

Simplified Adult BLS

Unresponsive
No breathing or
no normal breathing
(only gasping)



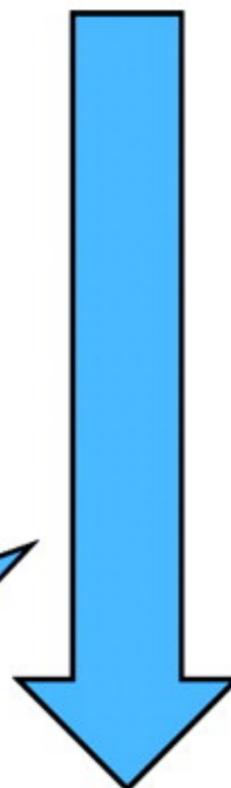
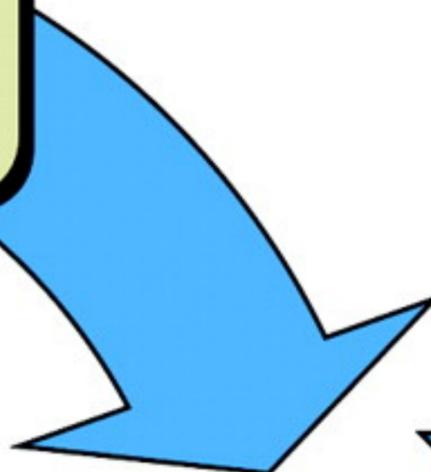
Activate
emergency
response



