



# CPR Cardio- Pulmonary Resuscitation

- ◆ DR
- ◆ HABIBI



Figure 3. AHA Chains of Survival for adult IHCA and OHCA.

### OHCA

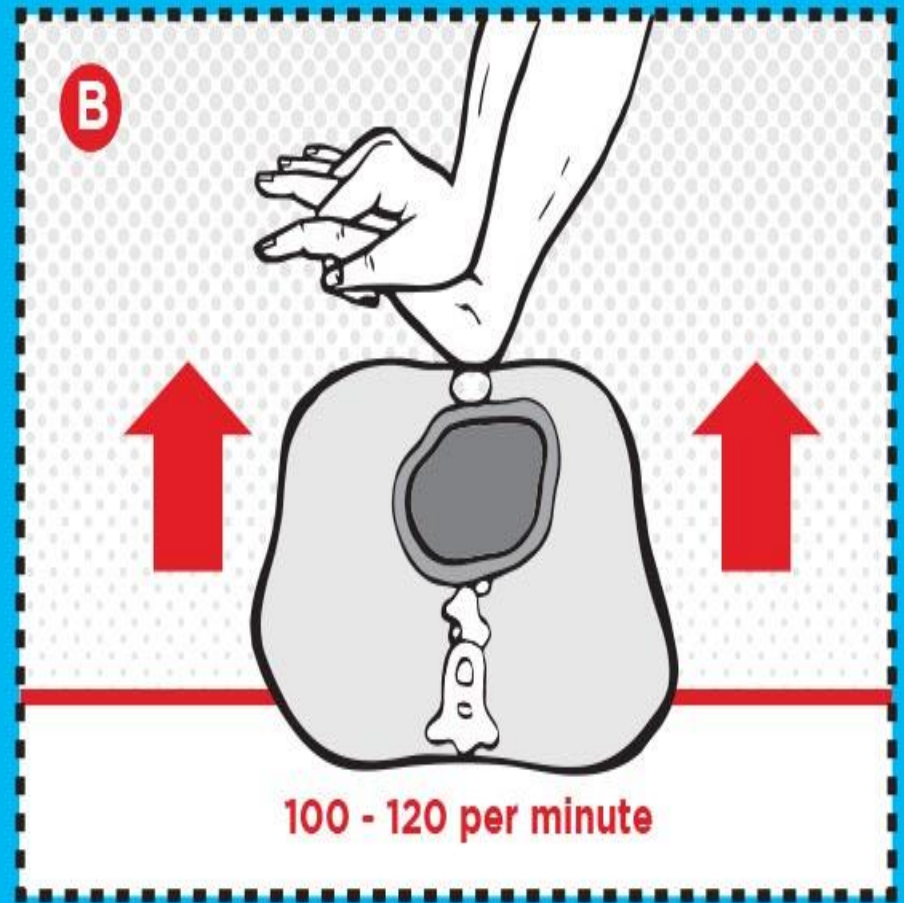
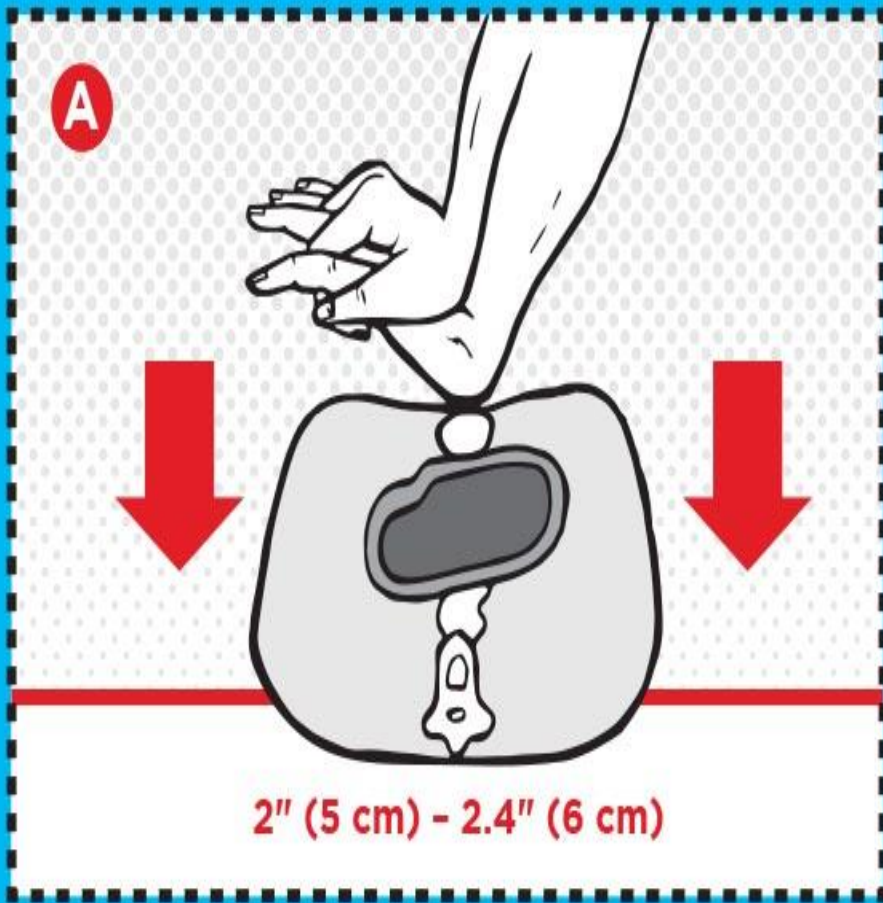


### IHCA





*ACLS*

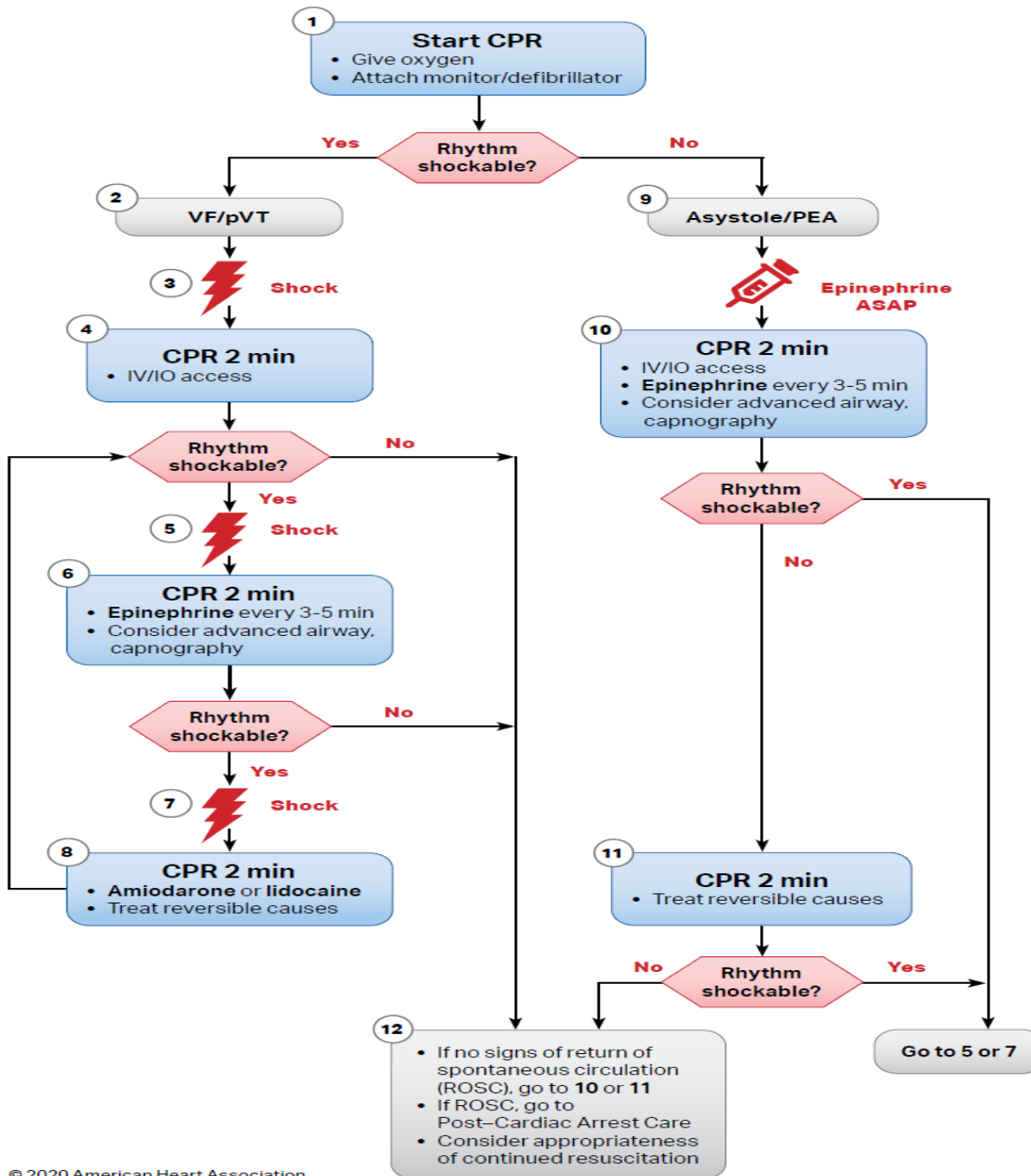


**CHEST COMPRESSIONS:**

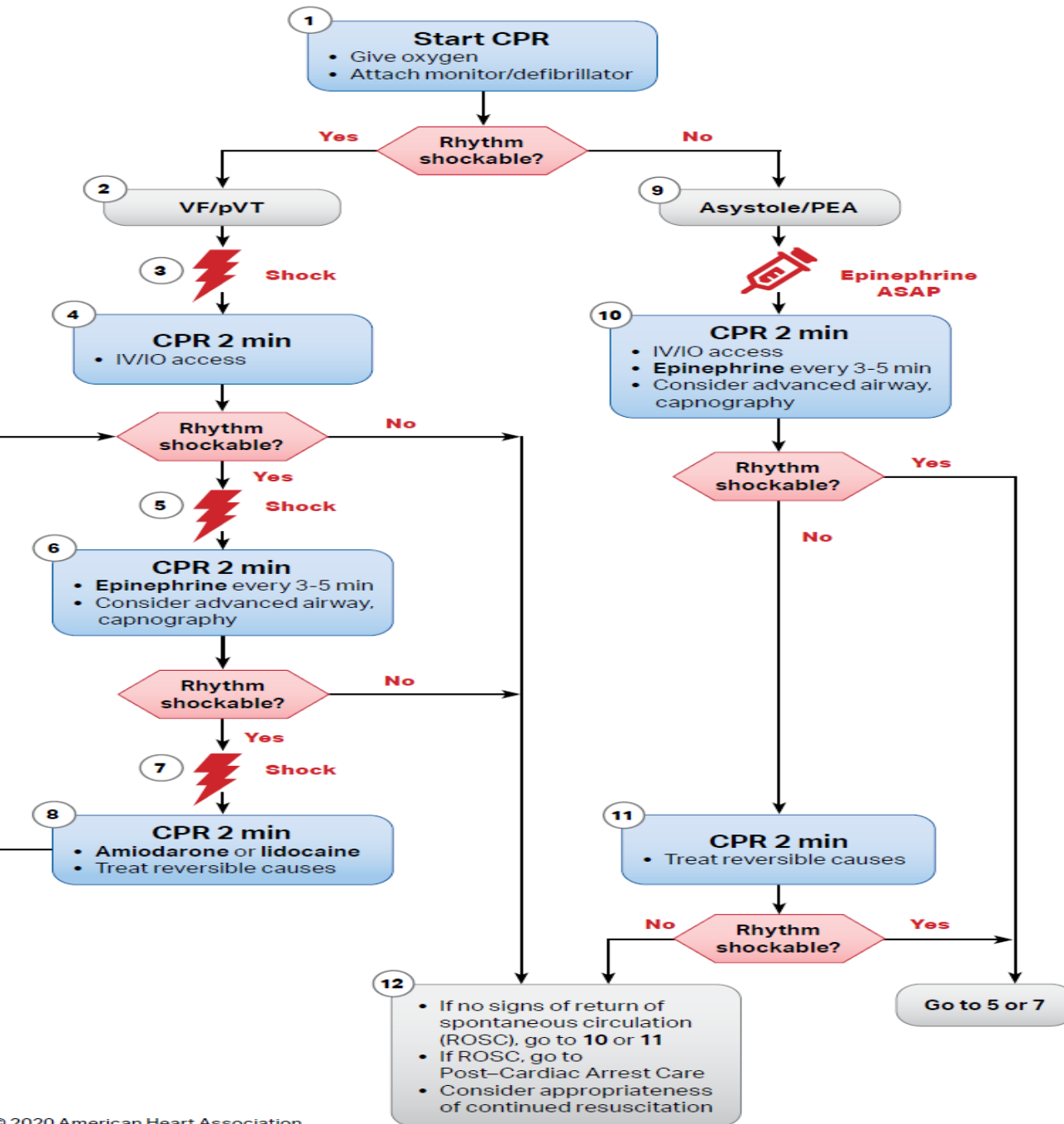
At least 2" (5 cm) and  
not more than 2.4" (6 cm)

