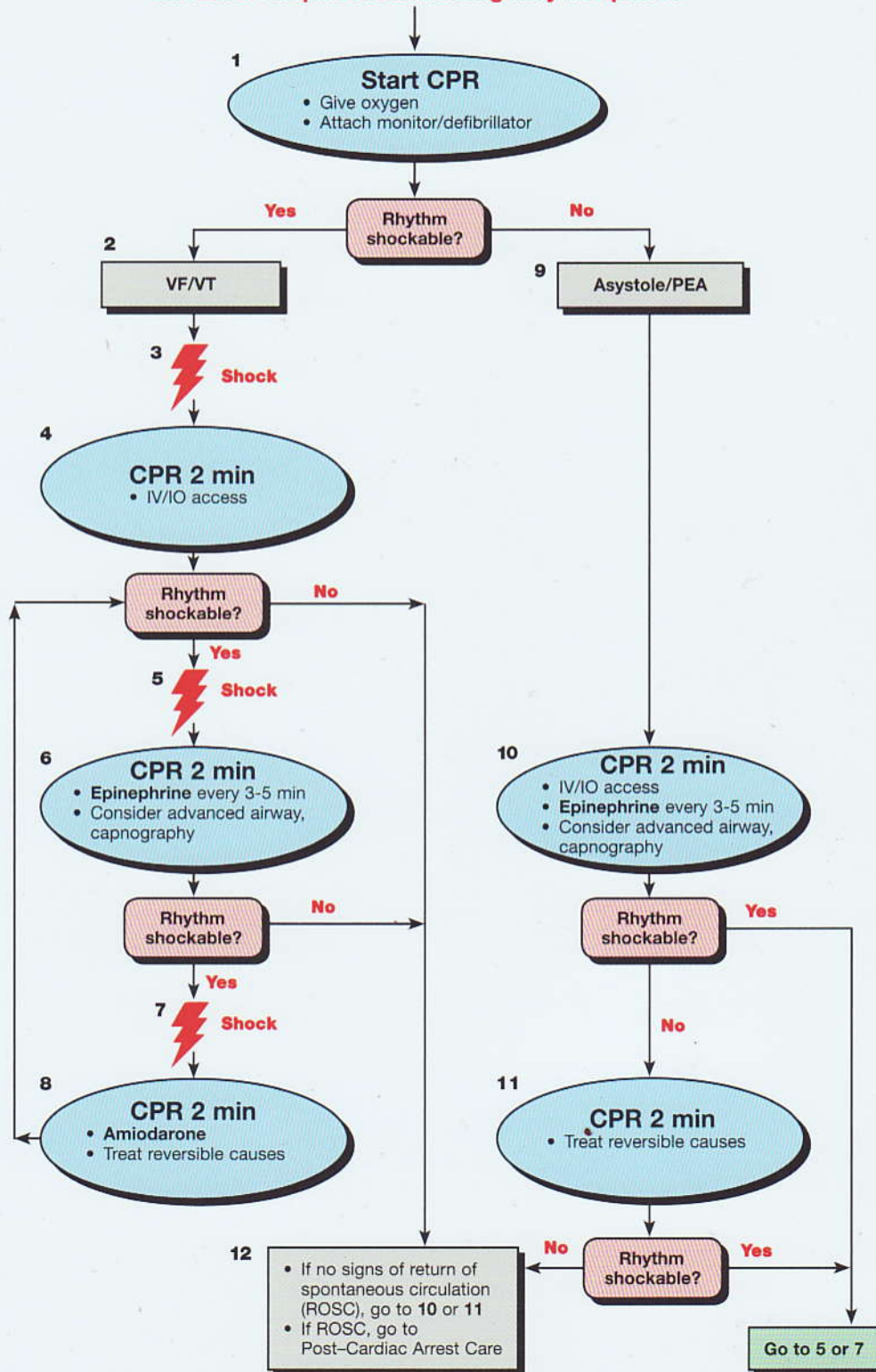


# Cardiac Arrest Algorithm



## Adult Advanced Cardiovascular Life Support

Shout for Help/Activate Emergency Response



### CPR Quality

- Push hard ( $\geq 2$  inches [5 cm]) and fast ( $\geq 100$ /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  $\geq 40$  mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

