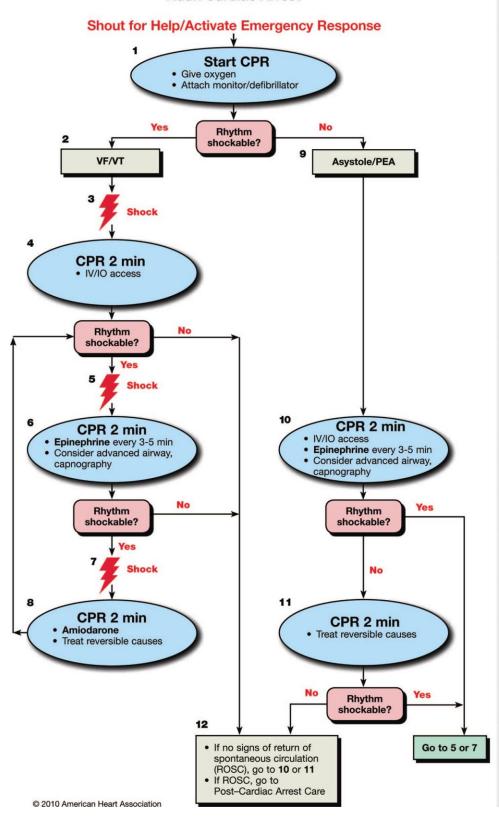
#### **Adult Cardiac Arrest**



#### **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 compressionventilation ratio
- Quantitative waveform capnography
  - If PETCO<sub>2</sub> <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, (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.

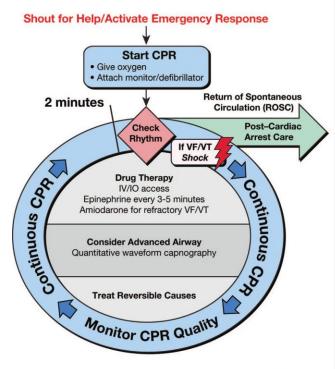
#### **Advanced Airway**

- 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
- Нурохіа
- Hydrogen ion (acidosis) Hypo-/hyperkalemia
- **H**ypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

### **Adult Cardiac Arrest**



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- · Avoid excessive ventilation
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#### Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in Petco₂ (typically ≥40 mm Hg)
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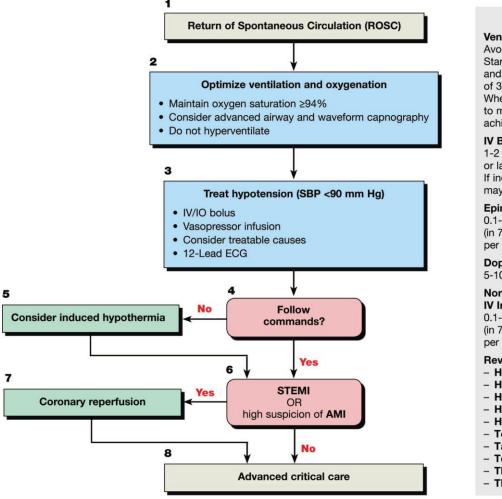
#### **Reversible Causes**

- **H**ypovolemia
- Hypoxia

- Hypothermia

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

#### **Adult Immediate Post-Cardiac Arrest Care**



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#### **Doses/Details**

#### Ventilation/Oxygenation

Avoid excessive ventilation. Start at 10-12 breaths/min and titrate to target  $PETCO_2$  of 35-40 mm Hg. When feasible, titrate  $FIO_2$  to minimum necessary to achieve  $SpO_2 \ge 94\%$ .