Get
defibrillator



Start CPR



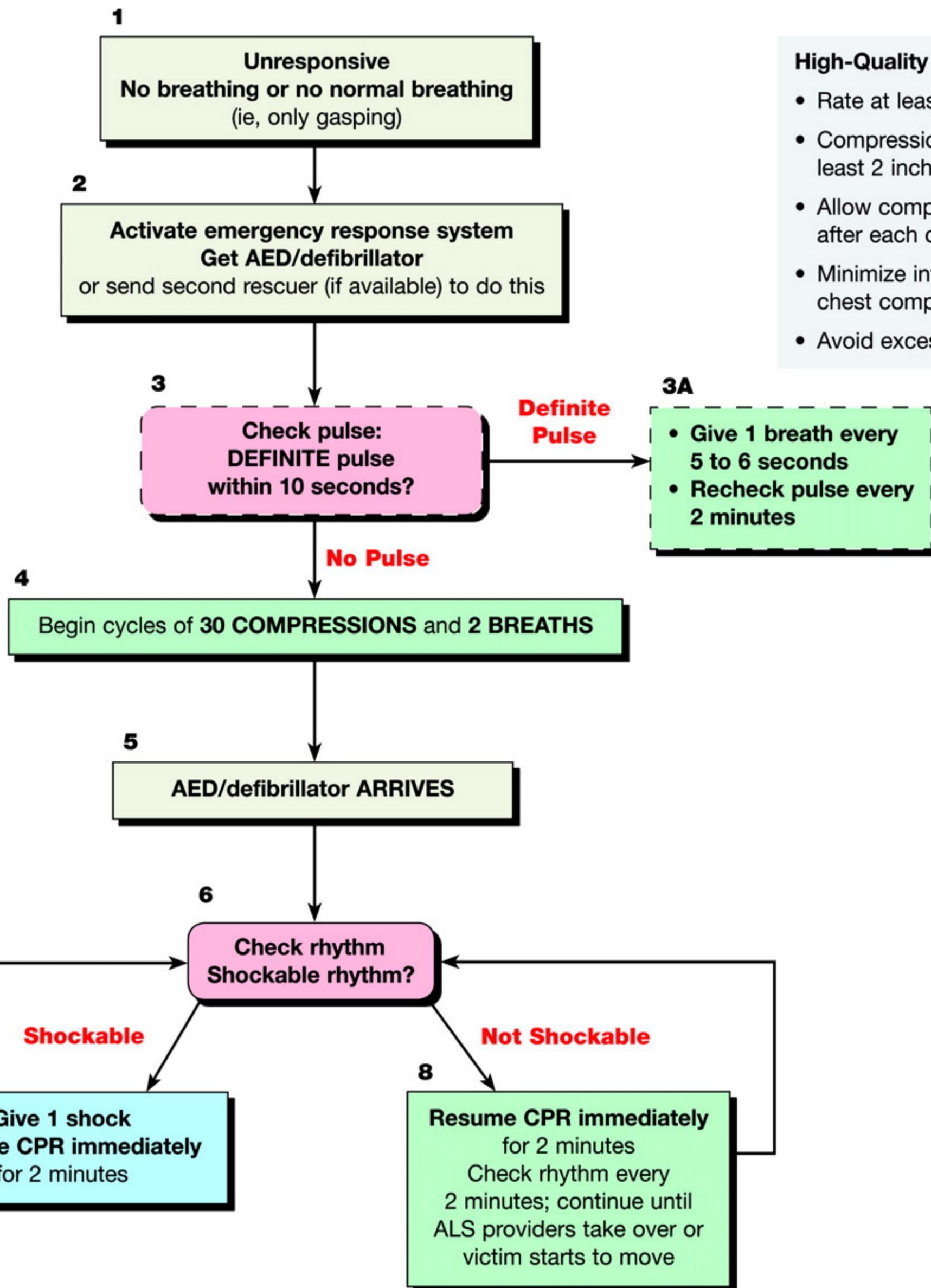
Check rhythm/
shock if
indicated



Repeat every 2 minutes

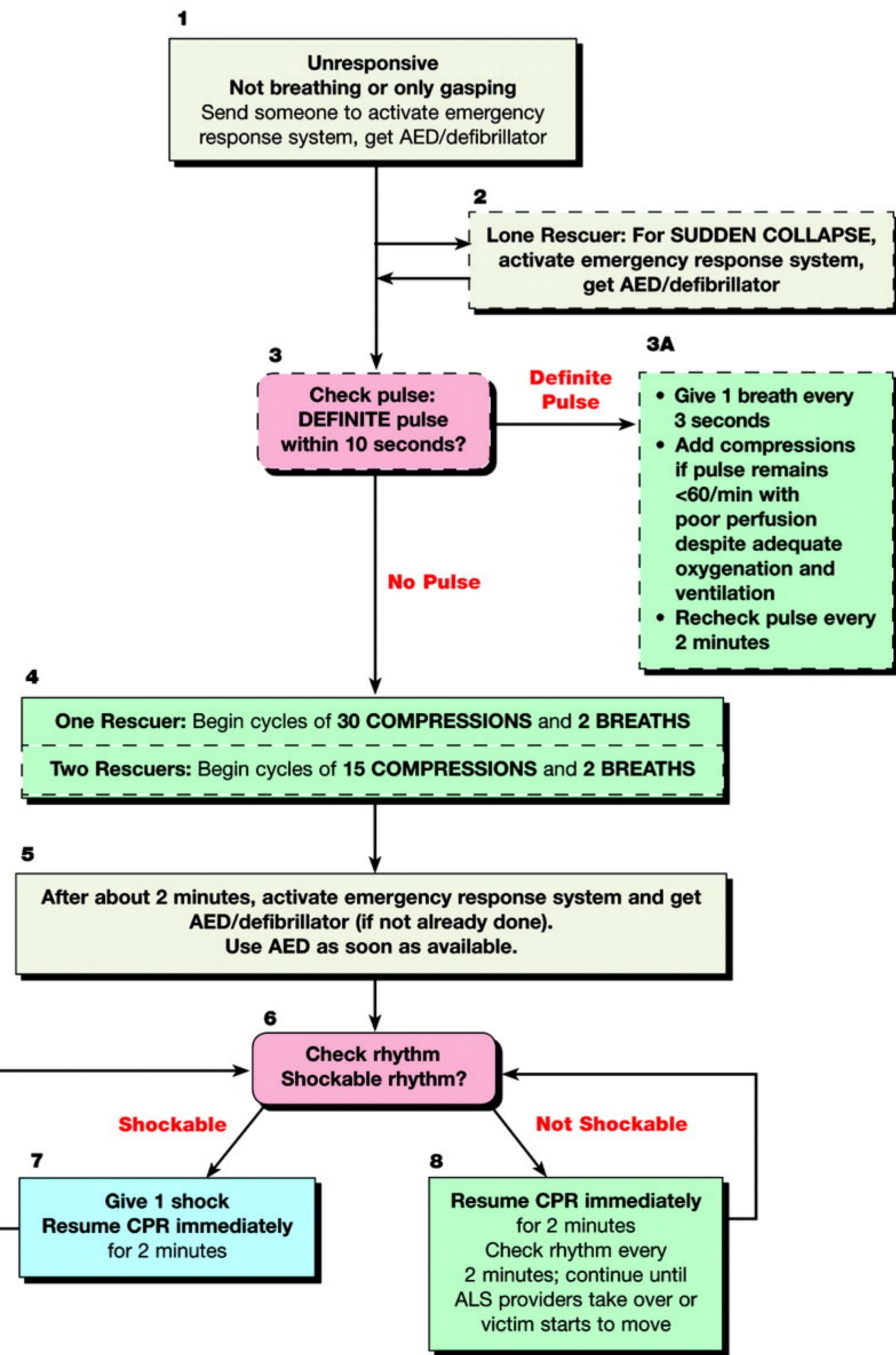
Push Hard • Push Fast

Adult BLS Healthcare Providers



Note: The boxes bordered with dashed lines are performed by healthcare providers and not by lay rescuers

Pediatric BLS Healthcare Providers



- ### High-Quality CPR
- Rate at least 100/min
 - Compression depth to at least 1/3 anterior-posterior diameter of chest, about 1½ inches (4 cm) in infants and 2 inches (5 cm) in children
 - Allow complete chest recoil after each compression
 - Minimize interruptions in chest compressions
 - Avoid excessive ventilation

Note: The boxes bordered with dashed lines are performed by healthcare providers and not by lay rescuers

Table 1
Summary of Key BLS Components for Adults, Children, and Infants*

Component	Recommendations		
	Adults	Children	Infants
Recognition	Unresponsive (for all ages)		
	No breathing or no normal breathing (ie, only gasping)	No breathing or only gasping	
	No pulse palpated within 10 seconds for all ages (HCP only)		
CPR sequence	C-A-B		
Compression rate	At least 100/min		
Compression depth	At least 2 inches (5 cm)	At least $\frac{1}{3}$ AP diameter About 2 inches (5 cm)	At least $\frac{1}{3}$ AP diameter About 1½ inches (4 cm)
Chest wall recoil	Allow complete recoil between compressions HCPs rotate compressors every 2 minutes		
Compression interruptions	Minimize interruptions in chest compressions Attempt to limit interruptions to <10 seconds		
Airway	Head tilt–chin lift (HCP suspected trauma: jaw thrust)		
Compression-to-ventilation ratio (until advanced airway placed)	30:2 1 or 2 rescuers	30:2 Single rescuer 15:2 2 HCP rescuers	
Ventilations: when rescuer untrained or trained and not proficient	Compressions only		
Ventilations with advanced airway (HCP)	1 breath every 6-8 seconds (8-10 breaths/min) Asynchronous with chest compressions About 1 second per breath Visible chest rise		
Defibrillation	Attach and use AED as soon as available. Minimize interruptions in chest compressions before and after shock; resume CPR beginning with compressions immediately after each shock.		

Abbreviations: AED, automated external defibrillator; AP, anterior-posterior; CPR, cardiopulmonary resuscitation; HCP, healthcare provider.
*Excluding the newly born, in whom the etiology of an arrest is nearly always asphyxial.

Team Resuscitation

2010 (New): The steps in the BLS algorithm have traditionally been presented as a sequence to help a single rescuer prioritize actions. There is increased focus on providing CPR as a team because resuscitations in most EMS and healthcare systems involve teams of rescuers, with rescuers performing several actions simultaneously. For example, one rescuer activates the emergency response system while a second begins chest compressions, a third is either providing ventilations or retrieving the bag-mask for rescue breathing, and a fourth is retrieving and setting up a defibrillator.

2005 (Old): The steps of BLS consist of a series of sequential assessments and actions. The intent of the algorithm is to present the steps in a logical and concise manner that will be easy for each rescuer to learn, remember, and perform.

