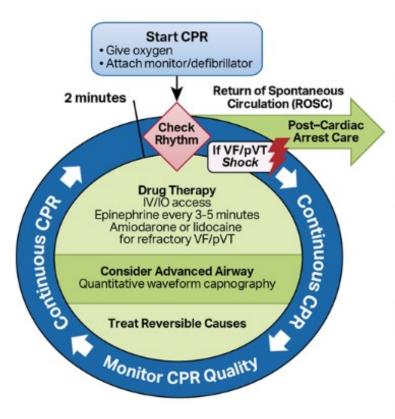


High-quality CPR improves a victim's chances of survival. The critical characteristics of high-quality CPR include the following:

- Start compressions within 10 seconds after recognizing cardiac arrest.
- Push hard and push fast: Compress at a rate of 100 to 120/min with a depth of
  - At least 2 inches (5 cm) for adults
  - At least one third the depth of the chest, approximately 2 inches (5 cm), for children
  - At least one third the depth of the chest, approximately 1½ inches (4 cm), for infants
- · Allow complete chest recoil after each compression.
- Minimize interruptions in compressions (try to limit interruptions to less than 10 seconds).
- Give effective breaths that make the chest rise.
- Avoid excessive ventilation.

	Summary of High-Quanty Cr	PR Components for BLS Provid	
Component	Adults and Adolescents	Children	Infants
		(Age 1 Year to Puberty)	(Age Less Than 1 Year)
Scene safety	Make sure the environment is safe for rescuers and victim		
Recognition of cardiac arrest	Check for responsiveness		
	No breathing or only gasping (ie, no normal	breathing)	
	No definite pulse felt within 10 seconds		
	(Breathing and pulse check can be performed simultaneously in less than 10 seconds)		
Activation of emergency response system	If you are alone with no mobile phone,		
	leave the victim to activate the emergency	Witnessed collapse	
	response system and get the AED before	Follow steps for adults and adolescents on the left	
	beginning CPR		
	OR	Unwitnessed collapse	
	Send someone and begin CPR	Give 2 minutes of CPR	
	immediately; use the AED as soon as it's	Leave the victim, activate the emergency response system, get the AED (if available),	
	available	return to the child or infant and resume CPR; use the AED if needed	
Compression-ventilation ratio	1 or 2 rescuers	1 rescuer 2 or more re	escuers
	30 to 2	30 to 2 15 to 2	
Compression rate	100-120/min		
Compression-ventilation ratio with	Continuous compressions at a rate of 100-120/min		
advanced airway	Give 1 breath every 6 seconds (10 breaths/min); Effective breaths produce adequate chest rise		
Compression depth	At least 2 inches (5 cm)*	At least one-third AP diameter of chest	At least one-third AP diameter of chest
	*no more than 2.4 inches (6 cm)	About 2 inches (5 cm)	About 1.5 inches (4 cm)
Hand placement	2 hands on the lower half of the breastbone (sternum)	2 hands or 1 hand (optional for a very small child) on the lower half of the breastbone (sternum)	1 rescuer
			2 fingers in the center of the chest, just
			below the nipple line
			2 or more rescuers
			2 thumbs encircling hands in the center
			of the chest, just below the nipple line
Chest recoil	Allow full recoil of chest after each compression to allow the heart to adequately refill between compressions		
Minimizing interruptions	Limit interruptions in chest compressions to less than 10 seconds		
AED	Turn it on 1st; Follow AED prompts; Actions required for submerged victim and hairy chested victim		
Rapid defibrillation	Eliminates abnormal heart rhythm; Restores a regular cardiac rhythm		
Team dynamics	Knowing one's limitations; Clear role & responsibilities; Constructive feedback		
Foreign Body Airway Obstruction	Conscious - Heimlich maneuver		Conscious - 5 Back slaps & 5 chest thrusts
	Unconscious - CPR modified to look for obs	tructed object when you open the airway	Unconscious - CPR modified
0 la la	tions: AED - automated external defibrillato	AD AD AND ADD ADD ADD ADD ADD ADD ADD AD	