**COMPRESSION RATE:**

Between 100 and 120  
compressions per minute

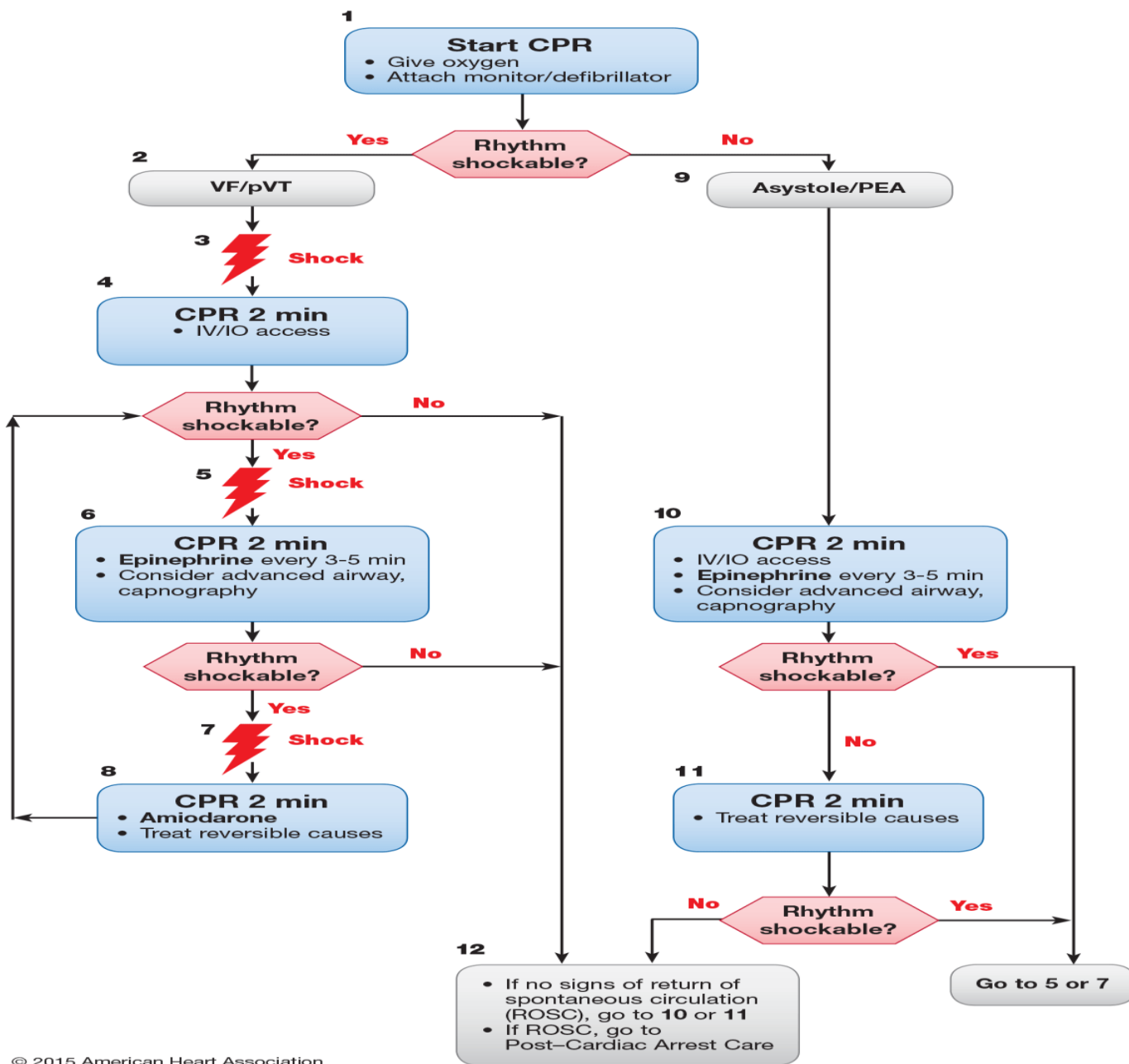


<b>CPR Quality</b>
<ul style="list-style-type: none"> <li>• Push hard (at least 5 cm [2 inches]) and fast (100-120/min) and allow complete chest recoil.</li> <li>• Minimize interruptions in compressions.</li> <li>• Avoid excessive ventilation.</li> <li>• Change compressor every 2 minutes, or sooner if fatigued.</li> <li>• If no advanced airway, 30:2 compression-ventilation ratio.</li> <li>• Quantitative waveform capnography             <ul style="list-style-type: none"> <li>– If PETCO<sub>2</sub> is low or decreasing, reassess CPR quality.</li> </ul> </li> </ul>
<b>Shock Energy for Defibrillation</b>
<ul style="list-style-type: none"> <li>• <b>Biphasic:</b> 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.</li> <li>• <b>Monophasic:</b> 360 J</li> </ul>
<b>Drug Therapy</b>
<ul style="list-style-type: none"> <li>• <b>Epinephrine IV/IO dose:</b> 1 mg every 3-5 minutes</li> <li>• <b>Amiodarone IV/IO dose:</b> First dose: 300 mg bolus. Second dose: 150 mg.</li> <li>or</li> <li>• <b>Lidocaine IV/IO dose:</b> First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.</li> </ul>
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<ul style="list-style-type: none"> <li>• Endotracheal intubation or supraglottic advanced airway</li> <li>• Waveform capnography or capnometry to confirm and monitor ET tube placement</li> <li>• Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions</li> </ul>
<b>Return of Spontaneous Circulation (ROSC)</b>
<ul style="list-style-type: none"> <li>• Pulse and blood pressure</li> <li>• Abrupt sustained increase in PETCO<sub>2</sub> (typically ≥40 mm Hg)</li> <li>• Spontaneous arterial pressure waves with intra-arterial monitoring</li> </ul>
<b>Reversible Causes</b>
<ul style="list-style-type: none"> <li>• Hypovolemia</li> <li>• Hypoxia</li> <li>• Hydrogen ion (acidosis)</li> <li>• Hypo-/hyperkalemia</li> <li>• Hypothermia</li> <li>• Tension pneumothorax</li> <li>• Tamponade, cardiac</li> <li>• Toxins</li> <li>• Thrombosis, pulmonary</li> <li>• Thrombosis, coronary</li> </ul>



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# Adult Cardiac Arrest Algorithm – 2015 Update



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## CPR Quality

- Push hard (at least 5 cm [2 inches]) 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
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- **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.

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## Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
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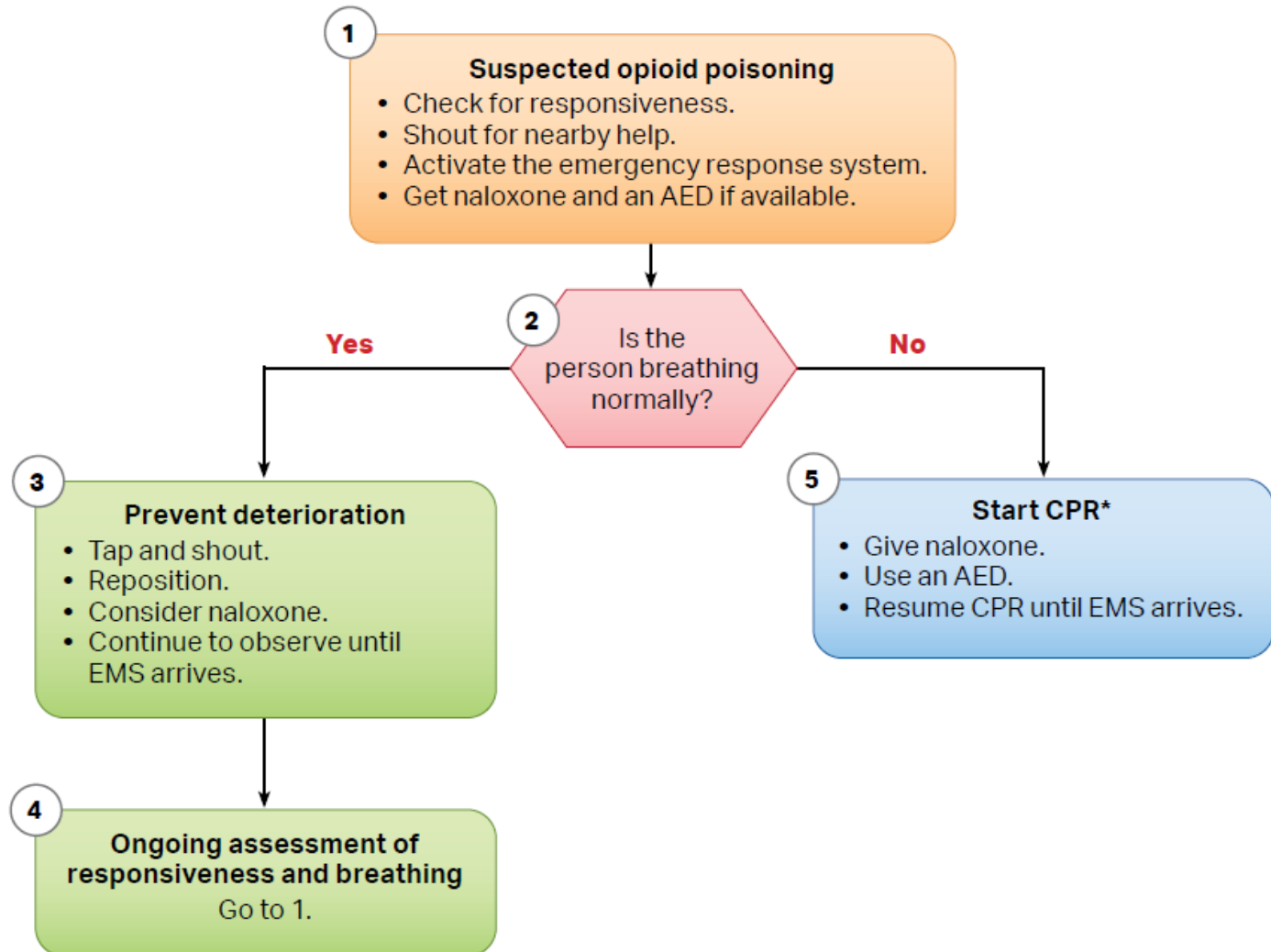
## Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO<sub>2</sub> (typically  $\geq 40$  mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

## Reversible Causes

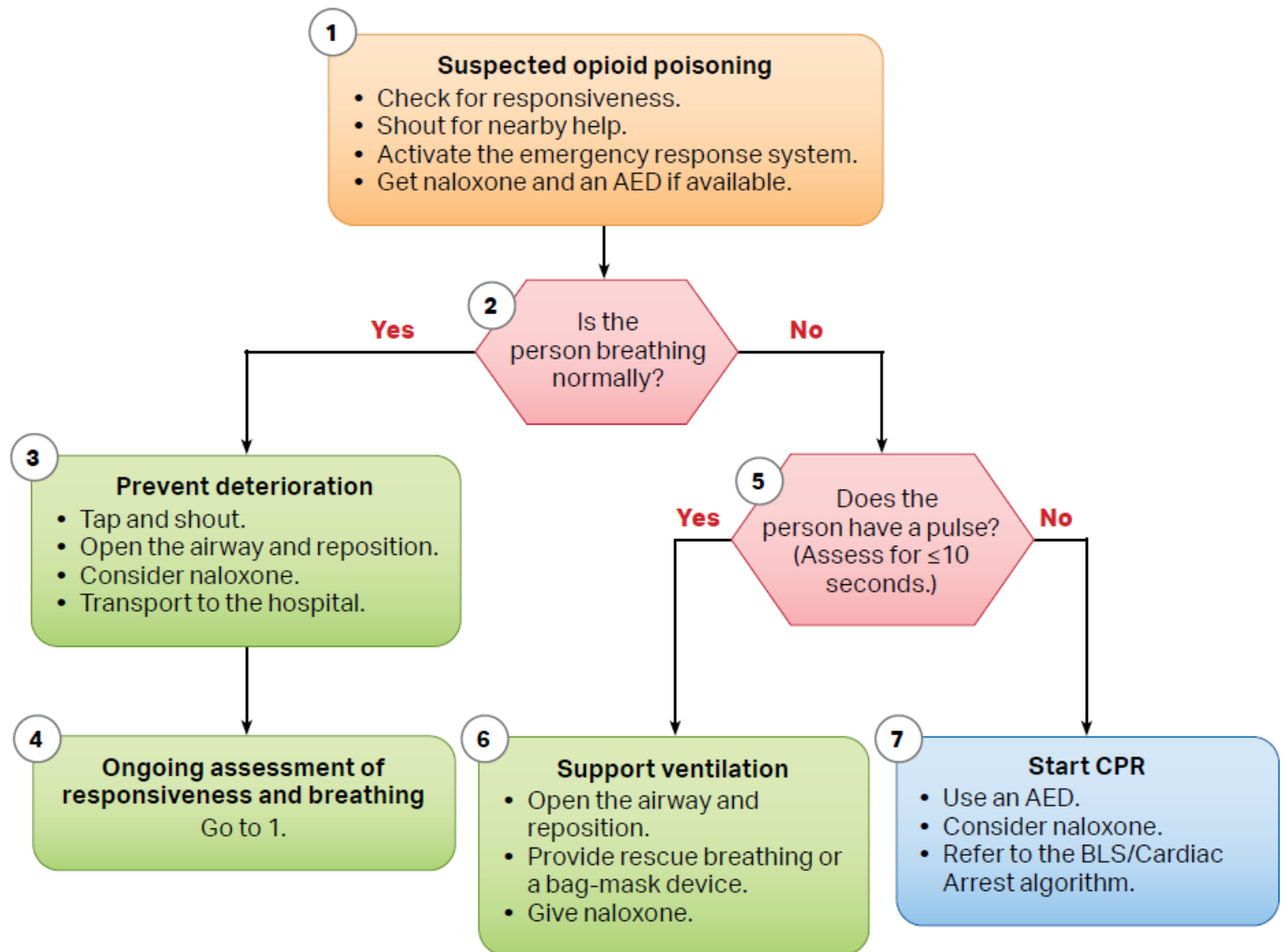
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**Figure 5. Opioid-Associated Emergency for Lay Responders Algorithm.**



