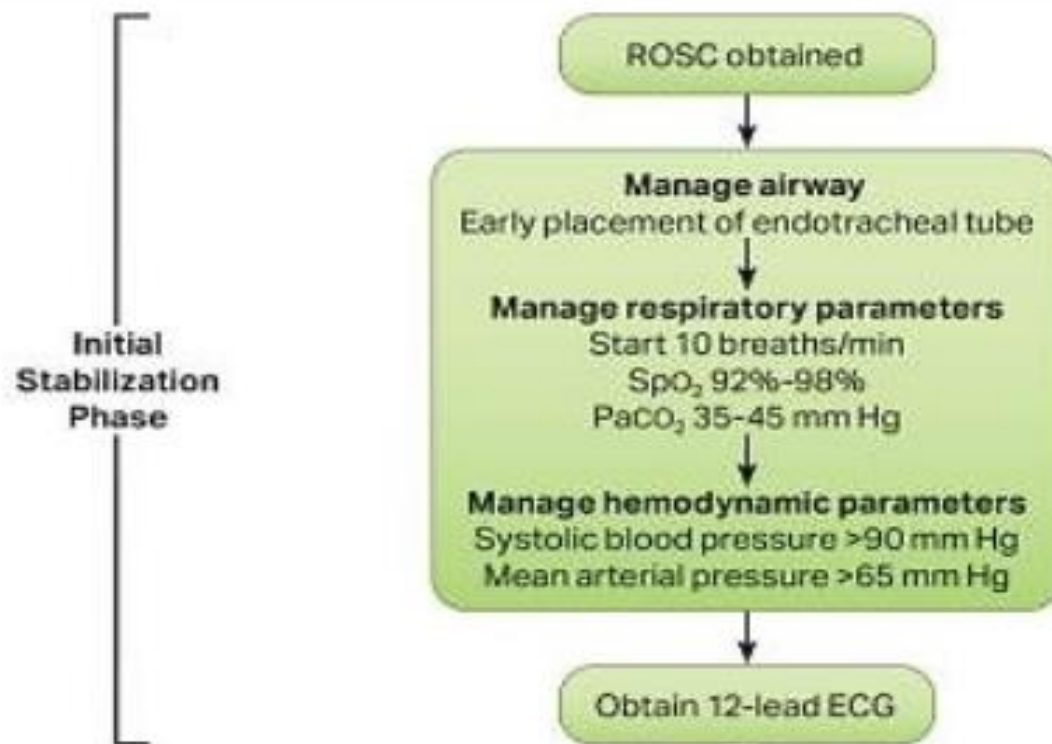
# Adult Basic and Advanced Life Support

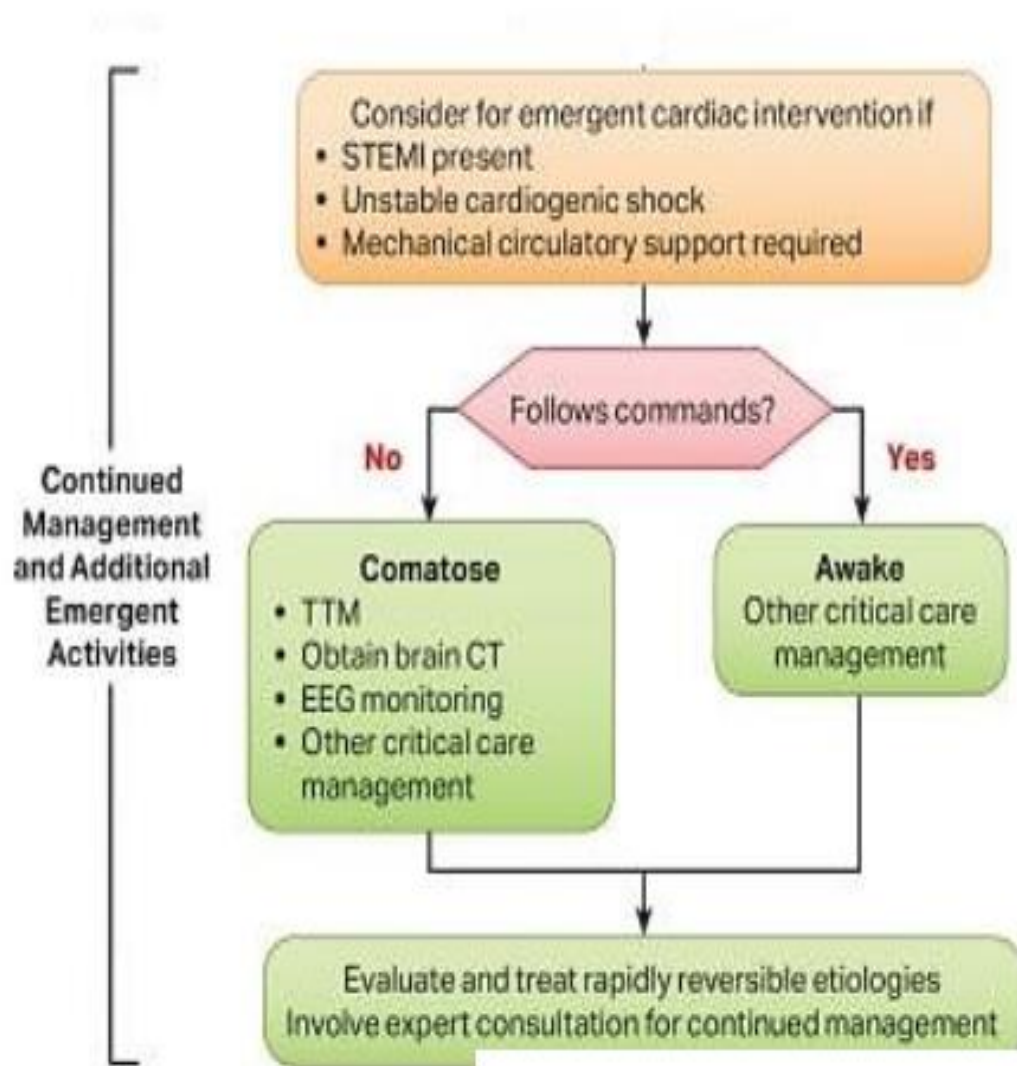
## Adult Post-Cardiac Arrest Care Algorithm.