### **Adult Cardiac Arrest**



### **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.
- 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)

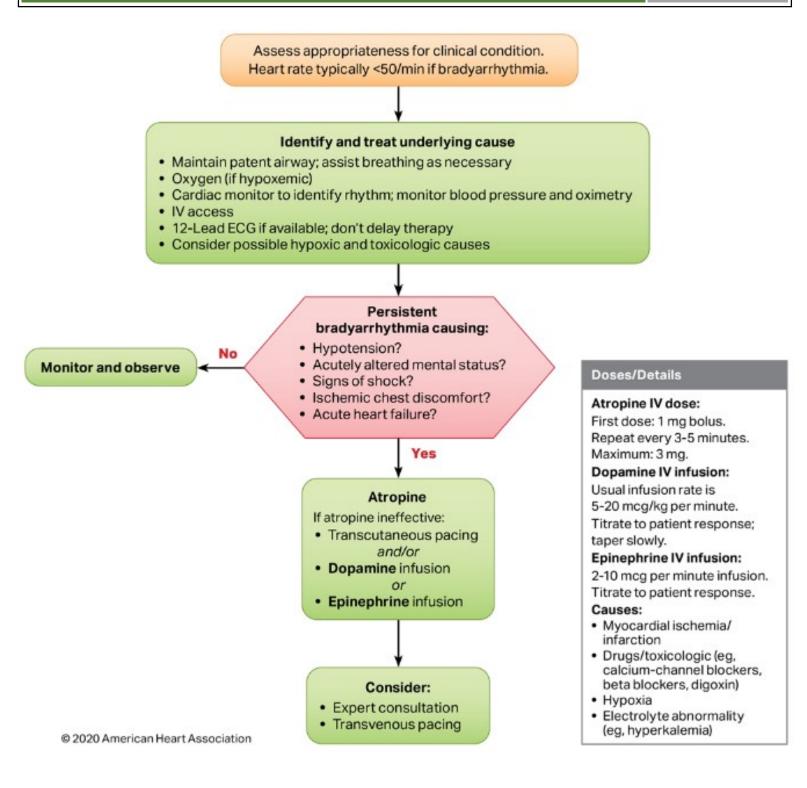
- Pulse and blood pressure
- Abrupt sustained increase in PETCO₂ (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

#### Reversible Causes

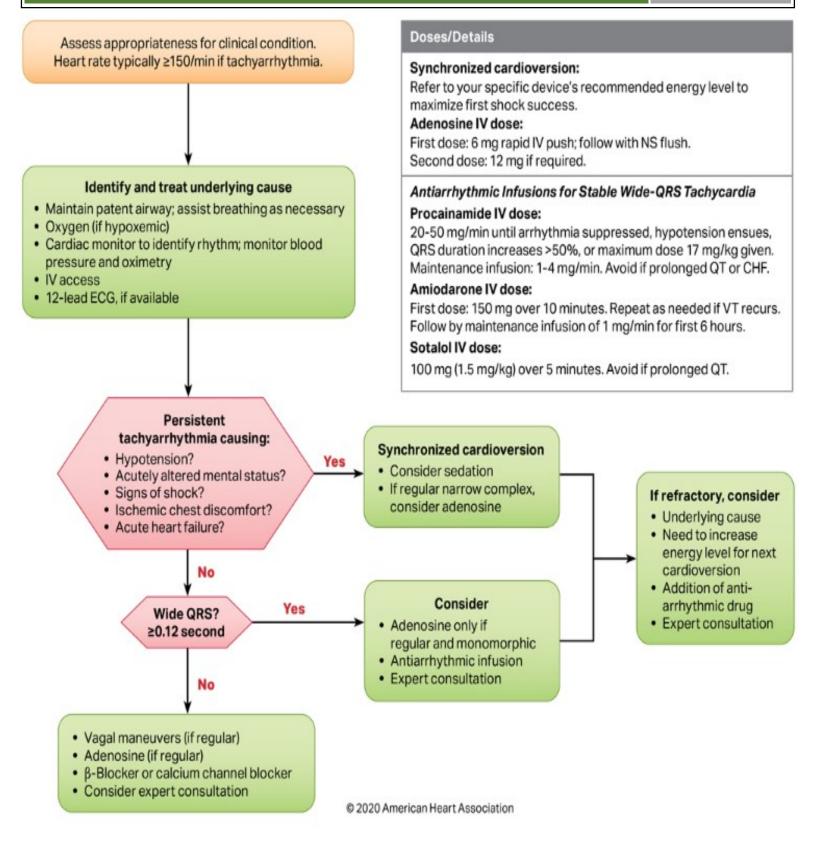
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia

- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- · Thrombosis, pulmonary
- · Thrombosis, coronary

## Bradycardia



# Tachycardia



### **Acute Coronary Syndromes**

#### Symptoms suggestive of ischemia or infarction EMS assessment and care and hospital preparation · Assess ABCs. Be prepared to provide CPR and defibrillation Administer aspirin and consider oxygen, nitroglycerin, and morphine if needed · Obtain 12-lead ECG; if ST elevation: Notify receiving hospital with transmission or interpretation; note time of onset and first medical contact Provide prehospital notification; on arrival, transport to ED/cath lab per protocol Notified hospital should mobilize resources to respond to STEMI If considering prehospital fibrinolysis, use fibrinolytic checklist Concurrent ED/cath lab assessment Immediate ED/cath lab general treatment (<10 minutes) If O<sub>2</sub> sat <90%, start oxygen at 4 L/min, titrate</li> Activate STEMI team upon EMS notification Aspirin 162 to 325 mg (if not given by EMS) Nitroglycerin sublingual or translingual Assess ABCs; give oxygen if needed · Establish IV access Morphine IV if discomfort not relieved by · Perform brief, targeted history, physical exam nitroglycerin · Review/complete fibrinolytic checklist; Consider administration of P2Y inhibitors check contraindications Obtain initial cardiac marker levels, complete blood counts, and coagulation studies Obtain portable chest x-ray (<30 minutes);</li> do not delay transport to the cath lab ECG interpretation ST elevation or new or Non-ST-elevation ACS (NSTE-ACS) presumably new LBBB; Determine risk using validated strongly suspicious for injury score (ie, TIMI or GRACE) ST-elevation MI (STEMI) ST depression or dynamic T-wave Normal ECG or nondiagnostic inversion, transient ST elevation; changes in ST segment or T wave; Start adjunctive therapies strongly suspicious for ischemia low-risk score as indicated and/or high-risk score Low-/intermediate-risk NSTE-ACS Do not delay reperfusion High-risk NSTE-ACS >12 hours Troponin elevated or high-risk patient Consider admission to Time from onset of Consider early invasive strategy if: ED chest pain unit or to symptoms ≤12 hours? appropriate bed for · Refractory ischemic chest discomfort further monitoring and Recurrent/persistent ST deviation possible intervention Ventricular tachycardia ≤12 hours Hemodynamic instability Signs of heart failure Reperfusion goals: Start adjunctive therapies Therapy defined by patient and (eg, nitroglycerin, heparin) as indicated center criteria See AHA/ACC NSTE-ACS Guidelines FMC-to-balloon inflation (PCI) goal of ≤90 minutes Door-to-needle (fibrinolysis) goal of 30 minutes © 2020 American Heart Association