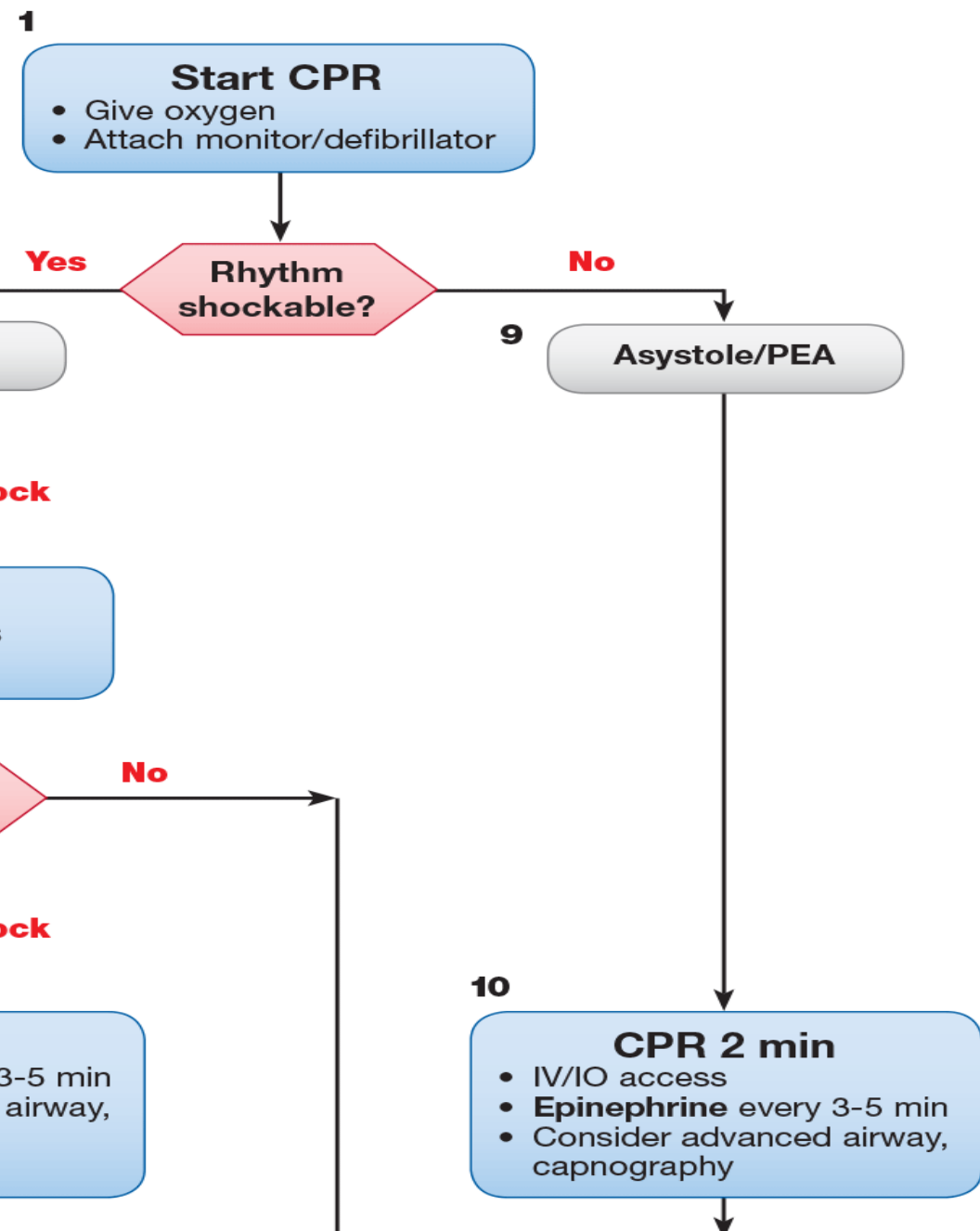
\*For adult and adolescent victims, responders should perform compressions and rescue breaths for opioid-associated emergencies if they are trained and perform Hands-Only CPR if not trained to perform rescue breaths. For infants and children, CPR should include compressions with rescue breaths.

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





# Algorithm – 2015 Update



## CPR Quality

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## Shock Energy for Defibrillation

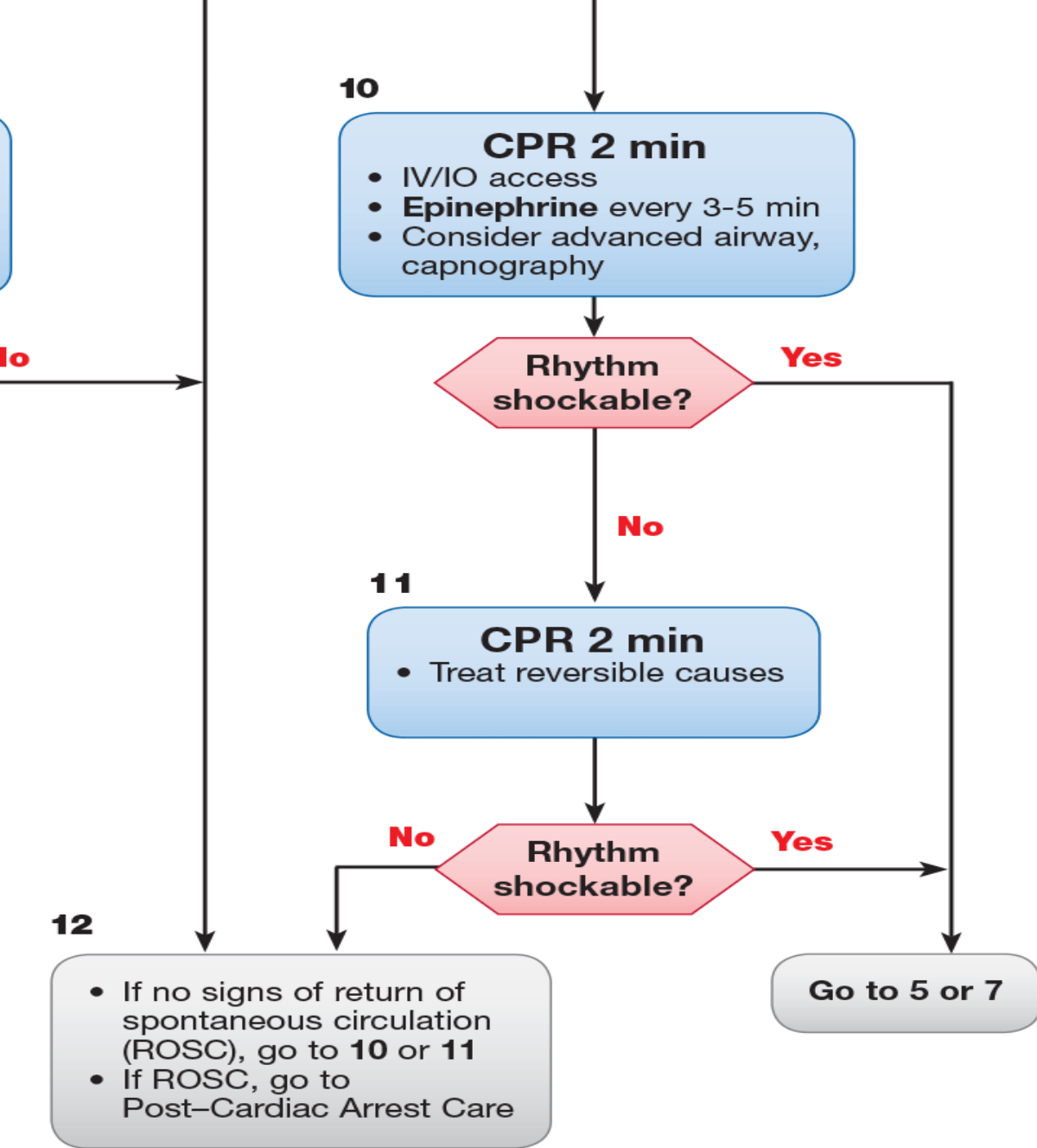
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## Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or



### Drug Therapy

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- **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



## *Sequence of Events-BCLS*

- ◆ **Airway open**
- ◆ **Breathing**
  - ◆ **Mouth to mask**
  - ◆ **Bag-valve-device (BVD / mask)**
- ◆ **Circulation – chest compressions**
  - ◆ **May do open chest compression in trauma patients or after post-op cardiac surgery**



## ◆ Primary survey

- ◆ Early defibrillation (ABCD)
- ◆ Use of automatic external defibrillator (AED)

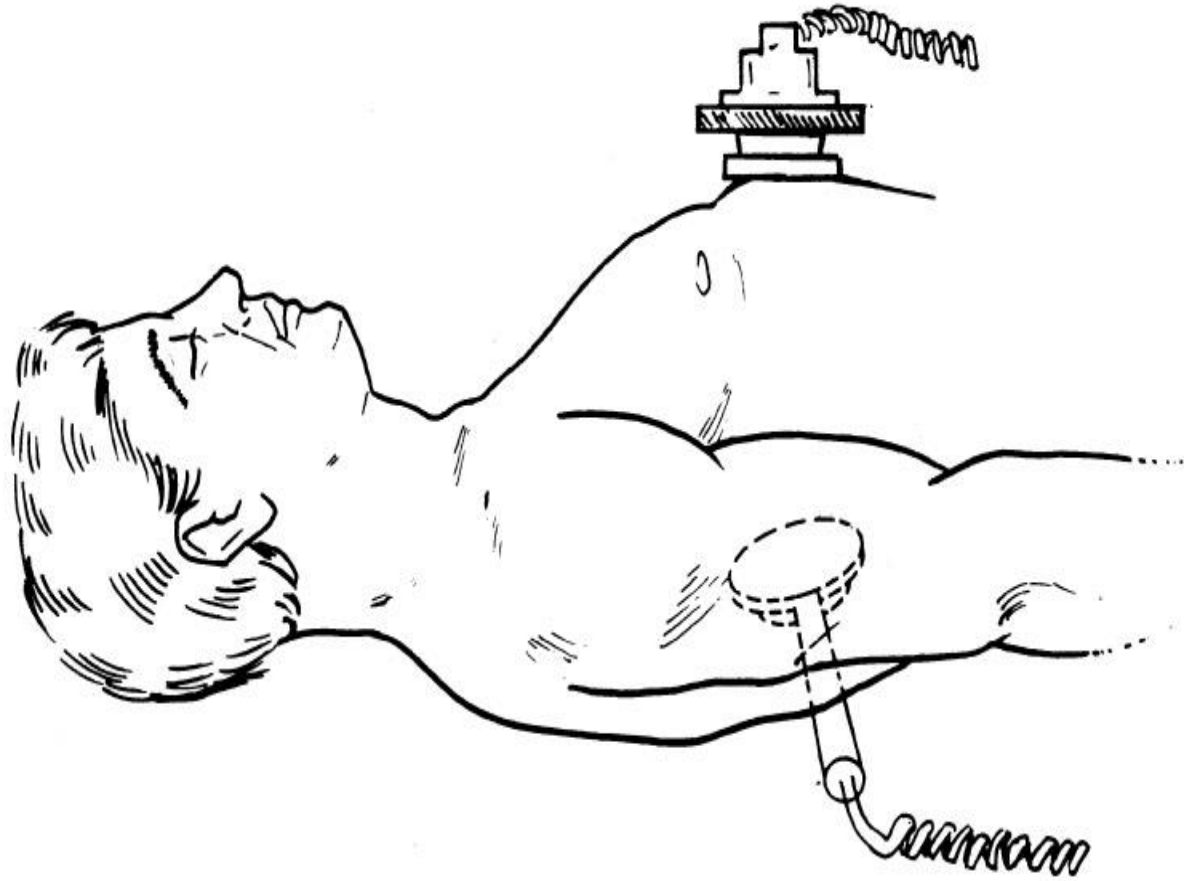
## ◆ Secondary survey

- ◆ Advanced skills
- ◆ Differential diagnosis



## *Sequence of Events-ACLS*

- ◆ **Defibrillation**
- ◆ **Airway management**
  - ◆ **Intubation**
  - ◆ **Manual ventilation**
- ◆ **IV access**



**Figure 7-9** Anteroposterior paddle placement. (Redrawn from Sheehy, S. B. [1990]. *Mosby's manual of emergency care* [p. 77]. St. Louis: Mosby.)