### Shock Energy

- **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
- **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

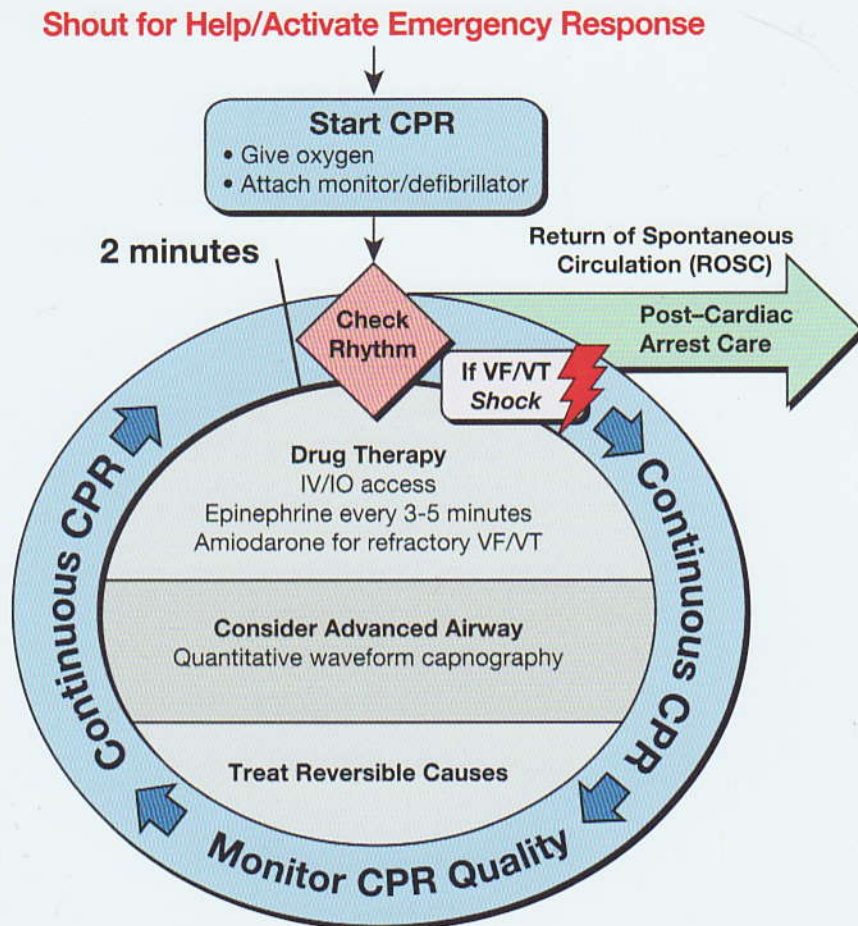
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary



# Cardiac Arrest Circular Algorithm



## Adult Advanced Cardiovascular Life Support



### CPR Quality

- Push hard ( $\geq 2$  inches [5 cm]) and fast ( $\geq 100$ /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  $\geq 40$  mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

### Shock Energy

- **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
- **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