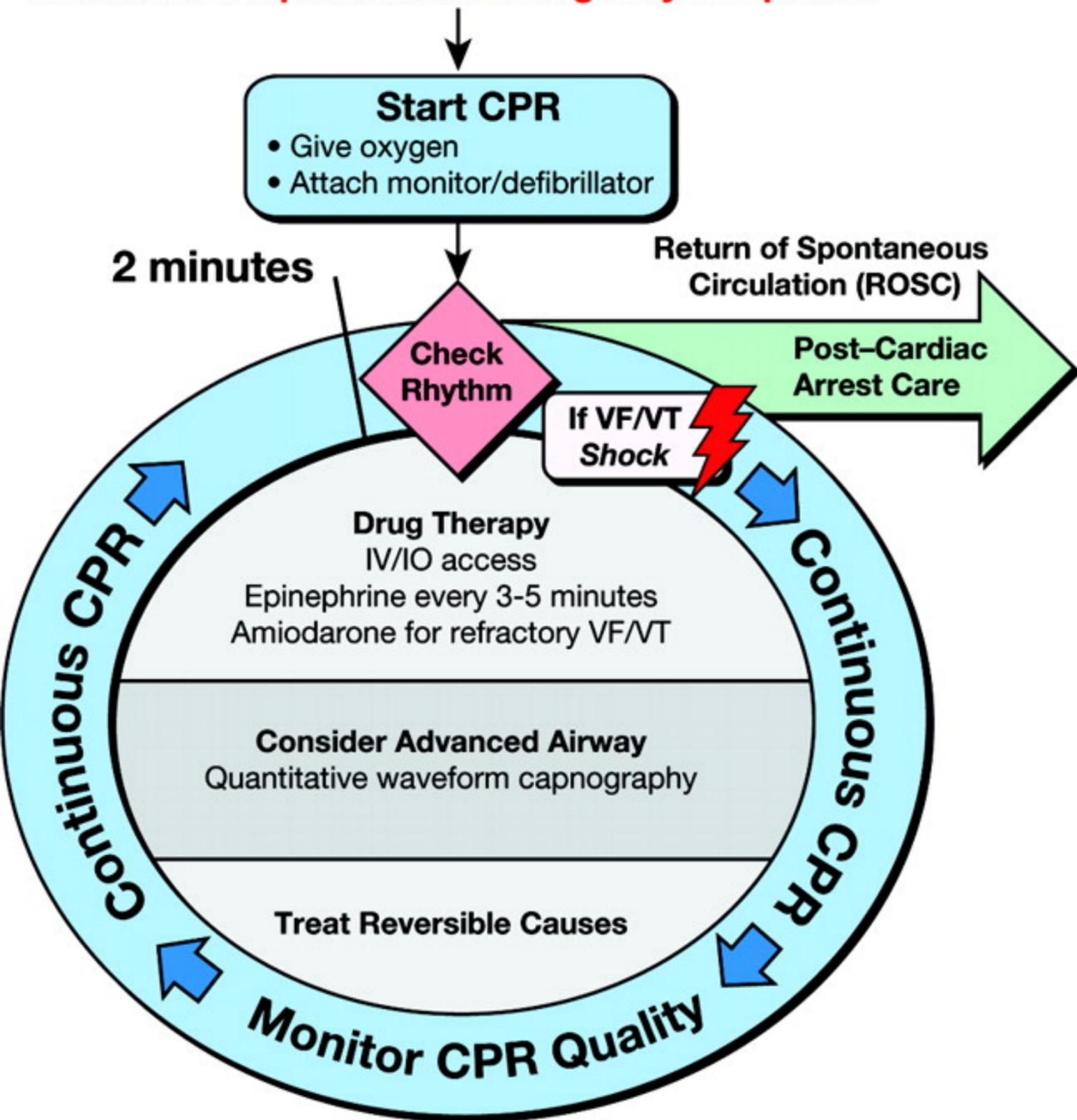
Why: Some resuscitations start with a lone rescuer who calls for help, whereas other resuscitations begin with several willing rescuers. Training should focus on building a team as each rescuer arrives, or on designating a team leader if multiple rescuers are present. As additional personnel arrive, responsibilities for tasks that would ordinarily be performed sequentially by fewer rescuers may now be delegated to a team of providers who perform them simultaneously. For this reason, BLS healthcare provider training should not only teach individual skills but should also teach rescuers to work in effective teams.

Comparison of Key Elements of Adult, Child, and Infant BLS

As in the 2005 AHA Guidelines for CPR and ECC, the 2010 AHA Guidelines for CPR and ECC contain a comparison table that lists the key elements of adult, child, and infant BLS (excluding CPR for newly born infants). These key elements are included in Table 1.

Adult Cardiac Arrest

Shout for Help/Activate Emergency Response



CPR Quality

- Push hard (≥ 2 inches [5 cm]) and fast (≥ 100 /min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- 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

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

Shock Energy

- **Biphasic:** Manufacturer recommendation (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
- **Vasopressin IV/IO Dose:** 40 units can replace first or second dose of epinephrine
- **Amiodarone IV/IO Dose:** First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway

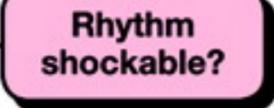
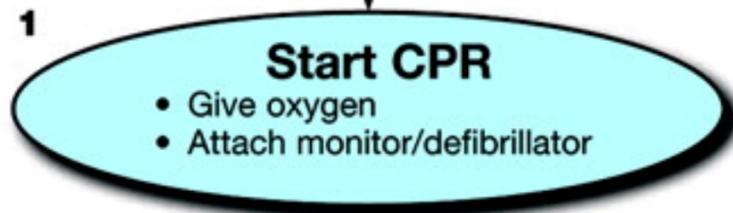
- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions

Reversible Causes

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

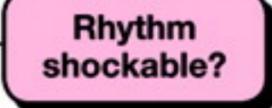
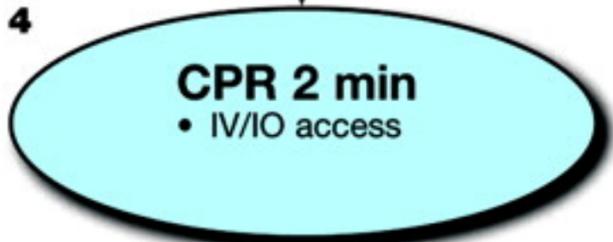
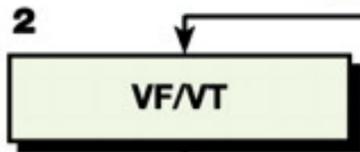
Adult Cardiac Arrest

Shout for Help/Activate Emergency Response

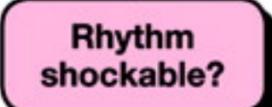
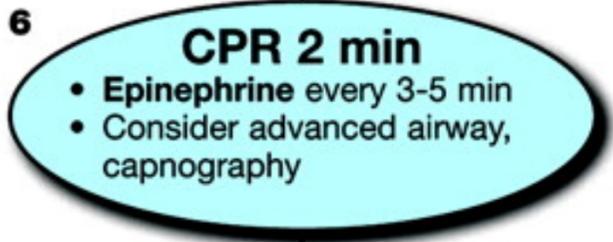
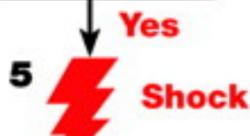


Yes

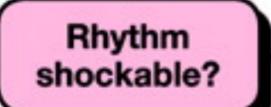
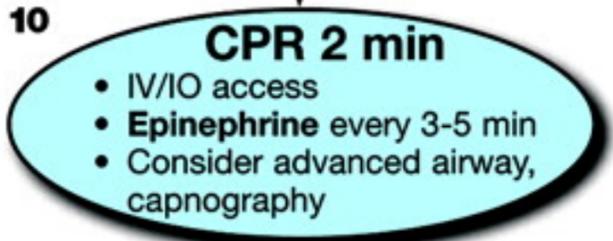
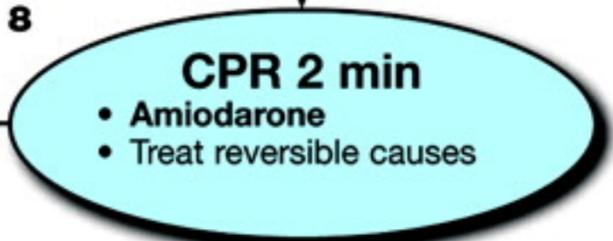
No