# Adult Basic and Advanced Life Support

## Adult Post-Cardiac Arrest Care Algorithm.





### 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  $\text{FIO}_2$  for  $\text{SpO}_2$  92%-98%; start at 10 breaths/min; titrate to  $\text{PaCO}_2$  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

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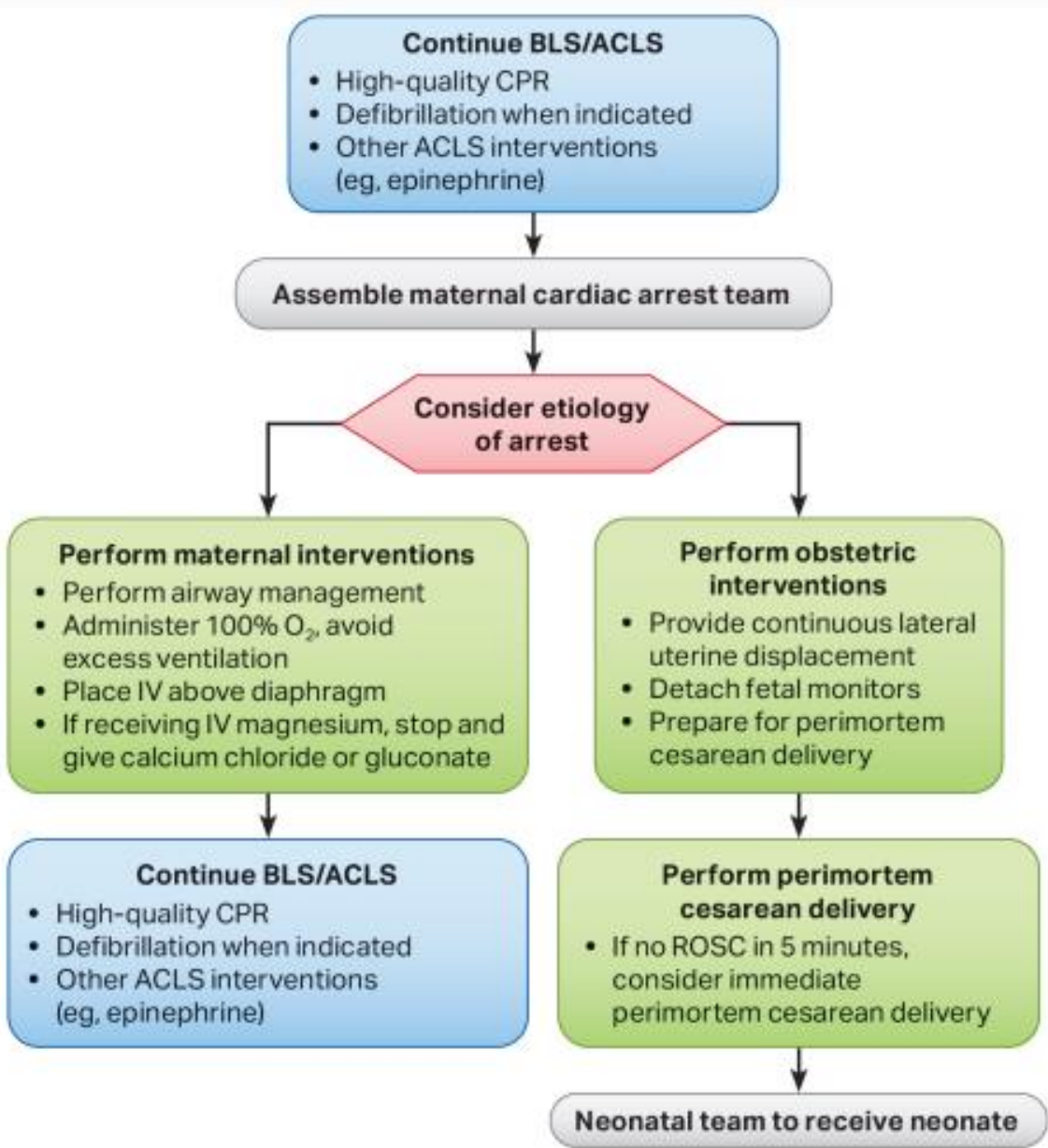
Thrombosis, coronary