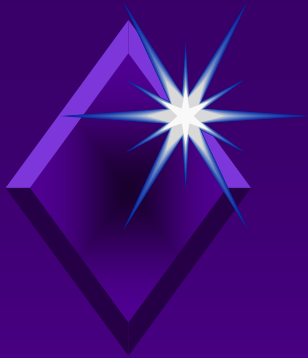
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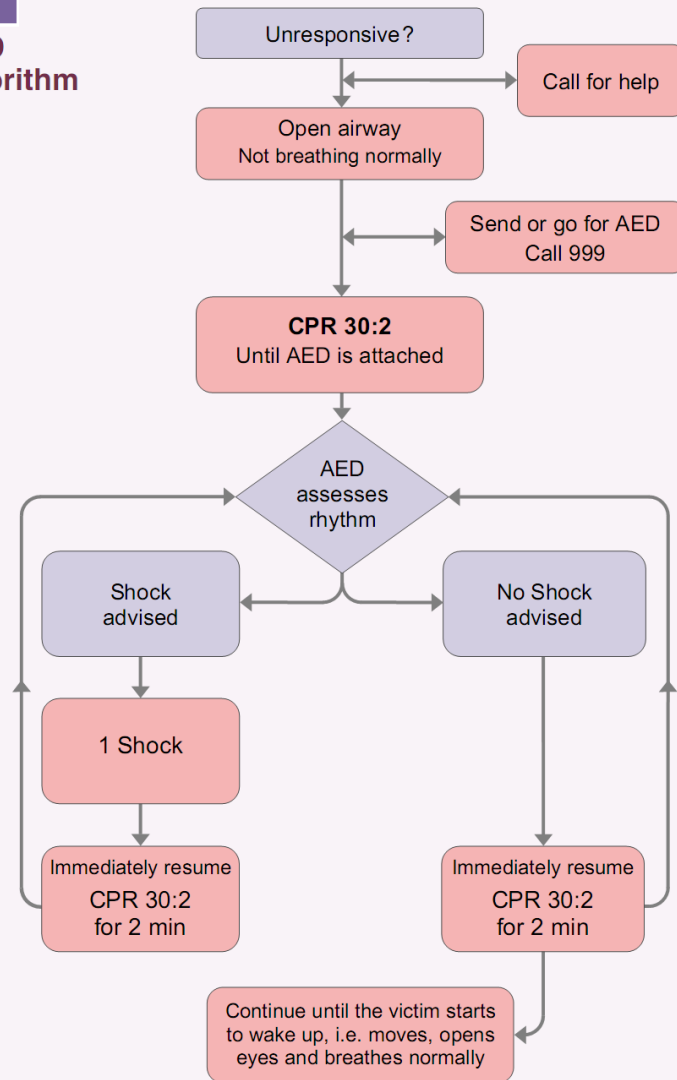
# Safety







### AED algorithm





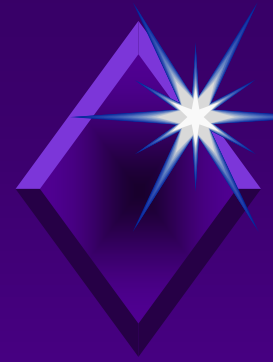
# *Critical Thinking Challenge*

- ◆ Why is intubation recommended before IV insertion?
- ◆ What site is recommended for IV access and why?
- ◆ What fluid is administered through the IV line?
- ◆ What is the procedure for drug administration through the ET tube, and what drugs can be given?



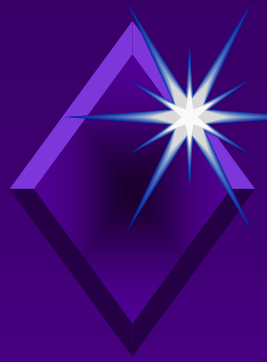
## *ACLS: IV Access*

- ◆ Large bore IVs
- ◆ Biggest veins
- ◆ May insert central line



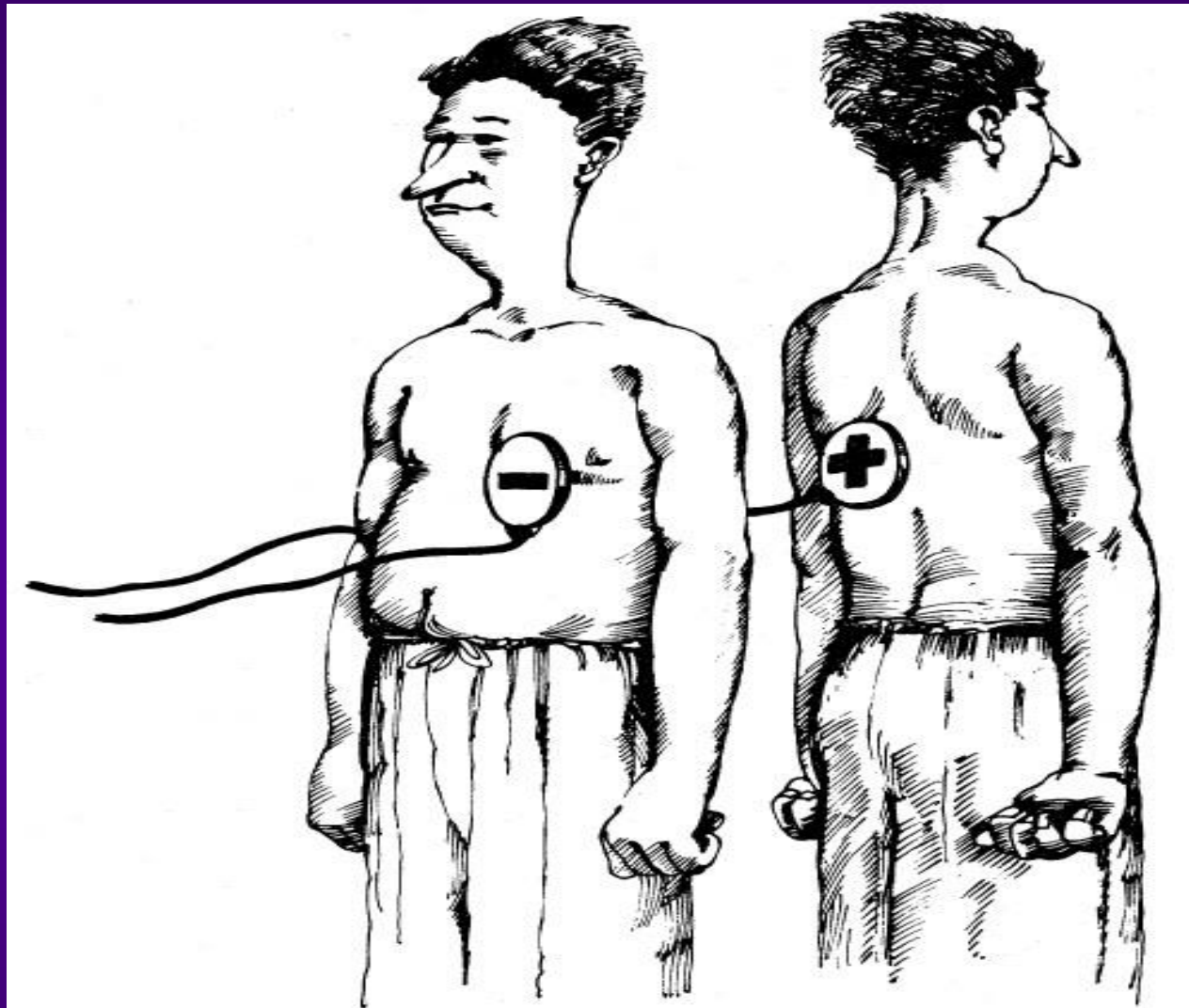
# *ACLS: Drugs*

- ◆ **Use of ET tube if needed: ALE**
  - ◆ **Atropine**
  - ◆ **Lidocaine**
  - ◆ **Epinephrine**
  - ◆ **Vasopressin**
  - ◆ **Naloxan**



# *ACLS: External pacing*

- ◆ **Methods**
- ◆ **Safety**
- ◆ **When is it used?**



**Figure 7-13** Application of electrodes for transcutaneous pacing. Electrodes are placed anteriorly and posteriorly. (From Crockett, P., & McHugh, L. G. [1988]. *Noninvasive pacing: What you should know* [p. 19]. Redmond, WA: Physio-Control.)

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# *V-LEAD Drugs*

*Know indications, doses, and administration*

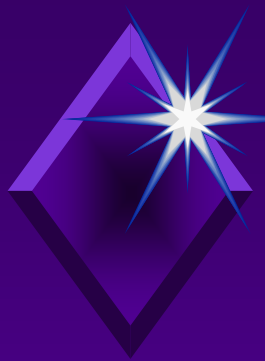
- ◆ Vasopressin – ventricular fibrillation/pulseless ventricular tachycardia
- ◆ Lidocaine--ventricular dysrhythmias
- ◆ Epinephrine- ventricular fibrillation/pulseless ventricular tachycardia; asystole; PEA
- ◆ Atropine-bradycardia; asystole; PEA
- ◆ Dopamine-hypotension



# *Fluids*

◆ Normal saline





## *ACLS Summary*

- ◆ **Treat patient, not monitor**
- ◆ **CPR throughout**
- ◆ **Early defibrillation essential**
- ◆ **Use ET tube as needed for medication administration**
- ◆ **Provide treatment according to algorithms**



# Dysrhythmia Management

- ◆ Algorithms
- ◆ Early Defibrillation
  - ◆ Public access defibrillation encouraged
  - ◆ AED used in field
  - ◆ AED may be used during in-hospital codes



# *Ventricular Fibrillation/ Pulseless Ventricular Tachycardia*

- ◆ ABCD
- ◆ Shock, shock, shock
- ◆ 360, 360, 360 joules or 200 j. biphasic
- ◆ Intubate
- ◆ Epinephrine or vasopressin
- ◆ Defibrillate



# *Ventricular Fibrillation / Pulseless Ventricular Tachycardia*

- ◆ Drug-Shock Continues
  - ◆ Epinephrine repeated as needed
  - ◆ Consider other drugs
    - ◆ Amiodarone
    - ◆ Lidocaine
    - ◆ Mg sulfate
    - ◆ Procainamide
    - ◆ Sodium bicarbonate



*“Please Shock, Shock, Shock,  
EVERYbody Shock, And Let’s  
Make Patients Better”*

◆ *Please - Precordial  
Thump*

◆ *Shock - 360J*

◆ *Shock - 360J*

◆ *Shock - 360J*

◆ *Everybody -  
Epinephrine*

◆ *Everybody -  
Vasopressin*

◆ *And - Amiodarone*

◆ *Let’s - Lidocaine*

◆ *Make - Magnesium  
sulfate*

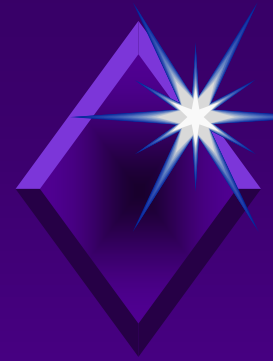
◆ *Patients -  
Procainamide*

◆ *Better - Bicarbonate*



# *Symptomatic Tachycardia* *(including VT)*

- ◆ **ABCD**
- ◆ **Airway, oxygen, IV access**
- ◆ **Sedation**
- ◆ **Cardioversion**



# *Pulseless Electrical Activity*

- ◆ Rhythm without pulse ABCD
- ◆ Airway, oxygen, intubate, IV access
- ◆ Treat cause
- ◆ Epinephrine and atropine
- ◆ “THINK PEA - problem, epinephrine, atropine”



# *Asystole*

- ◆ ABCD
- ◆ Airway, oxygen, intubate, IV access
- ◆ Confirm in two leads
- ◆ Treat cause: hypoxia, hypo/hyperkalemia, acidosis, overdose, hypothermia
- ◆ Transcutaneous pacemaker
- ◆ Epinephrine
- ◆ Atropine





*“Asystole.... Check me in another lead and let’s have another cup of TEA.”*

- ◆ T Transcutaneous Pacing (TCP)
- ◆ E Epinephrine
- ◆ A Atropine



# *Symptomatic Bradycardia*

- ◆ ABCD
- ◆ Airway, oxygen, IV access
- ◆ Atropine
- ◆ Transcutaneous pacing
  - ◆ May need sedation/analgesia
- ◆ Dopamine
- ◆ Epinephrine
- ◆ NO LIDOCAINE



# *“All Patients Deserve Empathy”*

- ◆ All Atropine
- ◆ Patients Pacing
- ◆ Deserve Dopamine
- ◆ Empathy Epinephrine
- ◆ *For increasing severe bradycardia*



# *Defibrillation*

- ◆ Paddles traditionally used to deliver current
- ◆ Newer models allow “hands-off” defibrillation
  - ◆ Multipurpose pads serve as electrodes, defibrillator pads, and pacing pads