No

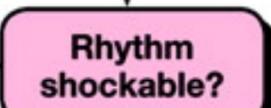
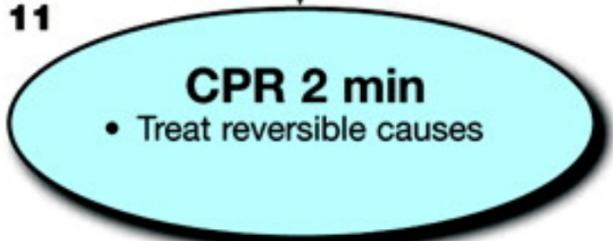


No



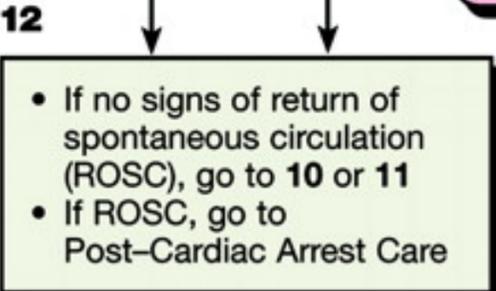
Yes

No



No

Yes



- CPR Quality**
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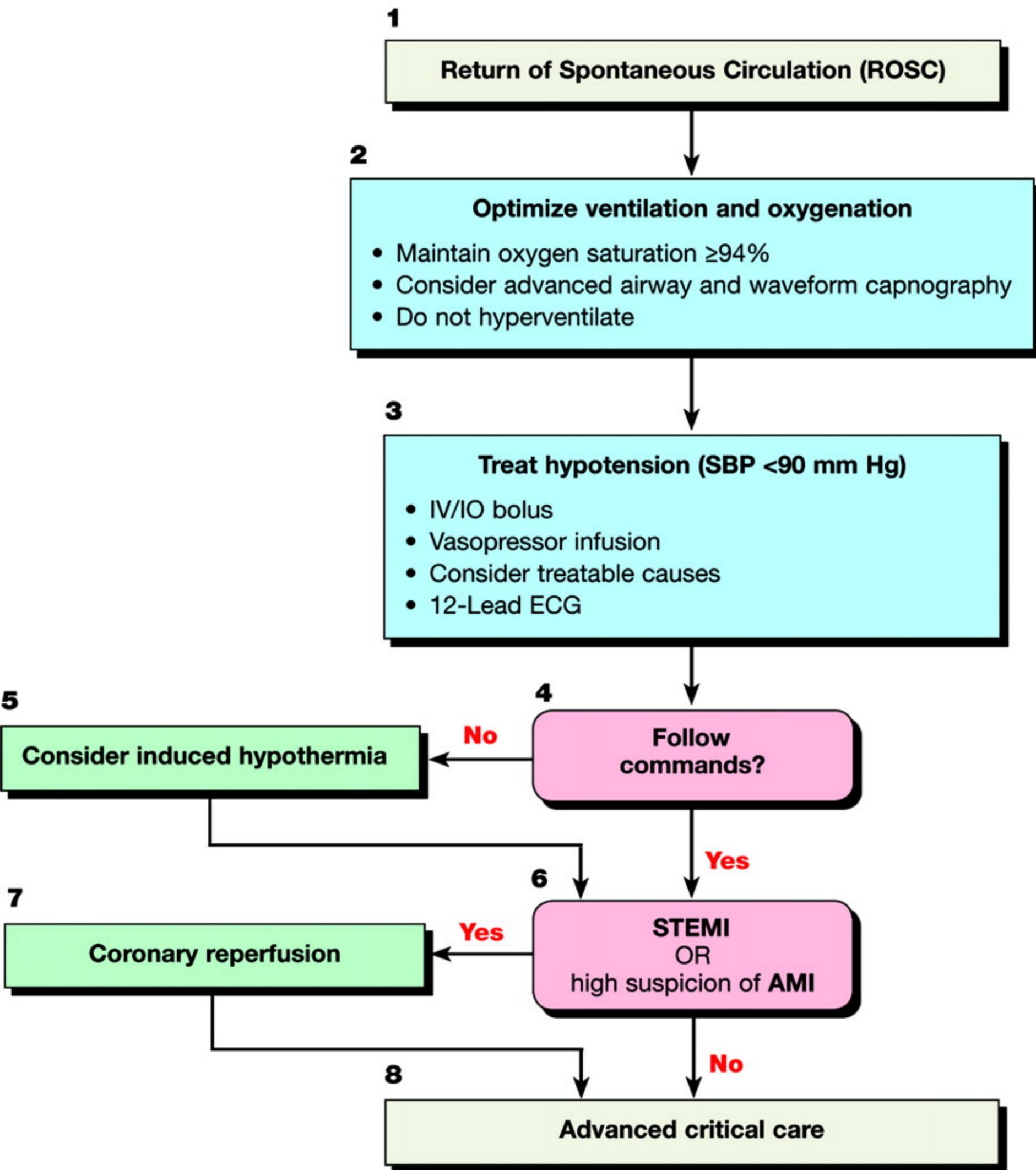
- Shock Energy**
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- Advanced Airway**
- Supraglottic advanced airway or endotracheal intubation
 - Waveform capnography to confirm and monitor ET tube placement
 - 8-10 breaths per minute with continuous chest compressions

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

Adult Immediate Post-Cardiac Arrest Care



Doses/Details

Ventilation/Oxygenation

Avoid excessive ventilation. Start at 10-12 breaths/min and titrate to target PETCO₂ of 35-40 mm Hg. When feasible, titrate FIO₂ to minimum necessary to achieve SpO₂ ≥94%.

IV Bolus

1-2 L normal saline or lactated Ringer's. If inducing hypothermia, may use 4°C fluid.