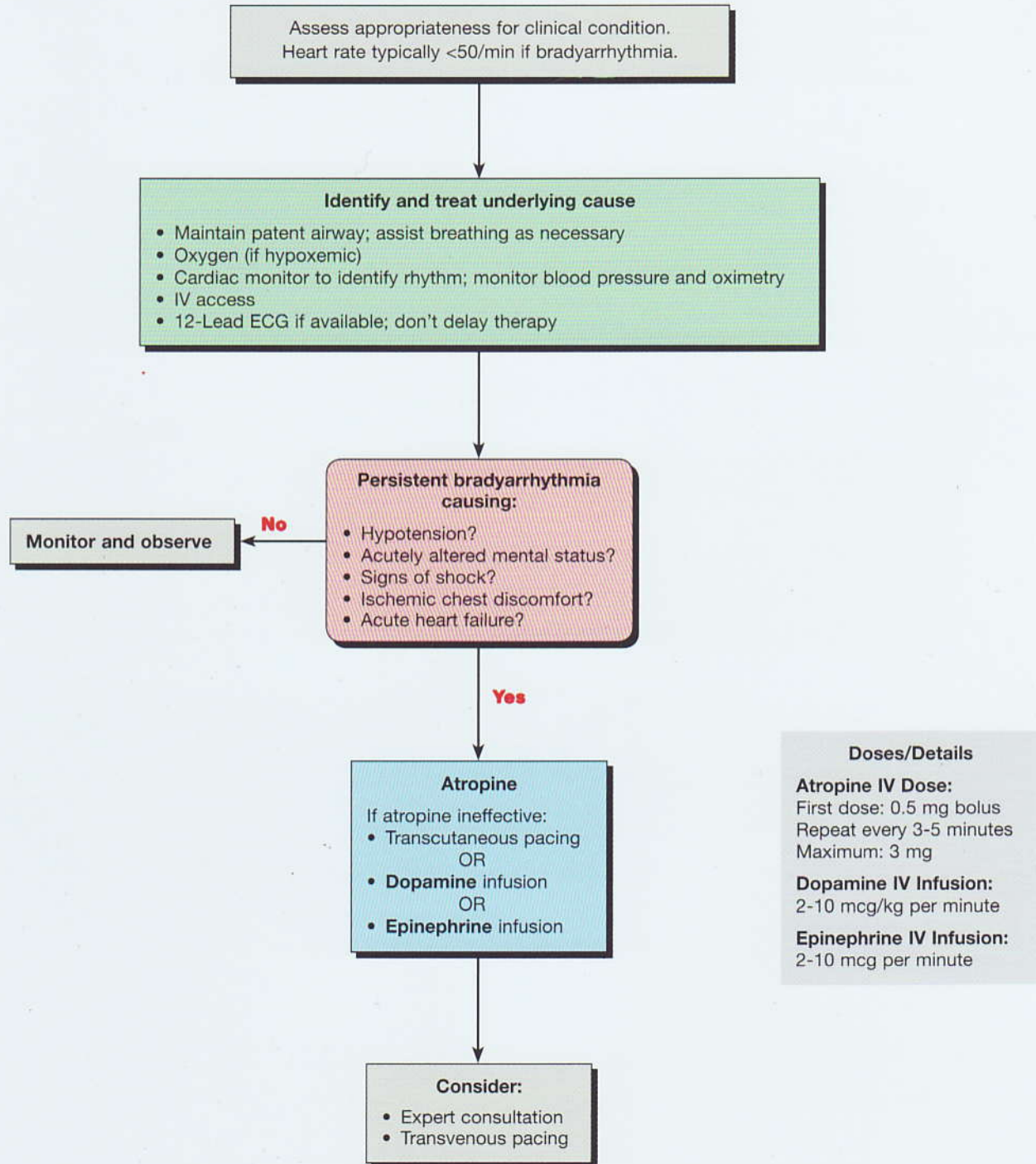
### Reversible Causes

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

# Bradycardia With a Pulse Algorithm



## Adult Advanced Cardiovascular Life Support



# Tachycardia With a Pulse Algorithm



## Adult Advanced Cardiovascular Life Support

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

**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

**Persistent tachyarrhythmia causing:**

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

**Yes**

**Synchronized cardioversion**

- Consider sedation
- If regular narrow complex, consider adenosine

**No**

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

**Yes**

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

**No**

- 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.