Thrombosis, coronary

Vasopressor	Non-Vasopressor
<b>Epinephrine</b> <ul style="list-style-type: none"> <li>• Recommended for patients in cardiac arrest (COR 1, LOE B-R)</li> <li>• Reasonable to administer 1 mg every 3-5 minute (COR 2a, LOE B-R)</li> <li>• Reasonable to administer as soon as feasible in non-shockable rhythm (COR 2a, LOE C-LD)</li> <li>• May be reasonable to administer after initial defibrillation attempts have failed in shockable rhythm (COR 2b, LOE C-LD)</li> </ul>	<b>Amiodarone or lidocaine</b> <ul style="list-style-type: none"> <li>• May be considered for VF/pVT unresponsive to defibrillation (COR 2b, LOE B-R)</li> </ul>
<b>Vasopressin</b> <ul style="list-style-type: none"> <li>• Offers no advantage over epinephrine (COR 2b, LOE C-LD)</li> </ul>	<b>Steroids</b> <ul style="list-style-type: none"> <li>• During CPR, are of uncertain benefit in OHCA (COR 2b, LOE C-LD)</li> </ul>
	<b>Calcium</b> <ul style="list-style-type: none"> <li>• Routine use NOT recommended (COR 3, LOE B-NR)</li> </ul>
	<b>Sodium bicarbonate</b> <ul style="list-style-type: none"> <li>• Routine use NOT recommended (COR 3)</li> </ul>
	<b>Magnesium</b> <ul style="list-style-type: none"> <li>• Routine use NOT recommended (LOE B-R)</li> </ul>

# Adult Basic and Advanced Life Support

## Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm



## Maternal Cardiac Arrest

- Team planning should be done in collaboration with the obstetric, neonatal, emergency, anesthesiology, intensive care, and cardiac arrest services.
- Priorities for pregnant women in cardiac arrest should include provision of high-quality CPR and relief of aortocaval compression with lateral uterine displacement.
- The goal of perimortem cesarean delivery is to improve maternal and fetal outcomes.
- Ideally, perform perimortem cesarean delivery in 5 minutes, depending on provider resources and skill sets.

## Advanced Airway

- In pregnancy, a difficult airway is common. Use the most experienced provider.
- Provide endotracheal intubation or supraglottic advanced airway.
- Perform waveform capnography or capnometry to confirm and monitor ET tube placement.
- Once advanced airway is in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.

## Potential Etiology of Maternal Cardiac Arrest

- A** Anesthetic complications
- B** Bleeding
- C** Cardiovascular
- D** Drugs
- E** Embolic
- F** Fever
- G** General nonobstetric causes of cardiac arrest (H's and T's)
- H** Hypertension