# *Defibrillation*

- ◆ **Automatic external defibrillation**
- ◆ **What are its advantages?**



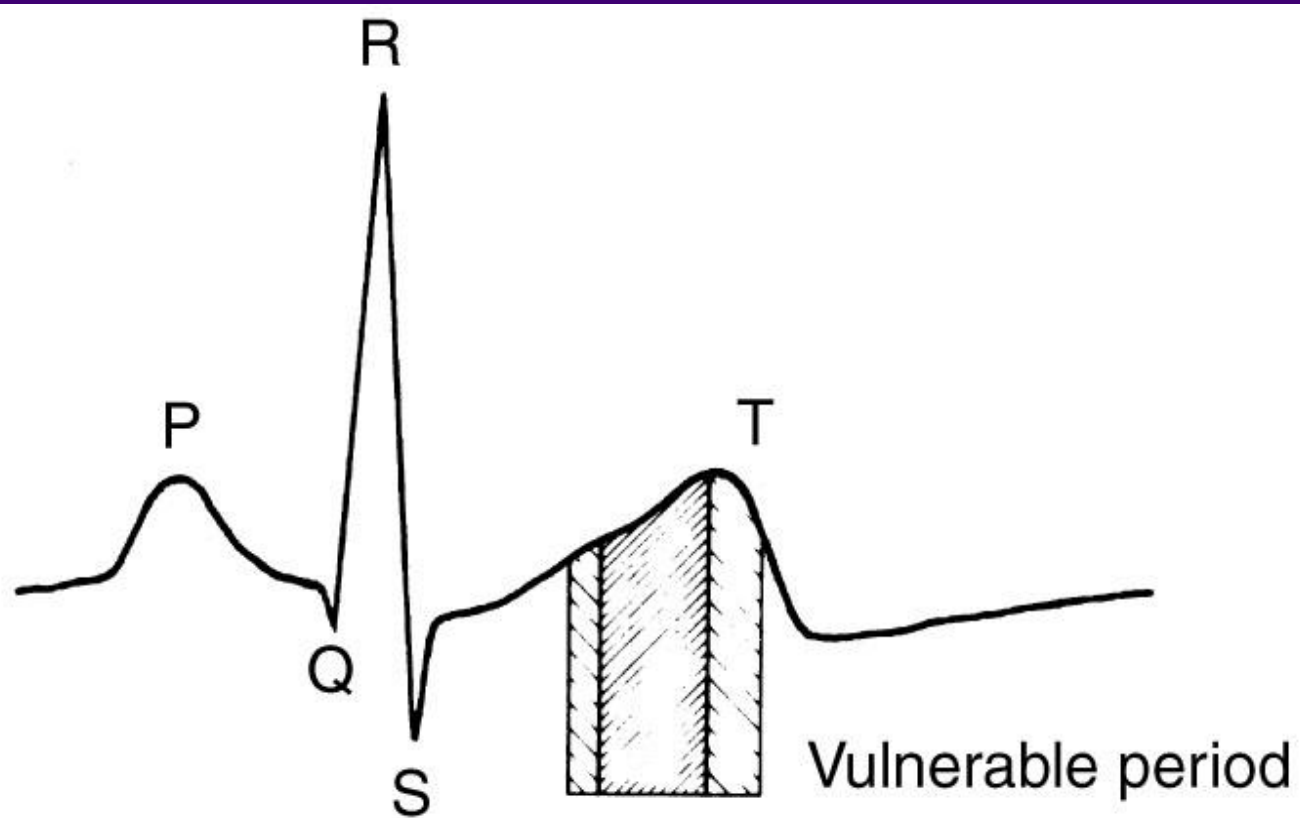
# *Defibrillation*

- ◆ **Electrical current**
- ◆ **3\* 360 joules or 200 j biphasic**
- ◆ **Completely depolarize the heart**
- ◆ **Allow for the resumption of rhythm**



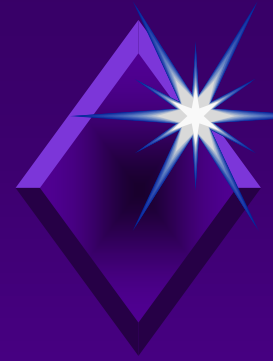
# *Cardioversion*

- ◆ **Electrical current**
- ◆ **Lower joules (e.g., 50)**
- ◆ **Synchronized delivery on R-wave  
(prevents “shock on T”)**
- ◆ **Disrupts ectopic foci**



**Figure 7-10** Vulnerable period during the cardiac cycle. If a countershock is delivered during this time, it may result in ventricular fibrillation. (From Crockett, P. J., Droppert, B. M., Higgins, S. E. (1991). *Defibrillation: What you should know* [3rd ed.] [p. 4]. Redmond, WA: Physio-Control.)





# *Defibrillation vs. Cardioversion*

- ◆ **No pulse-defibrillation**
- ◆ **Fast pulse with symptoms-  
cardiovertsion (can also do overdrive  
pacing)**



# *Methods for Countershock*

- ◆ External paddles (traditional)
- ◆ External “hands-off” defibrillation with multipurpose pads (ECG, pace, defib)
- ◆ Paddle/pad placement
  - ◆ Transverse/anterior
  - ◆ Anterior-posterior
    - ◆ When is this recommended?



# *Methods for Countershock*

- ◆ Internal paddles
  - ◆ “Spoons”
    - ◆ Cardiac surgery
    - ◆ Open-chest CPR
  - ◆ Lower joules



## *Methods for Countershock*

- ◆ **Automatic implantable cardioverter-defibrillator**
  - ◆ Recognizes ectopy
  - ◆ Delivers countershocks
  - ◆ Prevents episodes of sudden death



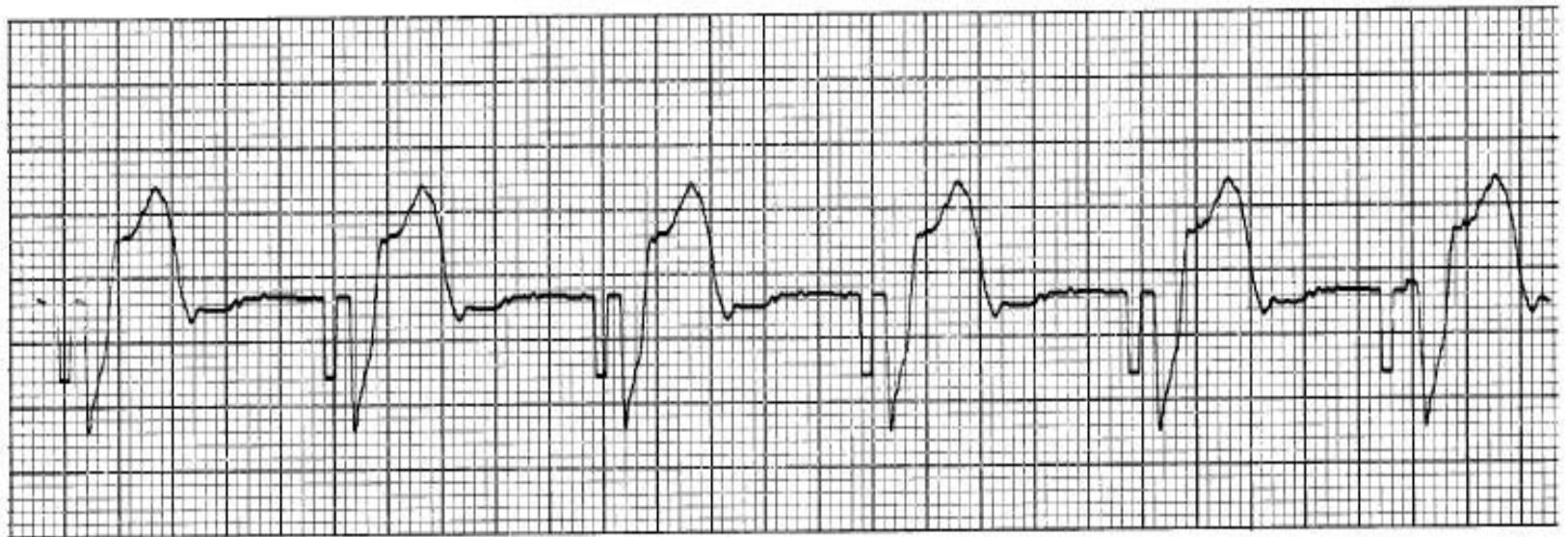
# *Procedure for Defibrillation*

- ◆ Paddle or defibrillation pad placement
- ◆ Good contact with skin (protect from burns)
  - ◆ Conductive medium with paddles
- ◆ Charge defibrillator to desired setting
- ◆ “All clear”
- ◆ Adequate pressure with paddles
- ◆ Shock
- ◆ Check rhythm and pulse



# *Transcutaneous Pacemaker*

- ◆ Symptomatic bradycardia and asystole
- ◆ External pads/anterior-posterior placement
- ◆ Demand mode
- ◆ Adjust mAs to cause pacing
- ◆ Assess rhythm for proper functioning
- ◆ Sedation and analgesia as needed



**Figure 7-14** Electrical capture of transcutaneous pacemaker. Note the pacemaker spikes followed by a wide QRS complex and a tall T wave.

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## *Critical Thinking Challenge*

- ◆ How is defibrillation different for patients who have:
  - ◆ AN implantable cardioverter defibrillator?
  - ◆ A permanent pacemaker?





# *Overview of Medications*



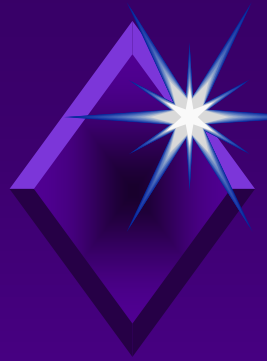
# *Epinephrine*

- ◆ Sympathomimetic
- ◆ Ventricular fibrillation, pulseless ventricular tachycardia, asystole, PEA
- ◆ 1 mg. IV push every 3 to 5 minutes
- ◆ Can be given via ET tube
- ◆ Infusion if needed



# *Vasopressin*

- ◆ **Non-adrenergic vasopressor**
- ◆ **Intense vasoconstriction at high doses**
- ◆ **May be as effective as epinephrine**
- ◆ **One-time dose of 40 units IV for ventricular fibrillation**
- ◆ **Usefulness in PEA and asystole being evaluated**



# *Atropine*

- ◆ Anticholinergic
- ◆ Symptomatic bradycardia
  - ◆ 0.5 mg every 3 to 5 min IV push
  - ◆ Maximum of 0.03 to 0.04 mg/kg



# *Atropine*

- ◆ **Asystole**
  - ◆ Start with 1 mg. IV push
  - ◆ Repeat every 3 to 5 minutes to maximum dose of 0.04 mg/kg
- ◆ Can be given via ET tube; 2-3 mg in 10 ml normal saline
- ◆ External pacer on standby



# *Lidocaine*

- ◆ Ventricular ectopy
- ◆ Bolus 1 to 1.5 mg/kg; additional bolus 0.5 to 0.75 mg/kg every 5 to 10 min up to 3 mg/kg
- ◆ Follow with infusion at 2 to 4 mg/min (250 mL 5% dextrose in water with 1 Gm)
  - ◆ Concentration – 1 mg/min = 15 ml/hour
- ◆ Assess for lidocaine toxicity



# *Amiodarone*

- ◆ **Unique drug; prolongs action potential and slows sinus rate**
- ◆ **Used for ventricular fibrillation and ventricular tachycardia refractory to treatment**
- ◆ **May also be given for atrial fibrillation or flutter**
- ◆ **IV push; follow with infusion if needed**



# *Adenosine*

- ◆ **Miscellaneous antidysrhythmic agent**
- ◆ **Slows conduction through AV node**
- ◆ **Primary use for paroxysmal supraventricular tachycardia**
- ◆ **IV push; rapid; through port nearest insertion site of IV**
- ◆ **Half-life 10 seconds; duration 1 to 2 minutes**





# *Verapamil*

- ◆ Calcium-channel blocker
- ◆ Decreases fast rates
- ◆ Treat PSVT
- ◆ Contraindicated in PSVT if patient has Wolff Parkinson White syndrome
- ◆ IV bolus