Epinephrine IV Infusion:

0.1-0.5 mcg/kg per minute (in 70-kg adult: 7-35 mcg per minute)

Dopamine IV Infusion:

5-10 mcg/kg per minute

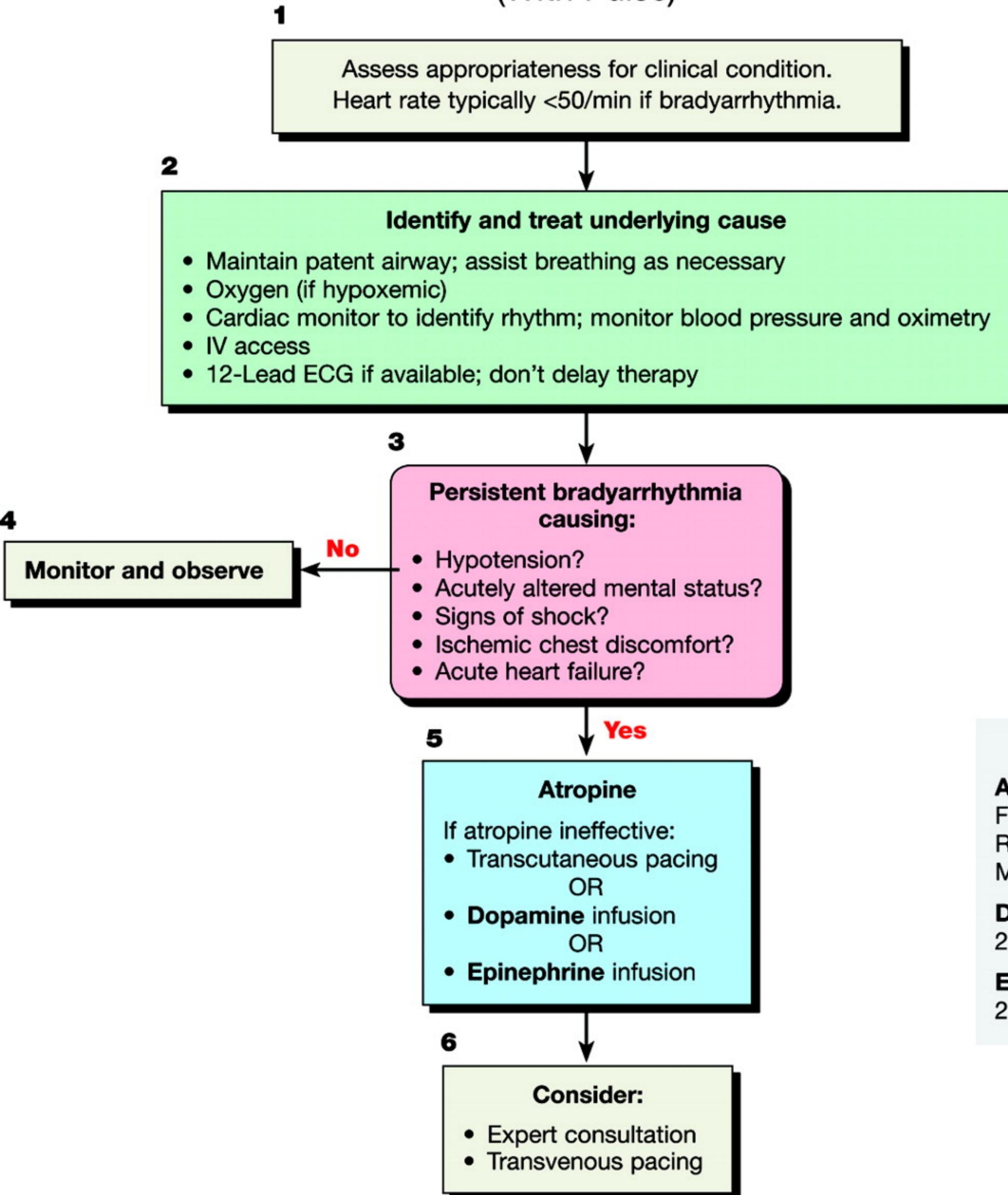
Norepinephrine

IV Infusion: 0.1-0.5 mcg/kg per minute (in 70-kg adult: 7-35 mcg per minute)

Reversible Causes

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

Adult Bradycardia (With Pulse)



Doses/Details

Atropine IV Dose:

First dose: 0.5 mg bolus
Repeat every 3-5 minutes
Maximum: 3 mg

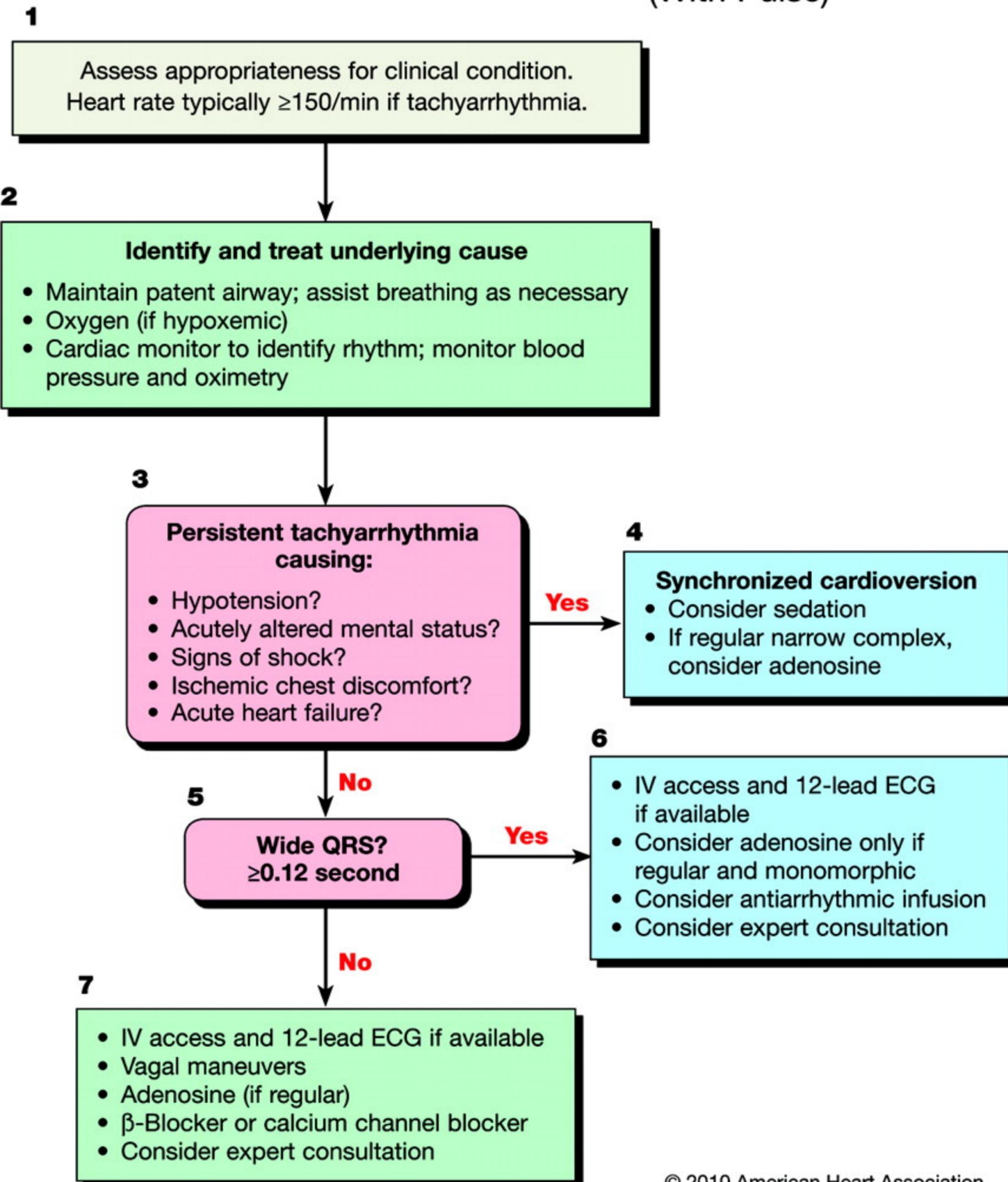
Dopamine IV Infusion:

2-10 mcg/kg per minute

Epinephrine IV Infusion:

2-10 mcg per minute

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:

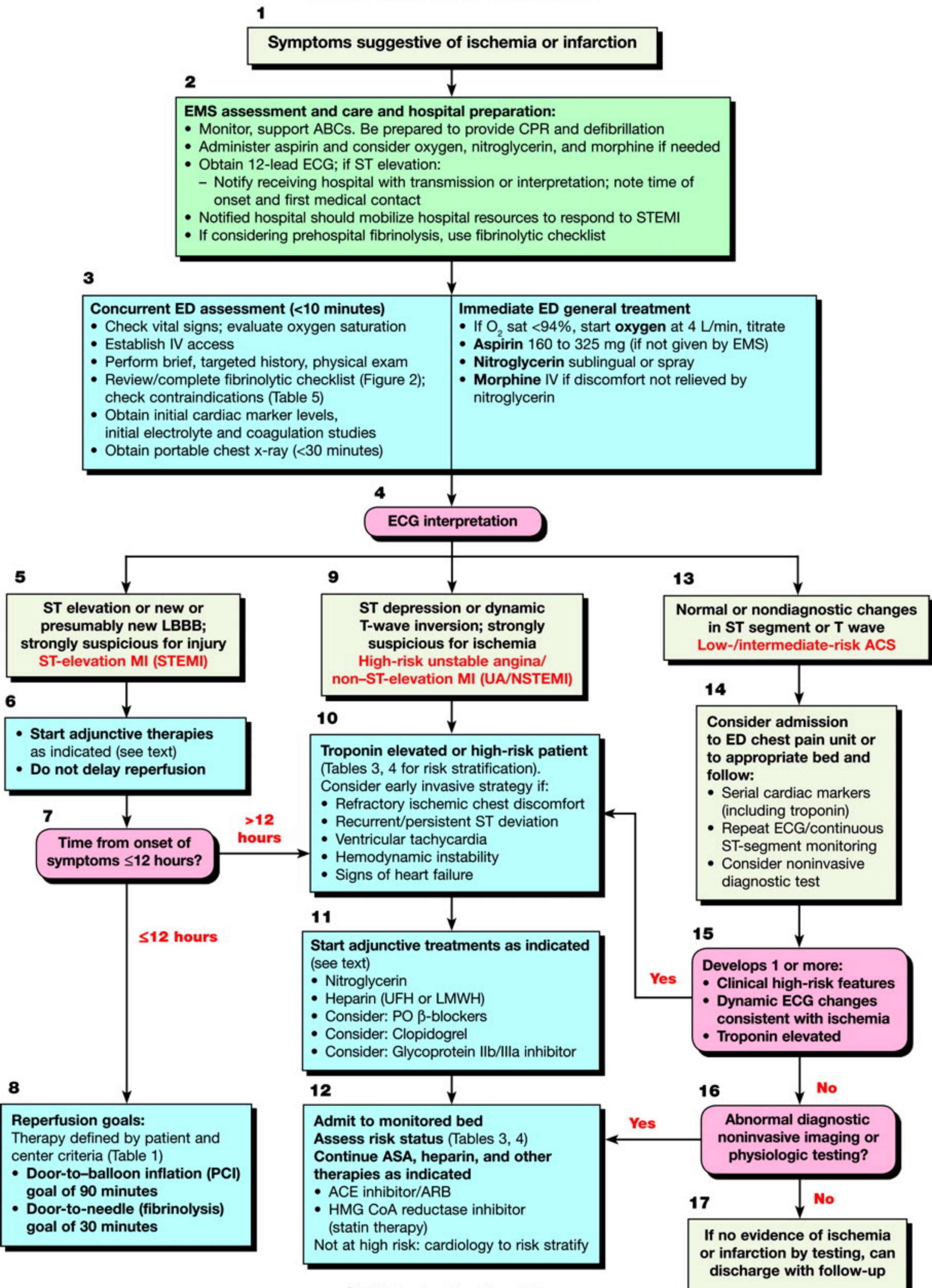
First dose: 150 mg over 10 minutes. Repeat as needed if VT recurs.

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.

Acute Coronary Syndromes



Maternal Cardiac Arrest

First Responder

- Activate maternal cardiac arrest team
- Document time of onset of maternal cardiac arrest
- Place the patient supine
- Start chest compressions as per BLS algorithm; place hands slightly higher on sternum than usual

Subsequent Responders

Maternal Interventions

Treat per BLS and ACLS Algorithms

- Do not delay defibrillation
- Give typical ACLS drugs and doses
- Ventilate with 100% oxygen
- Monitor waveform capnography and CPR quality
- Provide post-cardiac arrest care as appropriate

Maternal Modifications

- Start IV above the diaphragm
- Assess for hypovolemia and give fluid bolus when required
- Anticipate difficult airway; experienced provider preferred for advanced airway placement
- If patient receiving IV/IO magnesium prearrest, stop magnesium and give IV/IO calcium chloride 10 mL in 10% solution, or calcium gluconate 30 mL in 10% solution
- Continue all maternal resuscitative interventions (CPR, positioning, defibrillation, drugs, and fluids) during and after cesarean section

Obstetric Interventions for Patient With an Obviously Gravid Uterus*

- Perform manual left uterine displacement (LUD)—displace uterus to the patient's left to relieve aortocaval compression
- Remove both internal and external fetal monitors if present

Obstetric and neonatal teams should immediately prepare for possible emergency cesarean section

- If no ROSC by 4 minutes of resuscitative efforts, consider performing immediate emergency cesarean section
- Aim for delivery within 5 minutes of onset of resuscitative efforts

*An obviously gravid uterus is a uterus that is deemed clinically to be sufficiently large to cause aortocaval compression

Search for and Treat Possible Contributing Factors (BEAU-CHOPS)