**AHA Chains of Survival for pediatric IHCA and OHCA.**

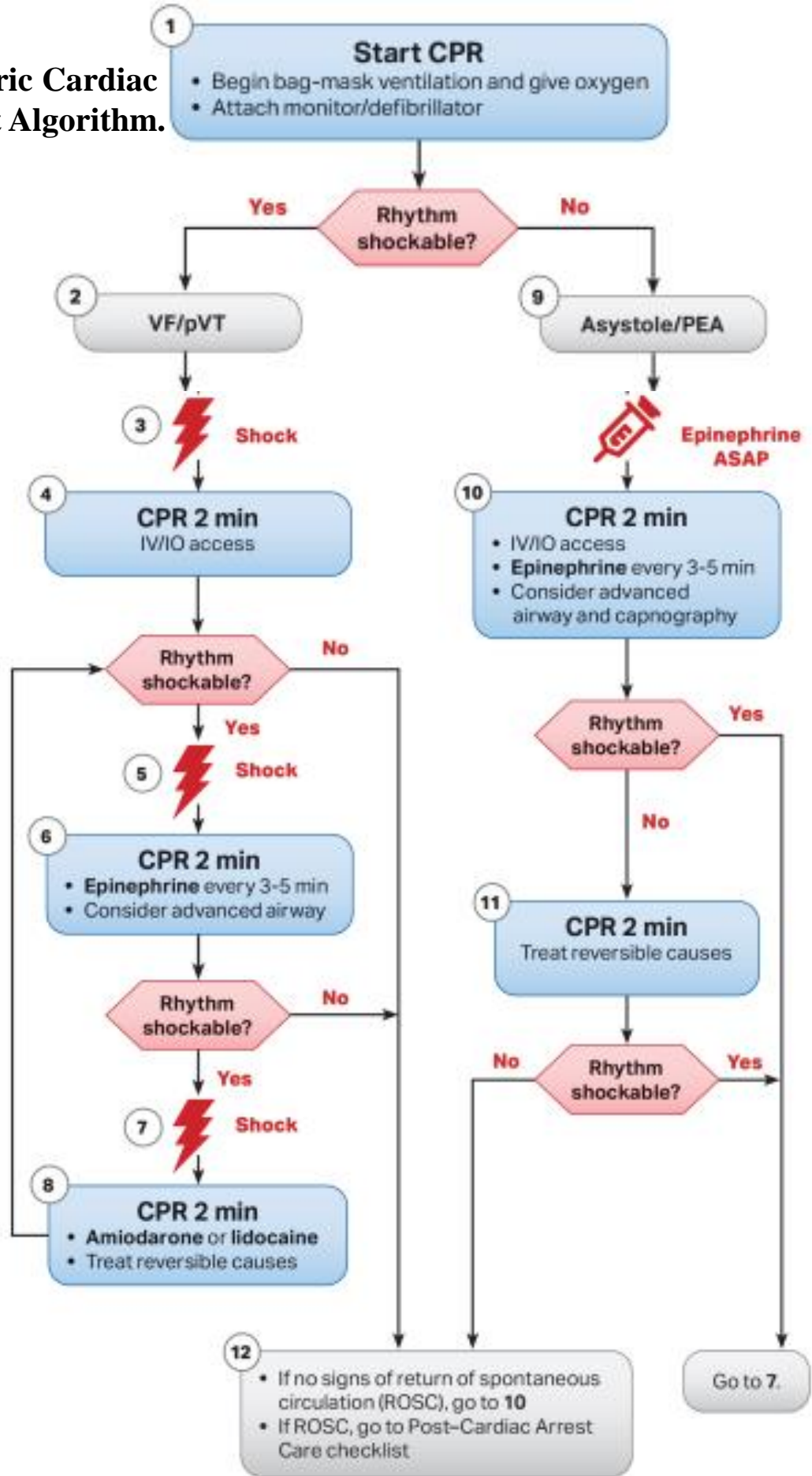
**IHCA**



**OHCA**



**Pediatric Cardiac Arrest Algorithm.**



### CPR Quality

- Push hard ( $\geq \frac{1}{3}$  of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

### Shock Energy for Defibrillation

- First shock 2 J/kg
- Second shock 4 J/kg
- Subsequent shocks  $\geq 4$  J/kg, maximum 10 J/kg or adult dose

### Drug Therapy

- **Epinephrine IV/IO dose:**  
0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration).  
Max dose 1 mg.  
Repeat every 3-5 minutes.  
If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:**  
5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT  
or  
**Lidocaine IV/IO dose:**  
Initial: 1 mg/kg loading dose