#### **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:

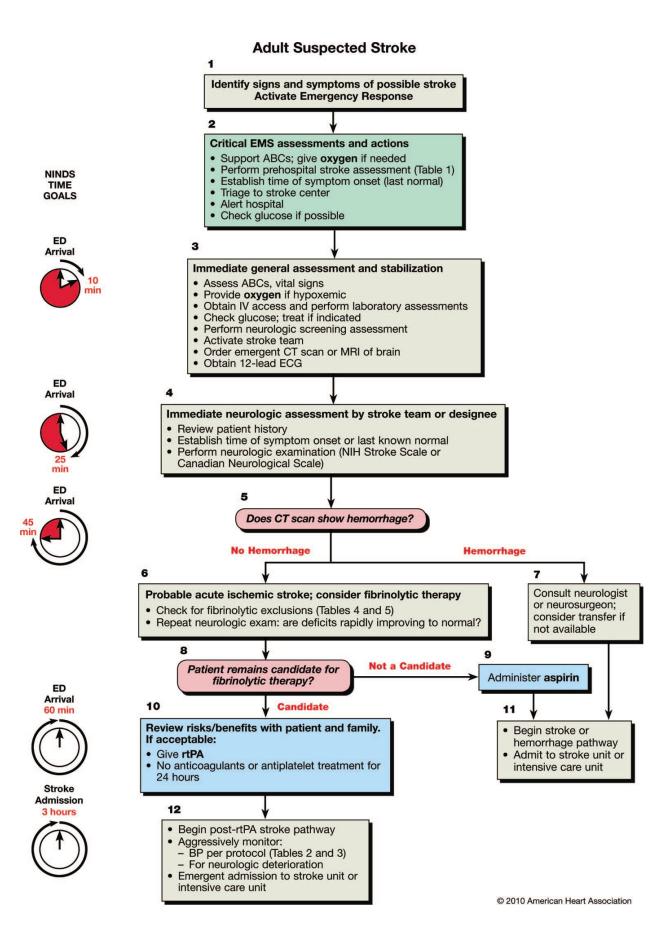
5-10 mcg/kg per minute

# Norepinephrine IV Infusion:

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

#### **Reversible Causes**

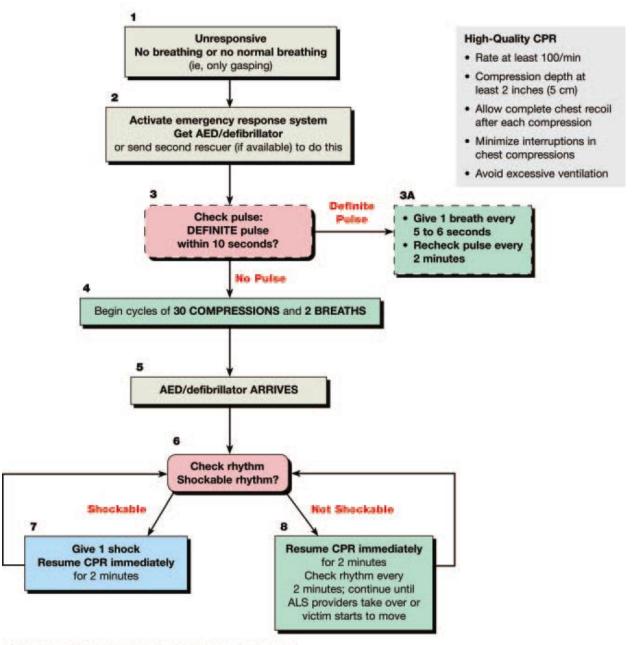
- **H**ypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary