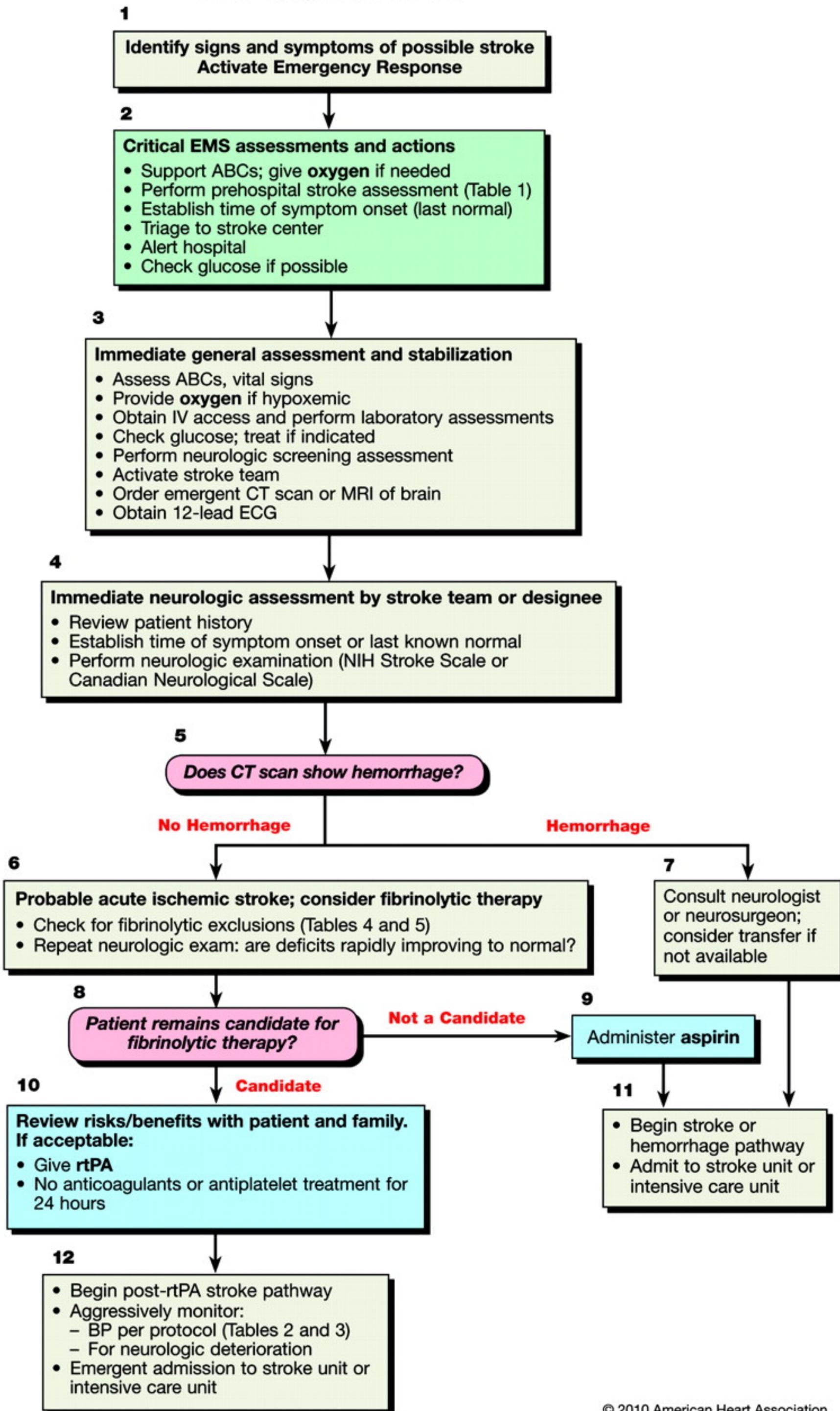
- B**leeding/DIC
- E**mbolism: coronary/pulmonary/amniotic fluid embolism
- A**nesthetic complications
- U**terine atony
- C**ardiac disease (MI/ischemia/aortic dissection/cardiomyopathy)
- H**ypertension/preeclampsia/eclampsia
- O**ther: differential diagnosis of standard ACLS guidelines
- P**lacenta abruptio/previa
- S**epsis

Adult Suspected Stroke

**NINDS
TIME
GOALS**



Stroke Admission
3 hours



Pediatric Bradycardia With a Pulse and Poor Perfusion

1

Identify and treat underlying cause

- Maintain patent airway; assist breathing as necessary
- Oxygen
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry
- IO/IV access
- 12-Lead ECG if available; don't delay therapy

2

Cardiopulmonary
compromise
continues?

No

Yes

3

CPR if HR <60/min
with poor perfusion despite
oxygenation and ventilation

4

Bradycardia
persists?

No

Yes

5

- **Epinephrine**
- **Atropine** for increased vagal tone or primary AV block
- Consider transthoracic pacing/transvenous pacing
- Treat underlying causes

6

If pulseless arrest develops, go to Cardiac Arrest Algorithm

Cardiopulmonary Compromise

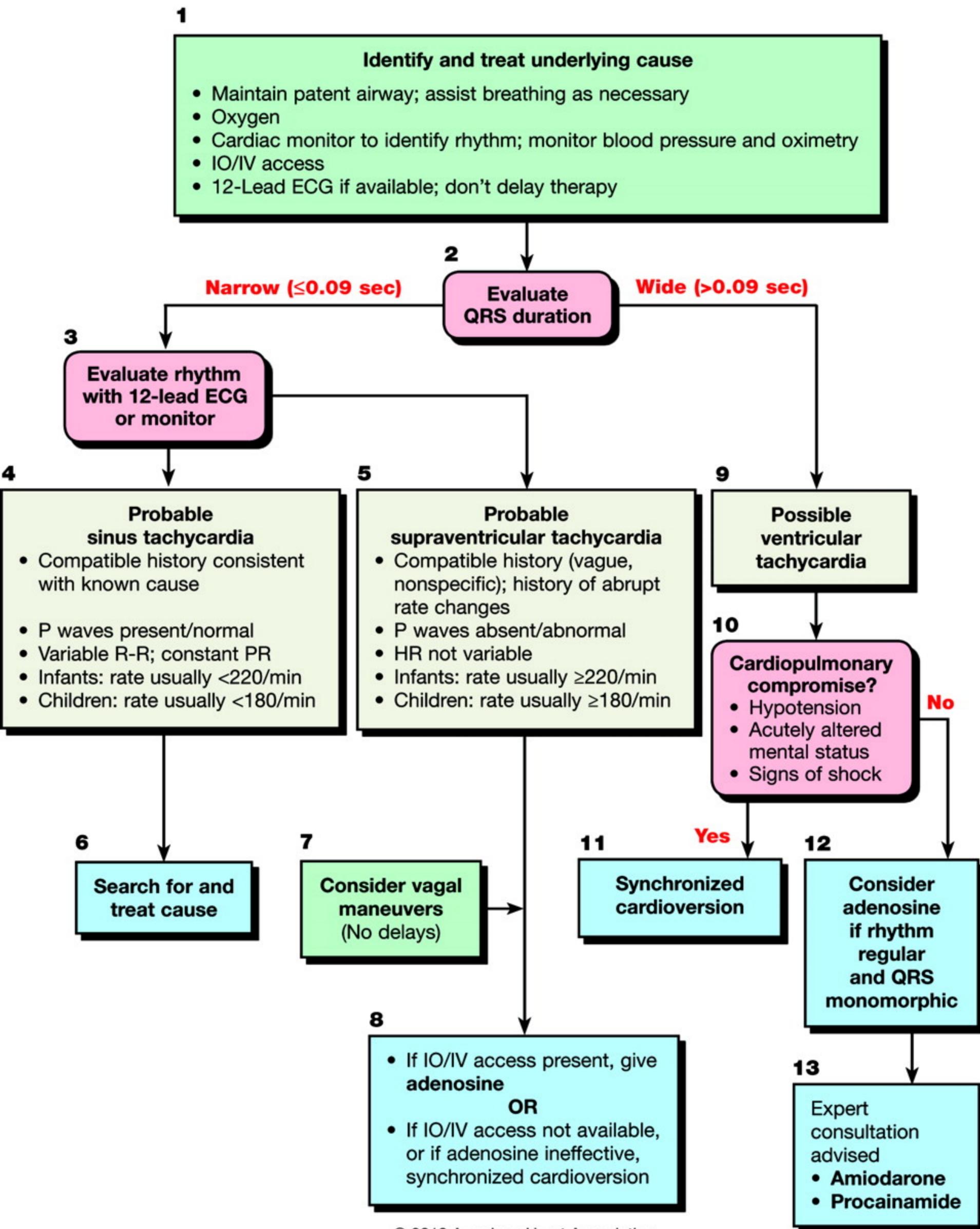
- Hypotension
- Acutely altered mental status
- Signs of shock