### Advanced Airway

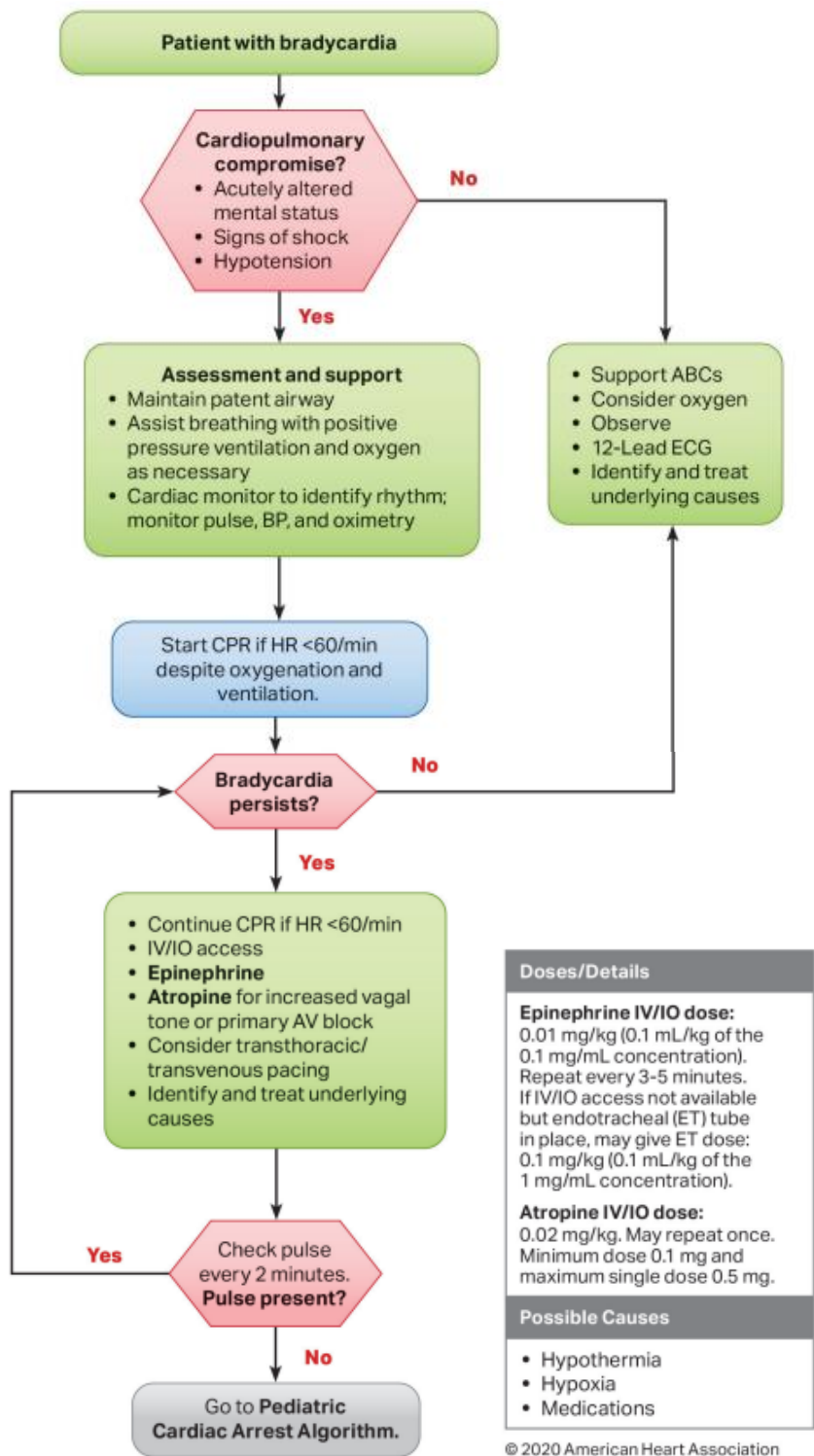
- Endotracheal intubation or supraglottic advanced airway
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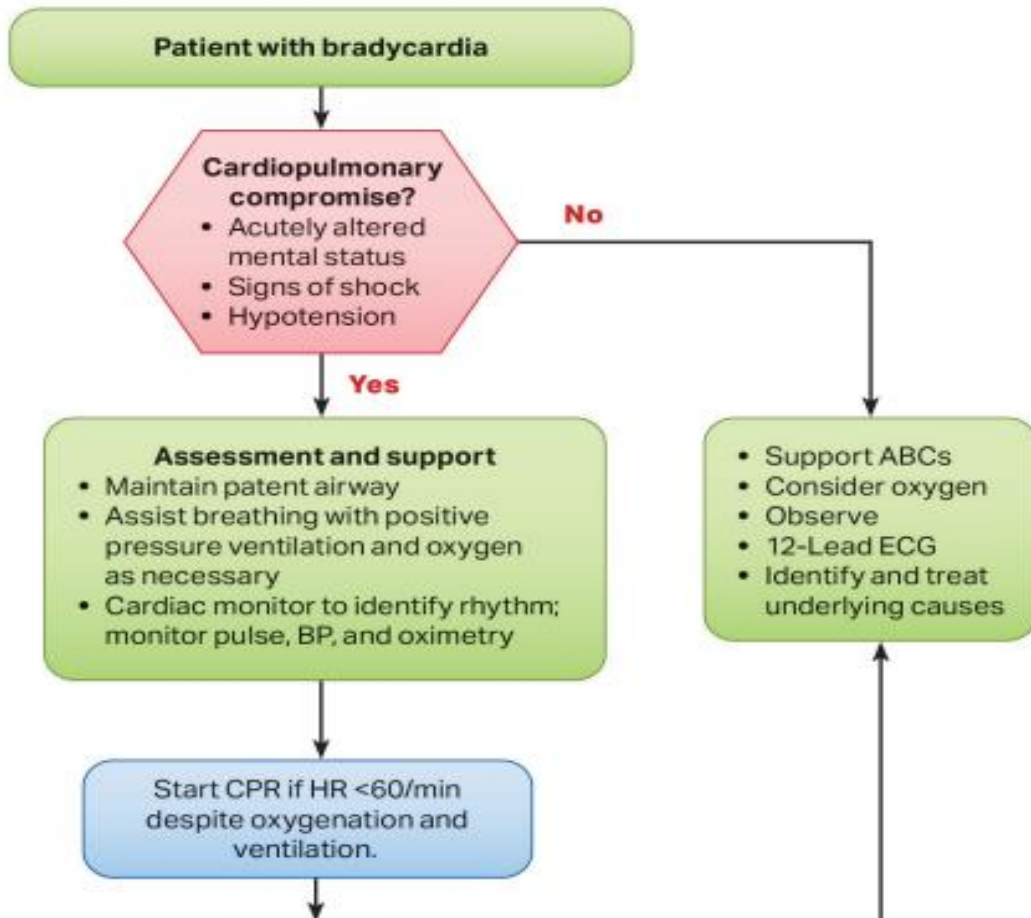
# Pediatric Basic and Advanced Life Support