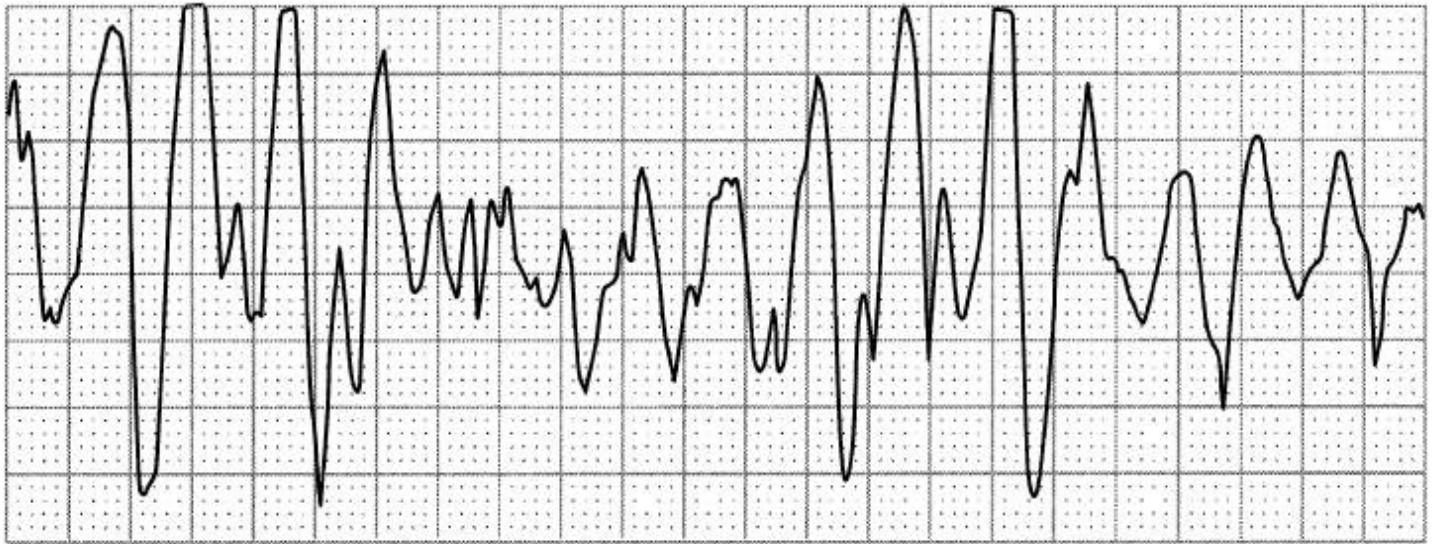
## *Diltiazem (Cardizem)*

- ◆ Calcium channel blocker
- ◆ Useful in PSVT, especially associated with atrial fibrillation or flutter
- ◆ IV bolus followed by infusion



# *Magnesium*

- ◆ **Refractory ventricular fibrillation**
- ◆ **Torsades de pointes (type of ventricular tachycardia)**
- ◆ **Known deficiency**
- ◆ **IV bolus followed by infusion titrated by magnesium levels**



**Figure 7-15** Torsades de pointes. The QRS complex seems to spiral around the isoelectric line. (From Paul, S., & Hebra, J. D. [1998]. *The nurse's guide to cardiac rhythm interpretation: Implications for patient care* Philadelphia: W. B. Saunders.)

Copyright © 2001 by W. B. Saunders Company



# *Sodium Bicarbonate*

- ◆ According to ABGs
- ◆ Rarely given



# *Dopamine*

- ◆ Vasoactive (vasoconstrictor) to increase blood pressure
- ◆ Continuous drip
- ◆ 1 to 20 mcg/kg/min (learn calculations)



# *Dopamine*

- ◆ **Effects are dose-related**
  - ◆ Lower doses may increase renal perfusion (not supported by recent studies)
  - ◆ Moderate doses = cardiac doses
  - ◆ Higher doses = vasopressor doses
- ◆ **Consider need for fluids versus dopamine**



# *Norepinephrine*

- ◆ Vasopressor
- ◆ Continuous infusion of 0.5 to 30 mcg/min
- ◆ Very potent





# *Calcium Chloride*

- ◆ Underlying problem
  - ◆ Hypocalcemia
  - ◆ Hyperkalemia
  - ◆ Calcium blocker toxicity
- ◆ IV push



# *Morphine Sulfate*

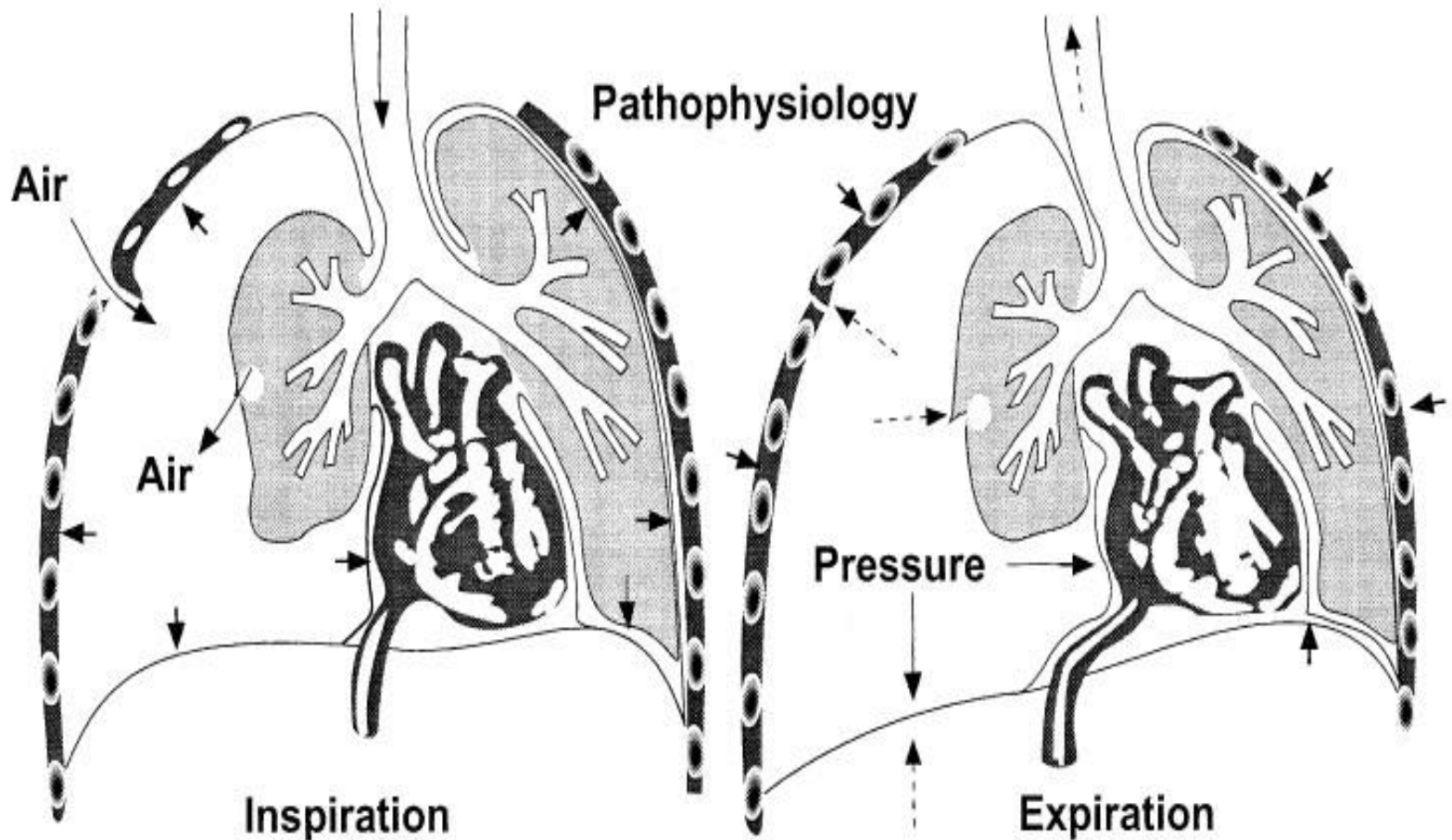
- ◆ Ischemic chest pain
- ◆ Pulmonary edema
  - ◆ Increases venous capacitance



# *Problems*

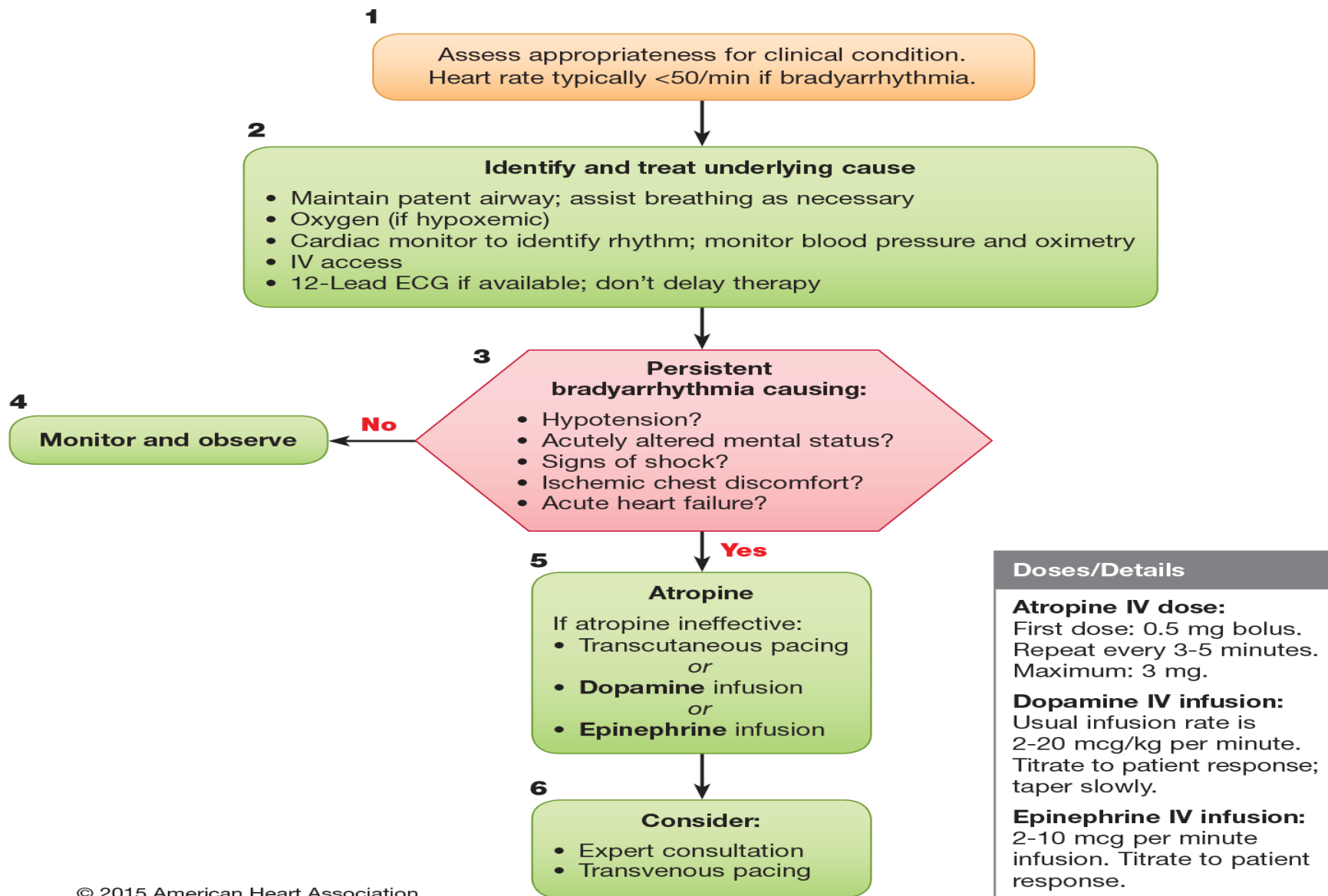
- ◆ Tension pneumothorax
- ◆ Cardiac tamponade

## TENSION PNEUMOTHORAX

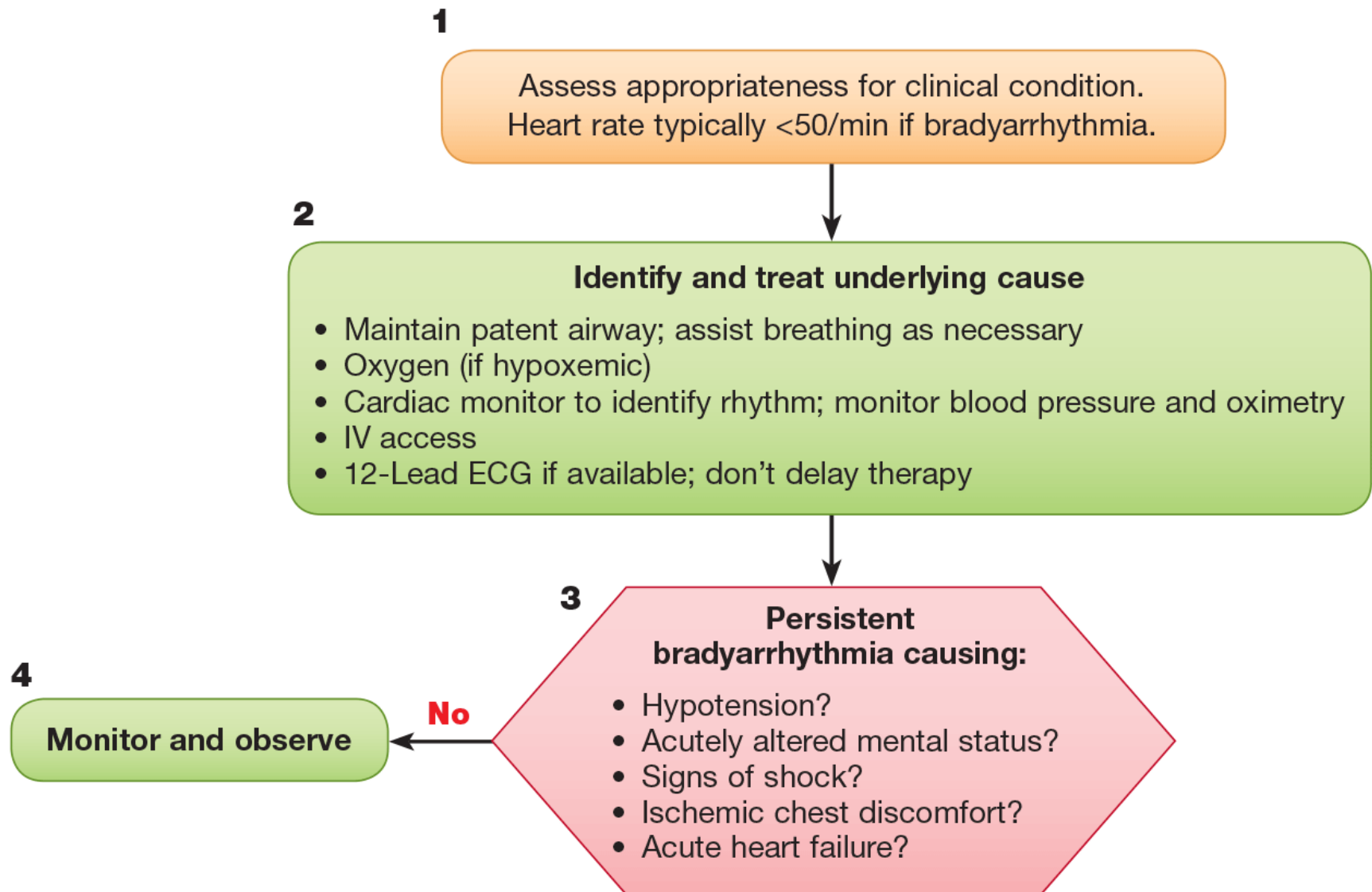


**Figure 7-16** Tension pneumothorax. (From Alspach, J. G. [Ed.] [1992]. *AACN instructor's resource manual for the AACN core curriculum for critical care nursing* [Transparency 168]. Philadelphia: W. B. Saunders.)