Doses/Details

Epinephrine IO/IV Dose:
0.01 mg/kg (0.1 mL/kg
of 1:10 000 concentration).
Repeat every 3-5 minutes.
If IO/IV access not available
but endotracheal (ET) tube
in place, may give ET dose:
0.1 mg/kg (0.1 mL/kg of
1:1000).

Atropine IO/IV Dose:
0.02 mg/kg. May repeat once.
Minimum dose 0.1 mg and
maximum single dose 0.5 mg.

Pediatric Tachycardia With a Pulse and Poor Perfusion



Doses/Details

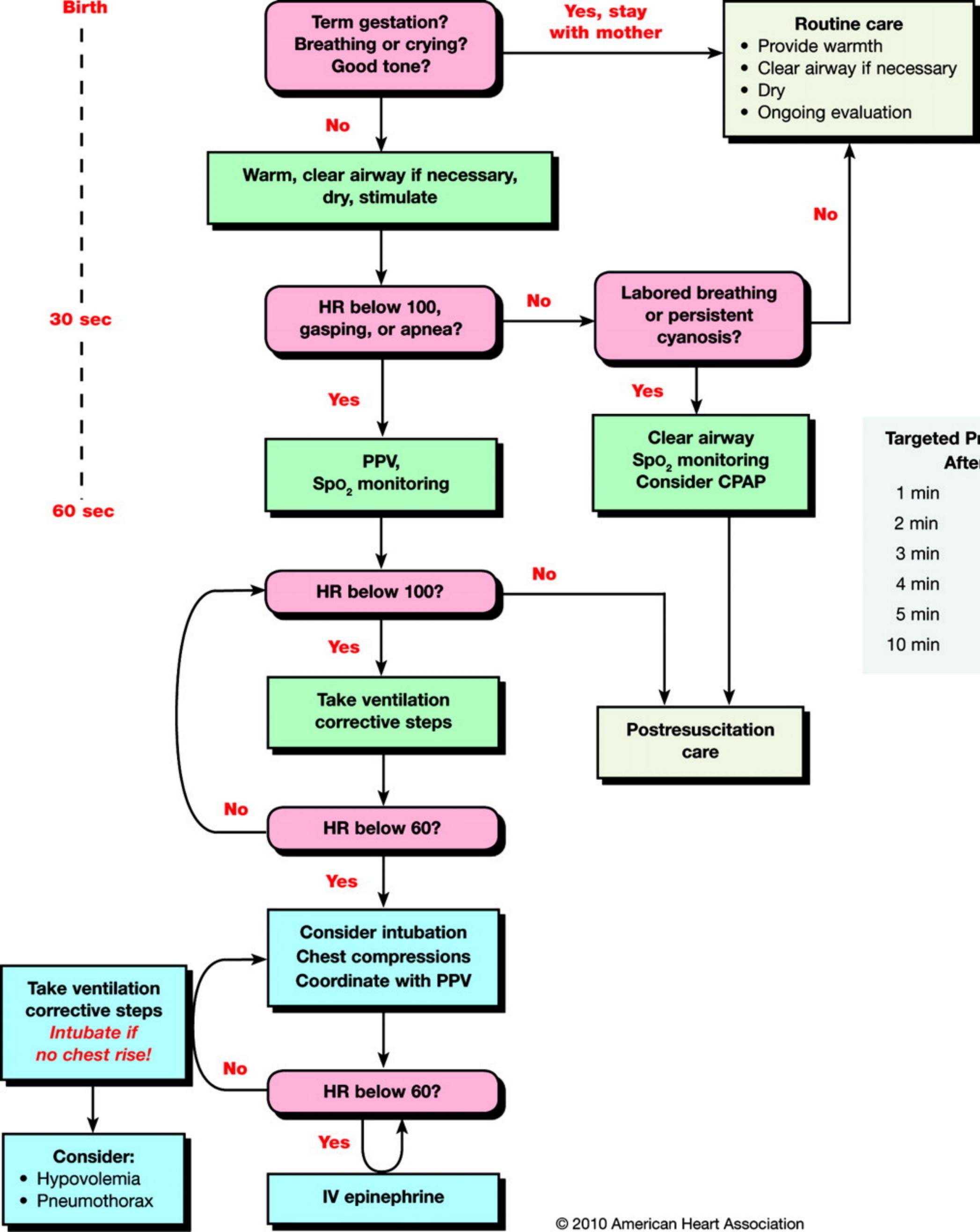
Synchronized Cardioversion:
Begin with 0.5-1 J/kg; if not effective, increase to 2 J/kg.
Sedate if needed, but don't delay cardioversion.

Adenosine IO/IV Dose:
First dose: 0.1 mg/kg rapid bolus (maximum: 6 mg).
Second dose: 0.2 mg/kg rapid bolus (maximum second dose 12 mg).

Amiodarone IO/IV Dose:
5 mg/kg over 20-60 minutes
or

Procainamide IO/IV Dose:
15 mg/kg over 30-60 minutes

Do not routinely administer amiodarone and procainamide together.



Targeted Preductal SpO₂ After Birth

1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%