## Pediatric Bradycardia With a Pulse Algorithm.



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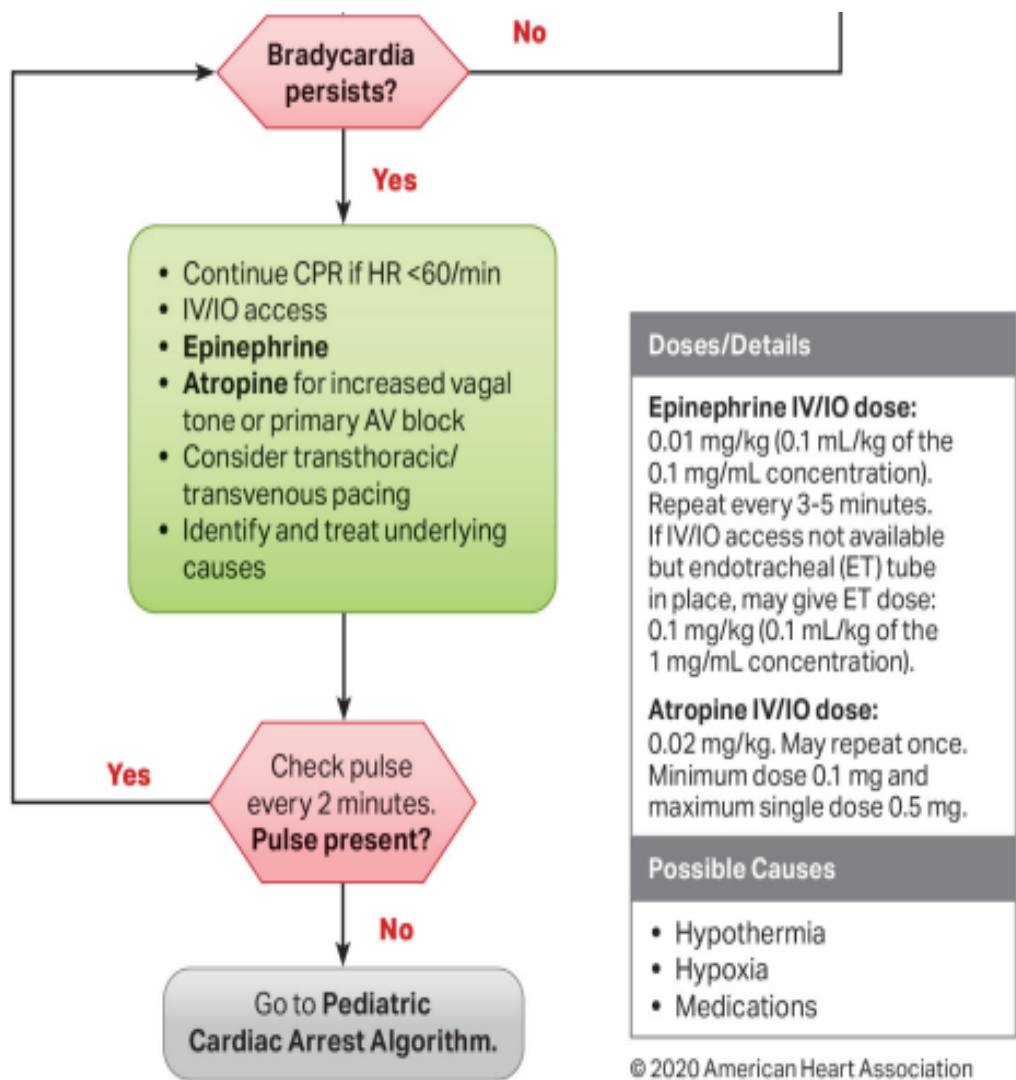
## Pediatric Bradycardia With a Pulse Algorithm.