# Adult Bradycardia With a Pulse Algorithm



# Adult Bradycardia With a Pulse Algorithm



5

Yes

### Atropine

If atropine ineffective:

- Transcutaneous pacing  
*or*
- **Dopamine** infusion  
*or*
- **Epinephrine** infusion

6

### Consider:

- Expert consultation
- Transvenous pacing

### Doses/Details

#### Atropine IV dose:

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

#### Dopamine IV infusion:

Usual infusion rate is  
2-20 mcg/kg per minute.  
Titrate to patient response;  
taper slowly.

#### Epinephrine IV infusion:

2-10 mcg per minute  
infusion. Titrate to patient  
response.

# Adult Tachycardia With a Pulse Algorithm

**1**  
Assess appropriateness for clinical condition.  
Heart rate typically  $\geq 150$ /min if tachyarrhythmia.

**2**  
**Identify and treat underlying cause**

- Maintain patent airway; assist breathing as necessary
- Oxygen (if hypoxemic)
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry

**3**  
**Persistent tachyarrhythmia causing:**

- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

**4**  
**Synchronized cardioversion**

- Consider sedation
- If regular narrow complex, consider adenosine

**5**  
**Wide QRS?  $\geq 0.12$  second**

**6**

- IV access and 12-lead ECG if available
- Consider adenosine only if regular and monomorphic
- Consider antiarrhythmic infusion
- Consider expert consultation

**7**

- IV access and 12-lead ECG if available
- Vagal maneuvers
- Adenosine (if regular)
- $\beta$ -Blocker or calcium channel blocker
- Consider expert consultation

## 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.



# Adult Tachycardia With a Pulse Algorithm

**1**

Assess appropriateness for clinical condition.  
Heart rate typically  $\geq 150/\text{min}$  if tachyarrhythmia.

**2**

## Identify and treat underlying cause

- Maintain patent airway; assist breathing as necessary
- Oxygen (if hypoxemic)
- Cardiac monitor to identify rhythm; monitor blood pressure and oximetry

**3**

## Persistent tachyarrhythmia causing:

- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

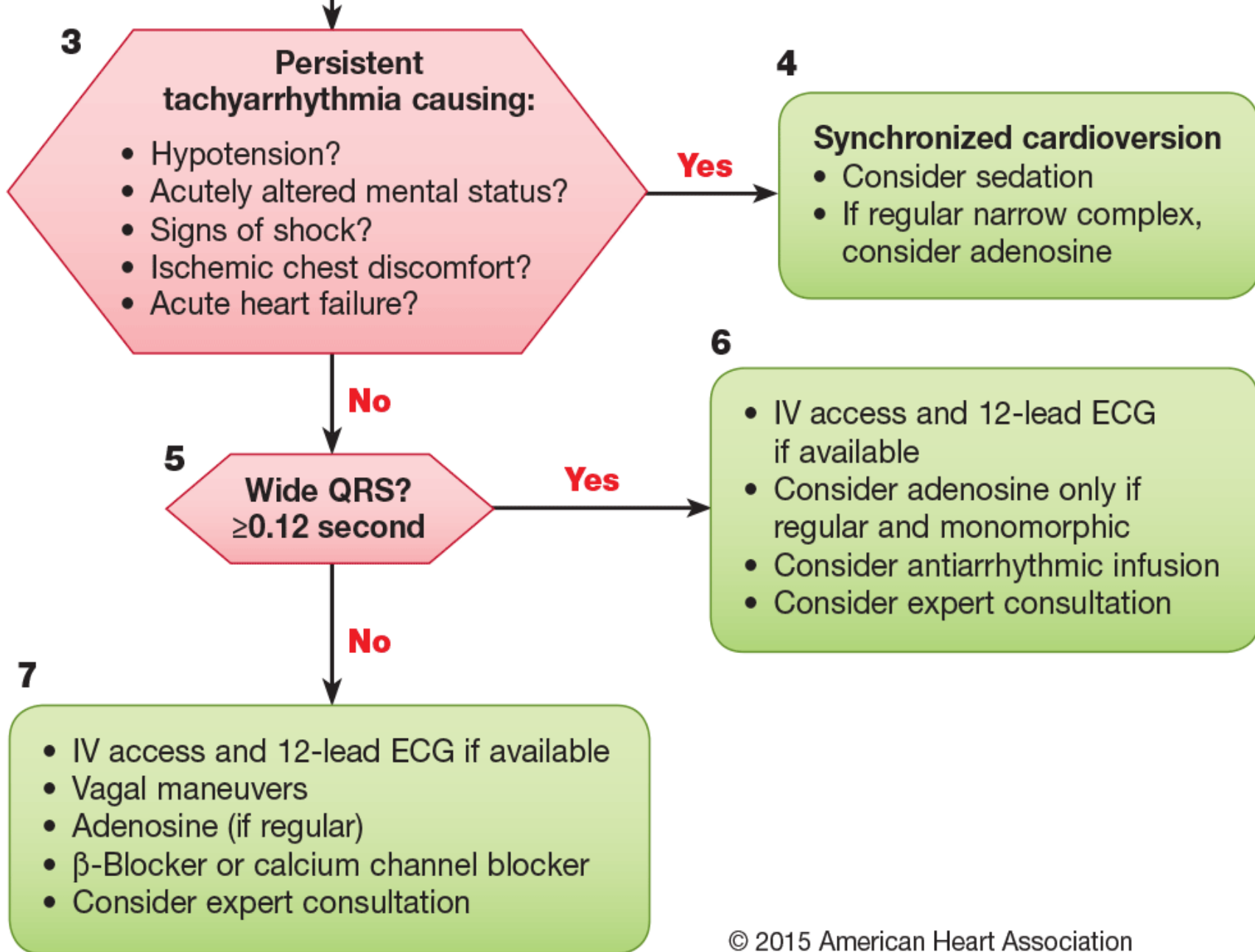
**Yes**

**4**

**No**

**6**

• IV



## Doses/Details

### **Synchronized cardioversion:**

Initial recommended doses:

- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic or 200 J monophasic
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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.



## *Critical Thinking Challenge*

- ◆ **Why do tension pneumothorax and cardiac tamponade sometimes occur during resuscitation efforts?**
- ◆ **How are the problems diagnosed and treated?**
- ◆ **If they occur, how outcomes of efforts be affected?**



## *Supporting the Family*

- ◆ Should they be present during a code?
- ◆ Visitation after a code
- ◆ Support from pastoral care/nursing staff



## *Supporting Other Patients*

- ◆ Get them away from the situation
- ◆ Talk with them
- ◆ Assess their feelings



# *Ethical Issues*

- ◆ Code versus no code versus slow code
- ◆ Withdrawal of life support after a code
- ◆ Organ donation