#### Acute Coronary Syndromes Symptoms suggestive of ischemia or infarction 2 EMS assessment and care and hospital preparation: Monitor, support 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 · Notified hospital should mobilize hospital resources to respond to STEMI If considering prehospital fibrinolysis, use fibrinolytic checklist Concurrent ED assessment (<10 minutes) Immediate ED general treatment Check vital signs; evaluate oxygen saturation • If O<sub>2</sub> sat <94%, start **oxygen** at 4 L/min, titrate Establish IV access Aspirin 160 to 325 mg (if not given by EMS) · Perform brief, targeted history, physical exam Nitroglycerin sublingual or spray Review/complete fibrinolytic checklist (Figure 2); Morphine IV if discomfort not relieved by check contraindications (Table 5) nitroglycerin Obtain initial cardiac marker levels, initial electrolyte and coagulation studies Obtain portable chest x-ray (<30 minutes) **ECG** interpretation 5 9 13 ST elevation or new or ST depression or dynamic Normal or nondiagnostic changes T-wave inversion; strongly presumably new LBBB; in ST segment or T wave strongly suspicious for injury suspicious for ischemia Low-/intermediate-risk ACS ST-elevation MI (STEMI) High-risk unstable angina/ non-ST-elevation MI (UA/NSTEMI) 14 10 Consider admission Start adjunctive therapies to ED chest pain unit or as indicated (see text) Troponin elevated or high-risk patient to appropriate bed and (Tables 3, 4 for risk stratification). Do not delay reperfusion follow: Consider early invasive strategy if: · Serial cardiac markers · Refractory ischemic chest discomfort (including troponin) 7 Recurrent/persistent ST deviation Repeat ECG/continuous hours Ventricular tachycardia Time from onset of ST-segment monitoring Hemodynamic instability symptoms ≤12 hours? Consider noninvasive · Signs of heart failure diagnostic test 11 ≤12 hours Start adjunctive treatments as indicated (see text) Develops 1 or more: Nitroglycerin Clinical high-risk features Heparin (UFH or LMWH) **Dynamic ECG changes** Consider: PO β-blockers consistent with ischemia · Consider: Clopidogrel **Troponin elevated** · Consider: Glycoprotein Ilb/Illa inhibitor 8 12 16 No Reperfusion goals: Admit to monitored bed Abnormal diagnostic Yes Therapy defined by patient and Assess risk status (Tables 3, 4) noninvasive imaging or physiologic testing? center criteria (Table 1) Continue ASA, heparin, and other · Door-to-balloon inflation (PCI) therapies as indicated goal of 90 minutes ACE inhibitor/ARB No 17 Door-to-needle (fibrinolysis) · HMG CoA reductase inhibitor goal of 30 minutes (statin therapy) If no evidence of ischemia Not at high risk: cardiology to risk stratify or infarction by testing, can discharge with follow-up

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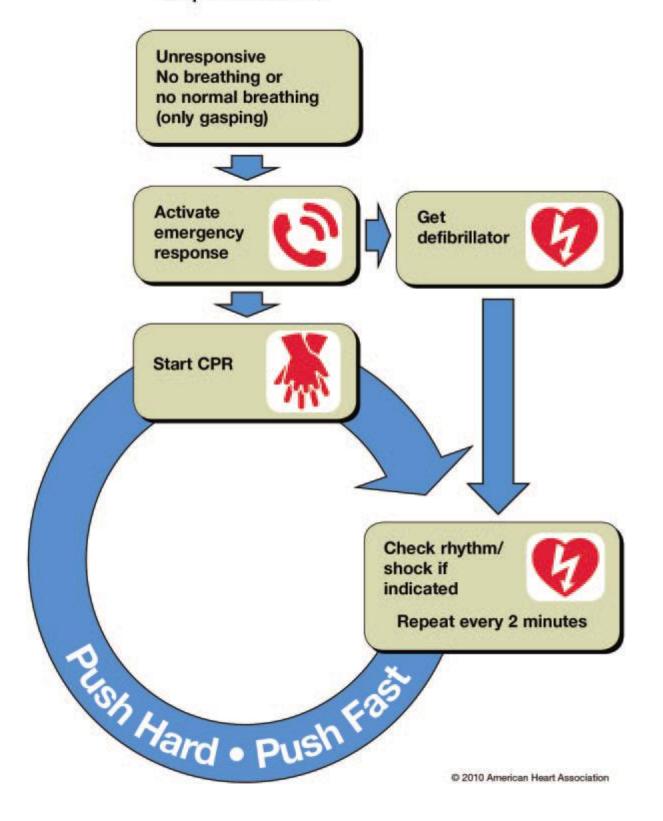
#### Adult BLS Healthcare Providers