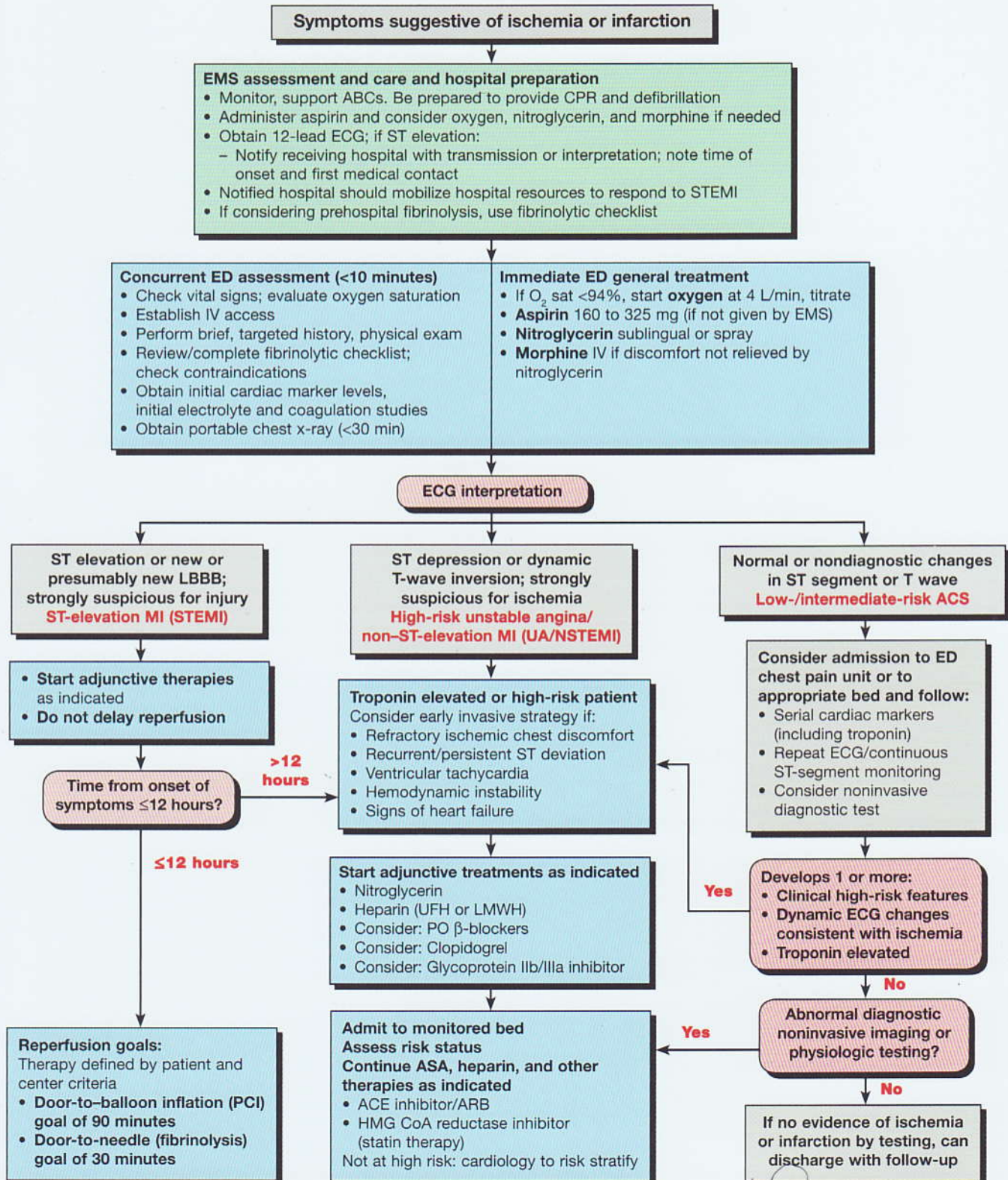
##### Sotalolol IV Dose:

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

# Acute Coronary Syndromes Algorithm



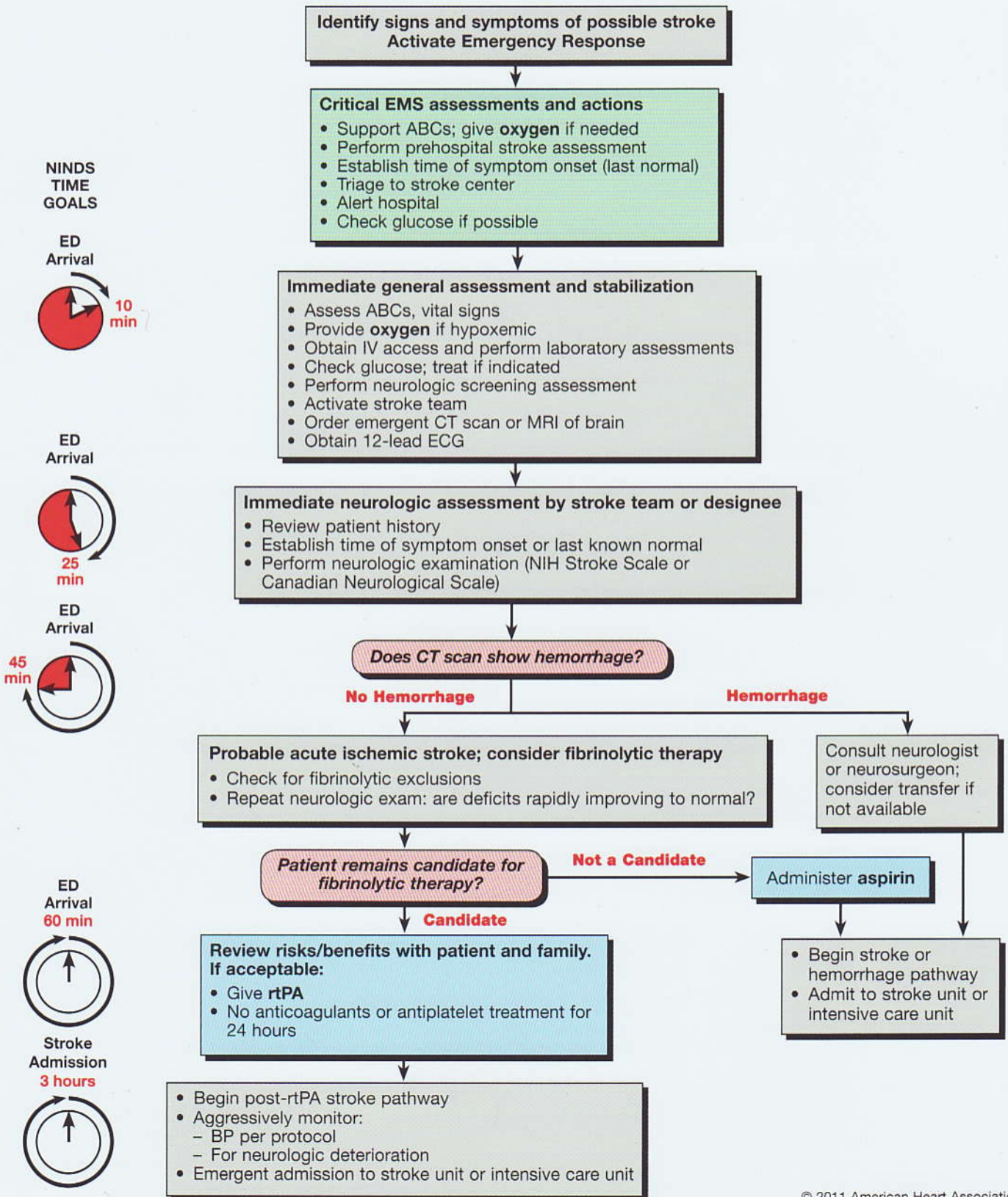
## Adult Advanced Cardiovascular Life Support