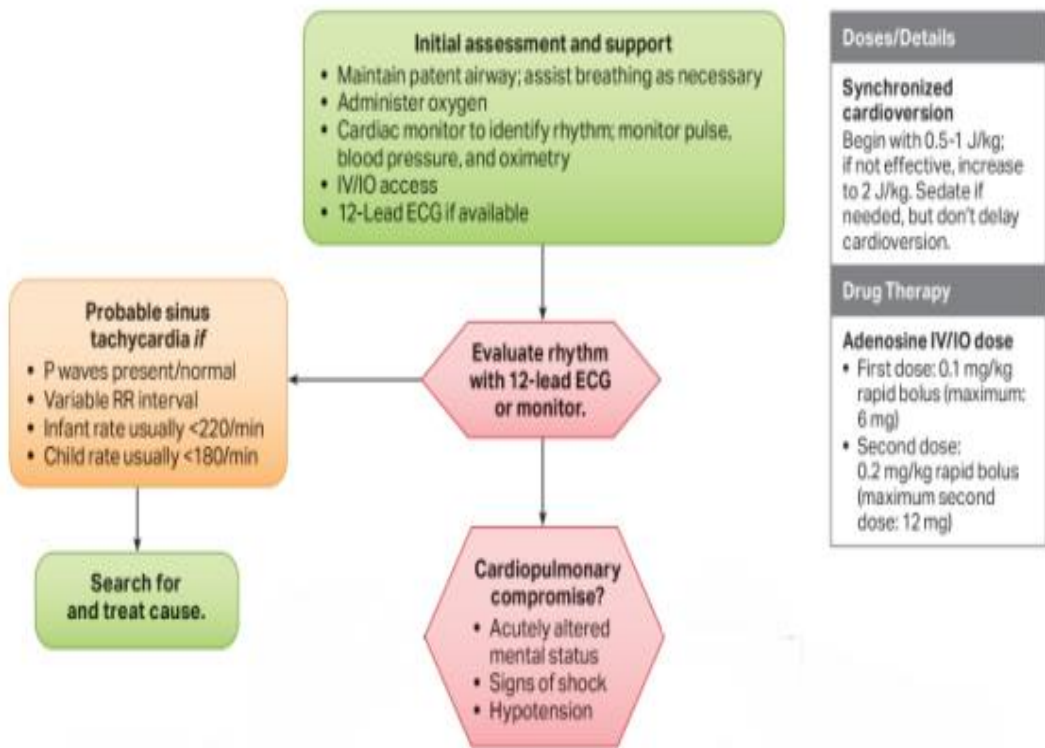


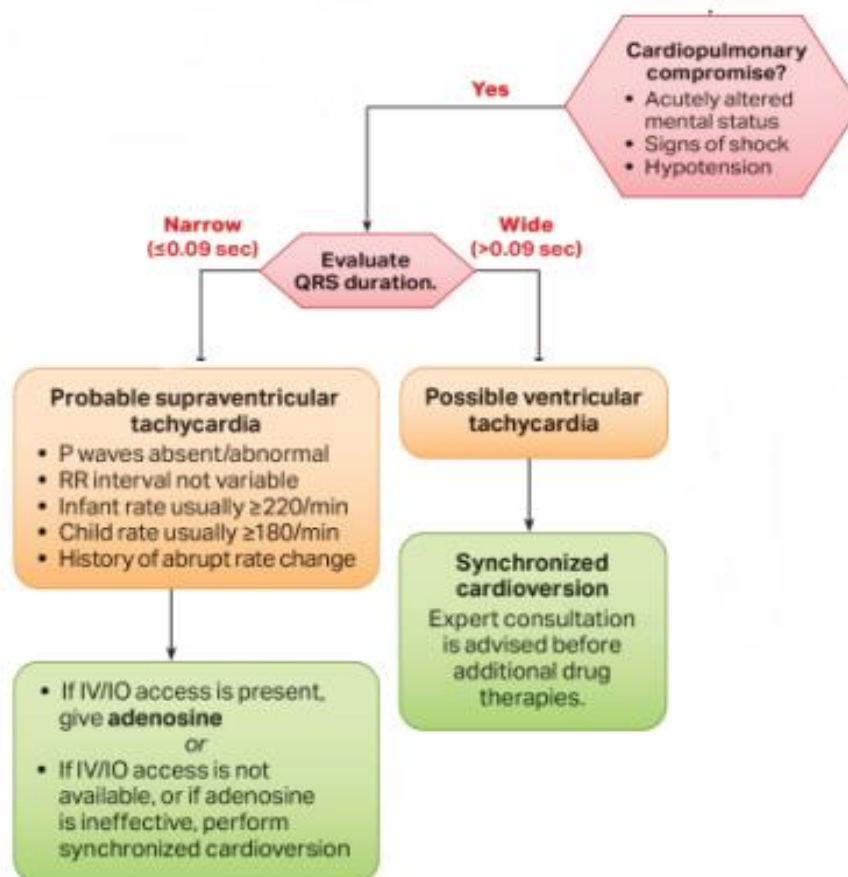
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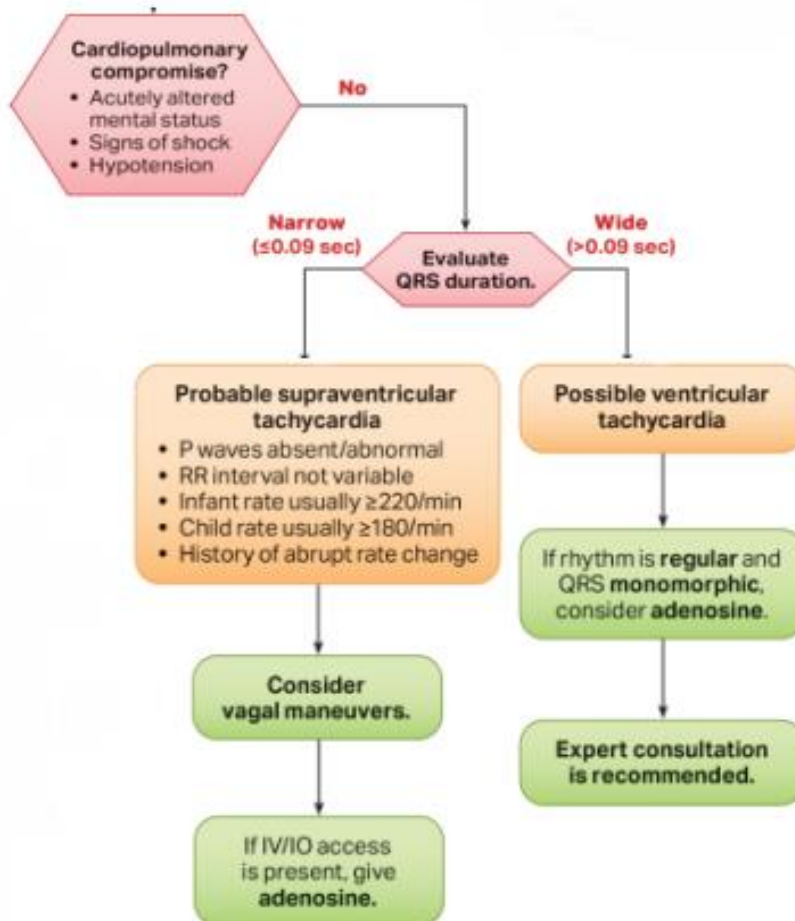


# Pediatric Tachycardia With a Pulse Algorithm.





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A surreal image of a park path. The trees have vibrant red leaves, and the ground is covered in a thick layer of red leaves. Two wooden benches are positioned on either side of the path. In the distance, a set of stairs leads up through the trees. The overall scene is dreamlike and visually striking.

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