### Identify signs and symptoms of possible stroke Activate emergency response

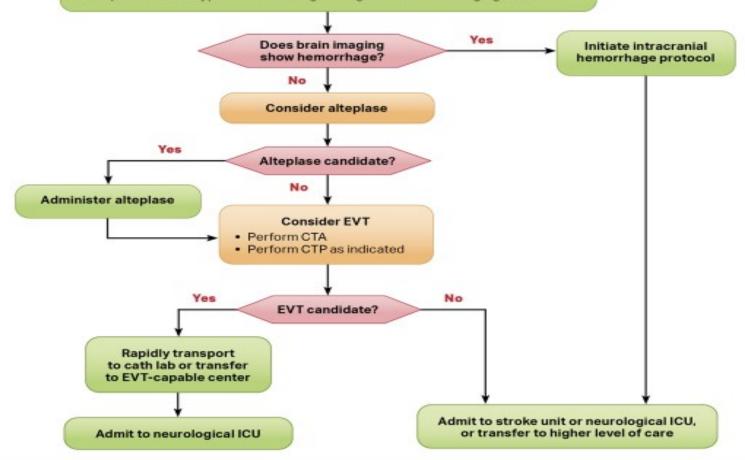
#### Critical EMS assessments and actions

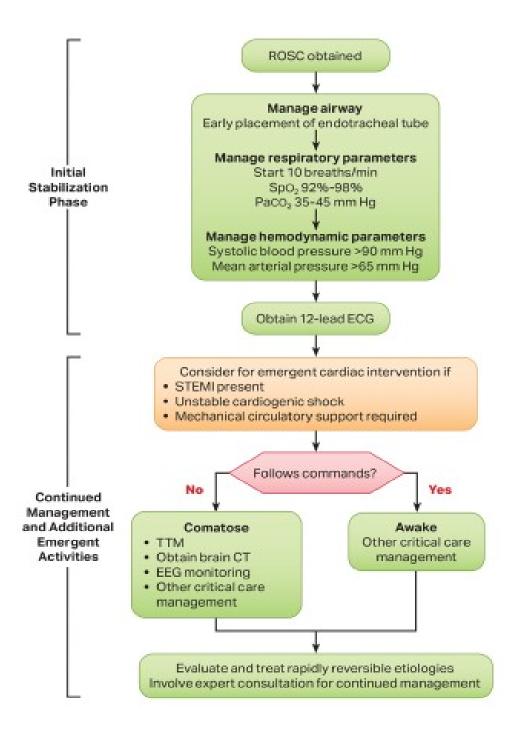
- · Assess ABCs; give oxygen if needed
- · Initiate stroke protocol
- · Perform physical exam
- Perform validated prehospital stroke screen and stroke severity tool
- Establish time of symptom onset (last known normal)
- · Triage to most appropriate stroke center
- · Check glucose; treat if indicated
- · Provide prehospital notification; on arrival, transport to brain imaging suite

Note: Refer to the expanded EMS stroke algorithm.

### ED or brain imaging suite\* Immediate general and neurologic assessment by hospital or stroke team

- Activate stroke team upon EMS notification
- . Prepare for emergent CT scan or MRI of brain upon arrival
- · Stroke team meets EMS on arrival
- · Assess ABCs; give oxygen if needed
- . Obtain IV access and perform laboratory assessments
- · Check glucose; treat if indicated
- · Review patient history, medications, and procedures
- · Establish time of symptom onset or last known normal
- Perform physical exam and neurologic examination, including NIH Stroke Scale or Canadian Neurological Scale
- \*Best practice is to bypass the ED and go straight to the brain imaging suite.





### 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 FiO<sub>2</sub> for SpO<sub>2</sub> 92%-98%; start at 10 breaths/min; titrate to PaCO<sub>2</sub> 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

**H**ypothermia

Tension pneumothorax

Tamponade, cardiac

Toxins.

Thrombosis, pulmonary

Thrombosis, coronary