# Suspected Stroke Algorithm



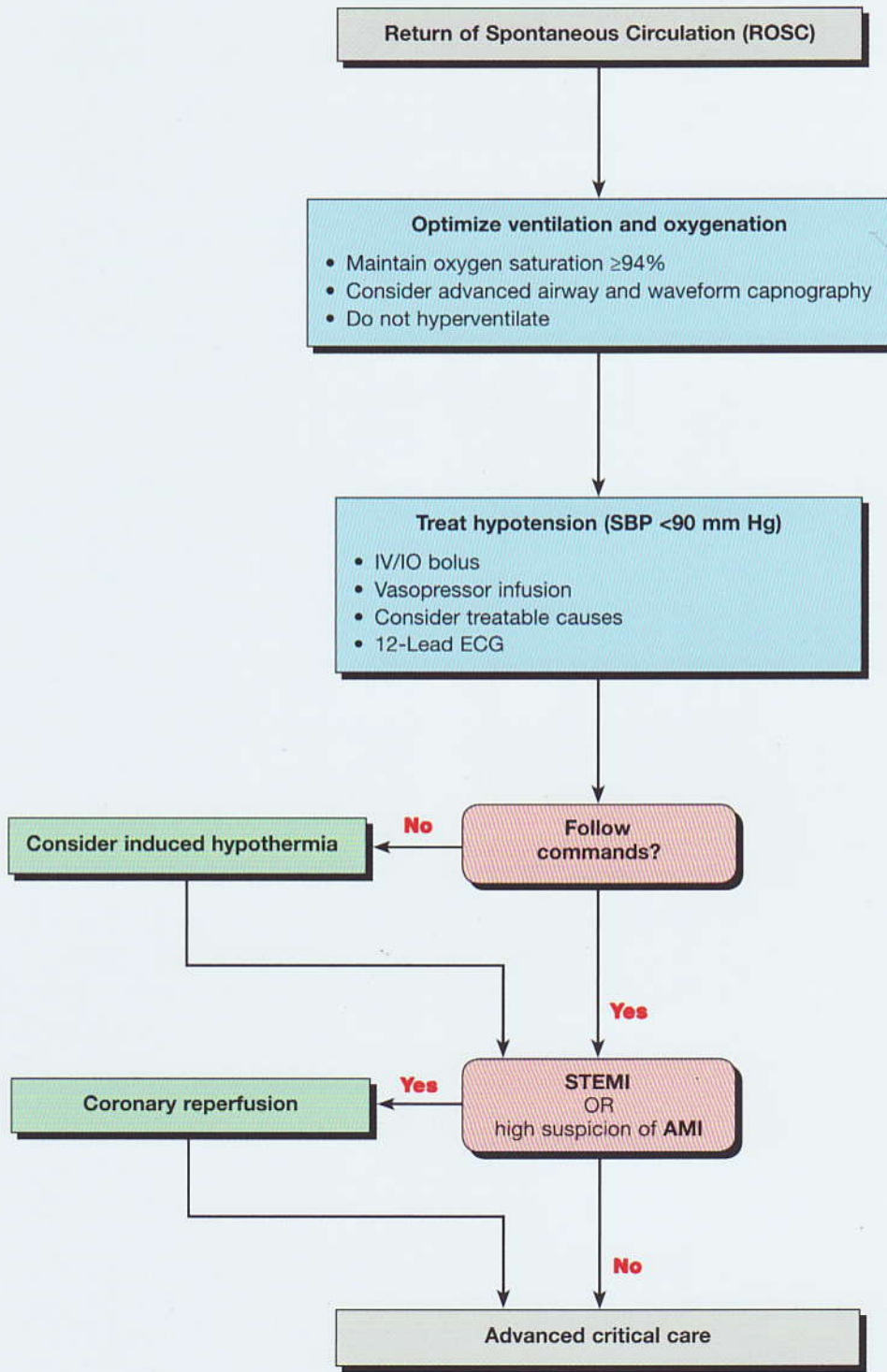
## Adult Advanced Cardiovascular Life Support



# Immediate Post-Cardiac Arrest Care Algorithm



## Adult Advanced Cardiovascular Life Support



**Doses/Details**

**Ventilation/Oxygenation**  
 Avoid excessive ventilation. Start at 10-12 breaths/min and titrate to target PETCO<sub>2</sub> of 35-40 mm Hg. When feasible, titrate FIO<sub>2</sub> to minimum necessary to achieve Spo<sub>2</sub> ≥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)