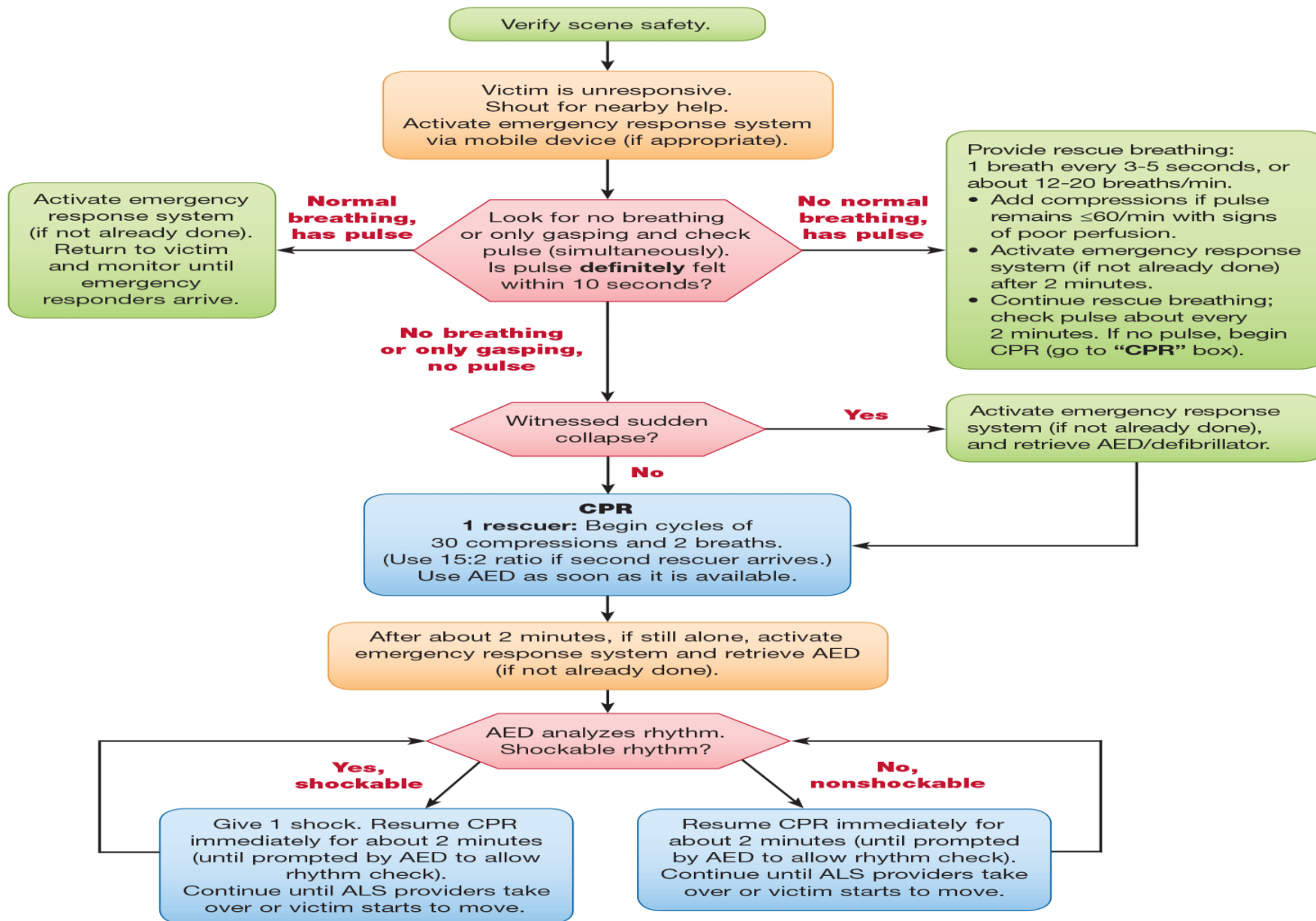


# *Documentation of Events*

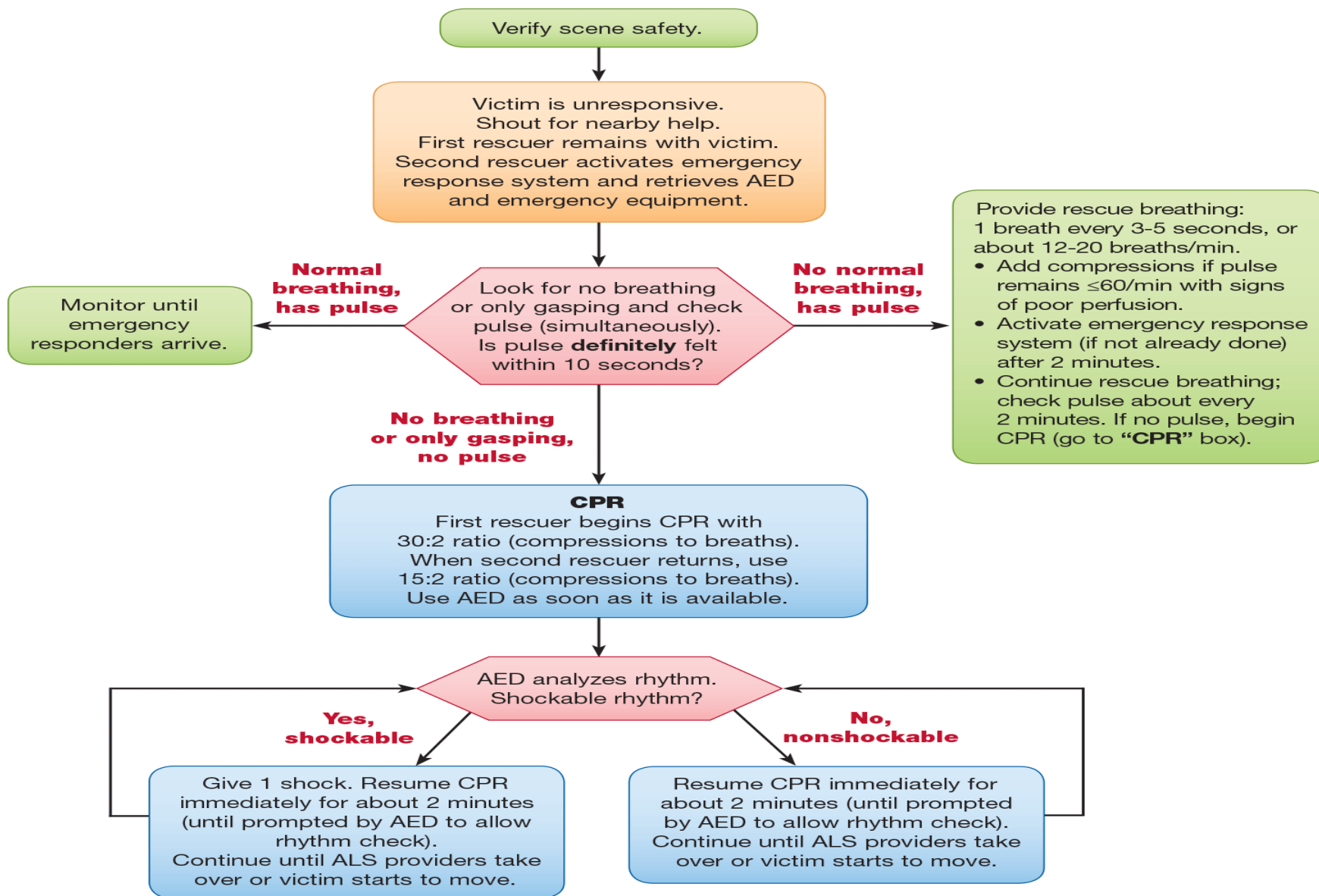
- ◆ Who should record the information?
- ◆ What information must be recorded and documented on the code record?
- ◆ What should be documented on the chart about events *before* the code?

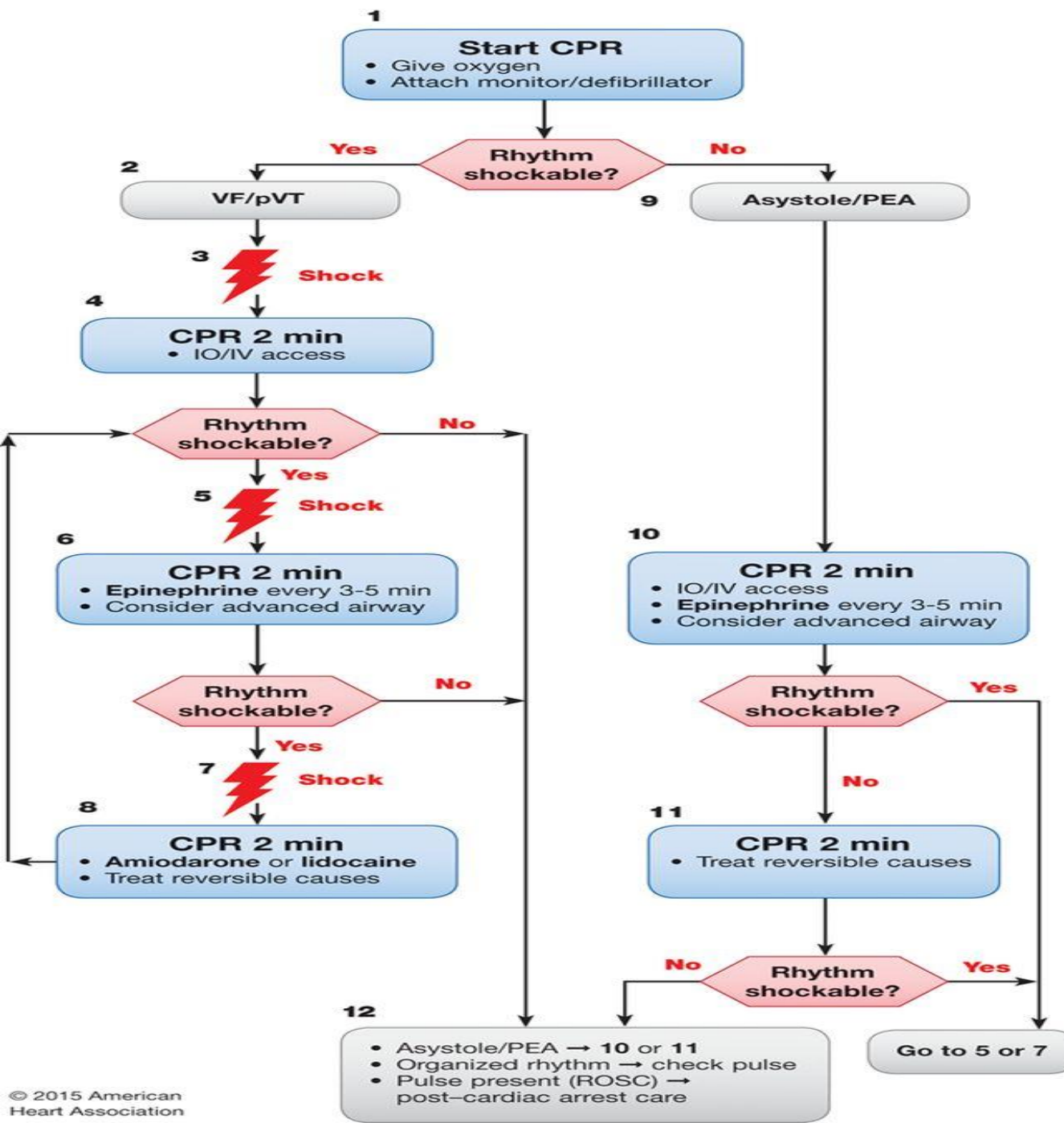


# BLS Healthcare Provider Pediatric Cardiac Arrest Algorithm for the Single Rescuer—2015 Update



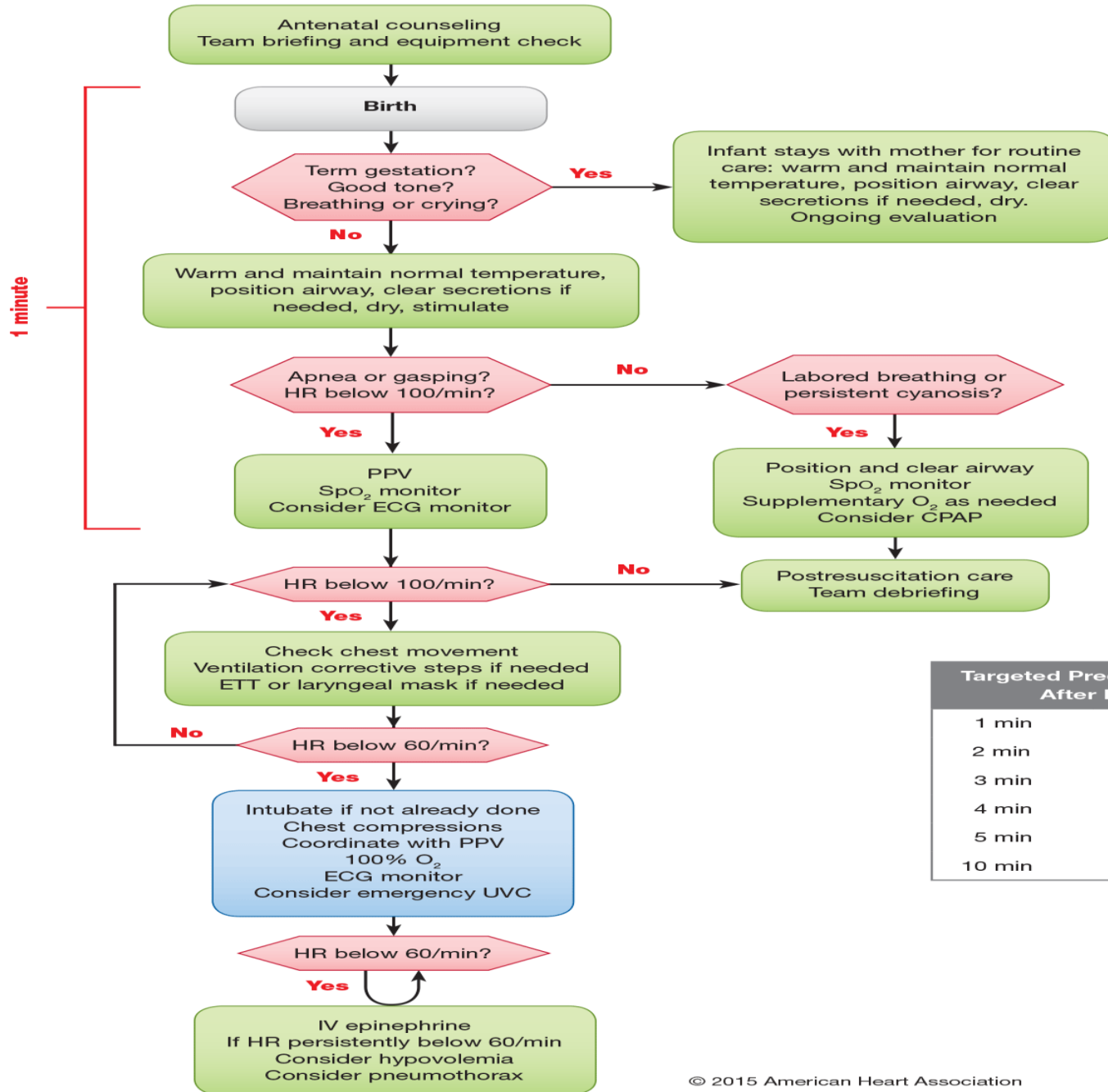
# BLS Healthcare Provider Pediatric Cardiac Arrest Algorithm for 2 or More Rescuers – 2015 Update





CPR Quality
<ul style="list-style-type: none"> <li>• Push hard (<math>\geq\frac{1}{3}</math> of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil.</li> <li>• Minimize interruptions in compressions.</li> <li>• Avoid excessive ventilation.</li> <li>• Rotate compressor every 2 minutes, or sooner if fatigued.</li> <li>• If no advanced airway, 15:2 compression-ventilation ratio.</li> </ul>
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
<ul style="list-style-type: none"> <li>• <b>Epinephrine IO/IV dose:</b> 0.01 mg/kg (0.1 mL/kg of 1:10 000 concentration). Repeat every 3-5 minutes. If no IO/IV access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of 1:1000 concentration).</li> <li>• <b>Amiodarone IO/IV dose:</b> 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VF/pulseless VT.</li> <li>• <b>Lidocaine IO/IV dose:</b> Initial: 1 mg/kg loading dose. Maintenance: 20-50 mcg/kg per minute infusion (repeat bolus dose if infusion initiated &gt;15 minutes after initial bolus therapy).</li> </ul>
Advanced Airway
<ul style="list-style-type: none"> <li>• Endotracheal intubation or supraglottic advanced airway</li> <li>• Waveform capnography or capnometry to confirm and monitor ET tube placement</li> <li>• Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions</li> </ul>
Return of Spontaneous Circulation (ROSC)
<ul style="list-style-type: none"> <li>• Pulse and blood pressure</li> <li>• Spontaneous arterial pressure waves with intra-arterial monitoring</li> </ul>
Reversible Causes
<ul style="list-style-type: none"> <li>• Hypovolemia</li> <li>• Hypoxia</li> <li>• Hydrogen ion (acidosis)</li> <li>• Hypoglycemia</li> <li>• Hypo-/hyperkalemia</li> <li>• Hypothermia</li> <li>• Tension pneumothorax</li> <li>• Tamponade, cardiac</li> <li>• Toxins</li> <li>• Thrombosis, pulmonary</li> <li>• Thrombosis, coronary</li> </ul>

# Neonatal Resuscitation Algorithm – 2015 Update



Targeted Productal SpO <sub>2</sub> 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%

# Acute Coronary Syndromes Algorithm – 2015 Update