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

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# Simplified Adult BLS



### Adult Tachycardia (With Pulse) Assess appropriateness for clinical condition. Heart rate typically ≥150/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 3 Persistent tachyarrhythmia causing: Synchronized cardioversion · Hypotension? Yes Consider sedation · Acutely altered mental status? If regular narrow complex, · Signs of shock? consider adenosine · Ischemic chest discomfort? Acute heart failure? No • IV access and 12-lead ECG 5 if available Yes

Wide QRS? ≥0.12 second

• IV access and 12-lead ECG if available

β-Blocker or calcium channel blocker

Consider expert consultation

Vagal maneuvers Adenosine (if regular)

No

Consider adenosine only if

regular and monomorphic

Consider expert consultation

Consider antiarrhythmic infusion

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1

2

#### 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:

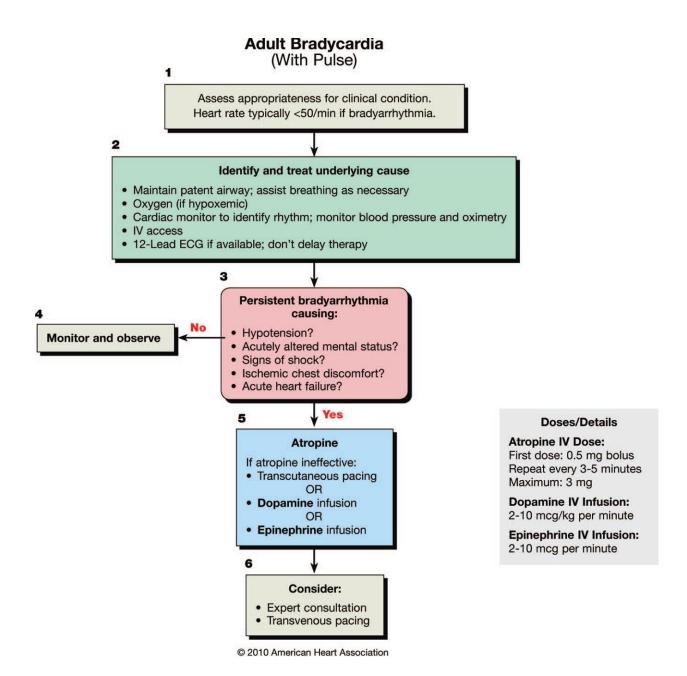
20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%, or maximum dose 17 mg/kg given. Maintenance infusion: 1-4 mg/min. Avoid if prolonged QT or CHF.

#### 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.



# **Prehospital Fibrinolytic Checklist**

Step 1	Has patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?  YES  NO  Does ECG show STEMI or new or presumably new LBBB?		
	YES	NO	<u>_</u>
Step 2	Are there contraindications to fibrinolysis?  If ANY one of the following is checked YES, fibrinolysis MAY be contraindicated.		
Systol	c BP >180 to 200 mm Hg or diastolic BP >100 to 110 mm Hg	O YES	O NO
Right v	s left arm systolic BP difference >15 mm Hg	○ YES	O NO
History	of structural central nervous system disease	O YES	O NO
Signifi	cant closed head/facial trauma within the previous 3 weeks	O YES	O NO
Stroke >3 hours or <3 months		O YES	O NO
Recent (within 2-4 weeks) major trauma, surgery (including laser eye surgery), GI/GU bleed		○ YES	○ NO
Any history of intracranial hemorrhage		YES	O NO
Bleeding, clotting problem, or blood thinners		O YES	O NO
Pregnant female		O YES	O NO
Serious systemic disease (eg, advanced cancer, severe liver or kidney disease)		○ YES	○ NO
Step 3	Is patient at high risk?  If ANY one of the following is checked YES, consider transfer	er to PCI facility.	
Heart rate ≥100/min AND systolic BP <100 mm Hg		○ YES	O NO
Pulmonary edema (rales)		O YES	O NO
Signs of shock (cool, clammy)		○ YES	O NO
Contra	indications to fibrinolytic therapy		O NO
Required CPR		<b>◯ YES</b>	O NO

<sup>†</sup>Consider transport to primary PCI facility as destination hospital.