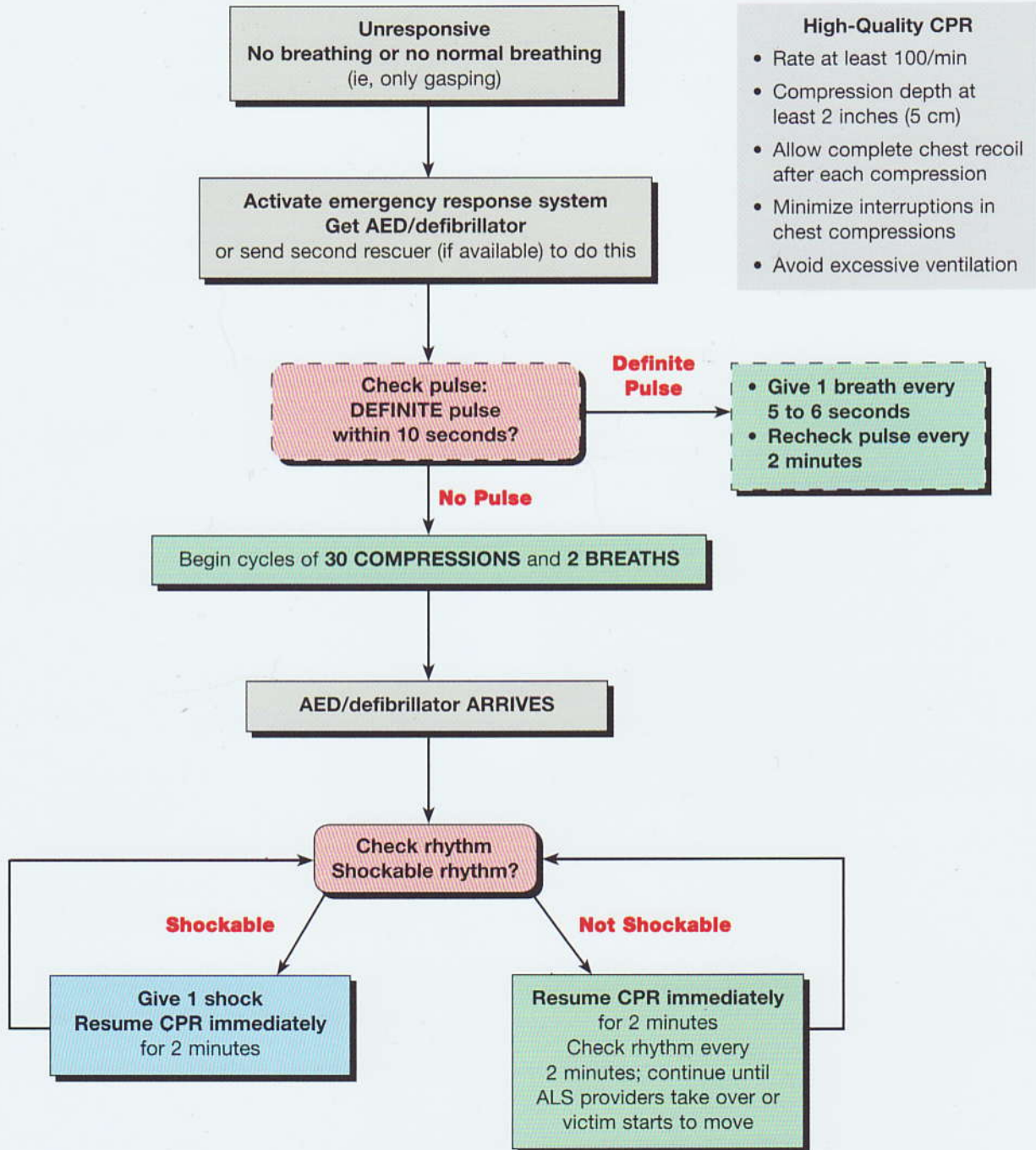
**Reversible Causes**

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

# BLS Healthcare Provider Algorithm



## Adult Advanced Cardiovascular Life Support



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