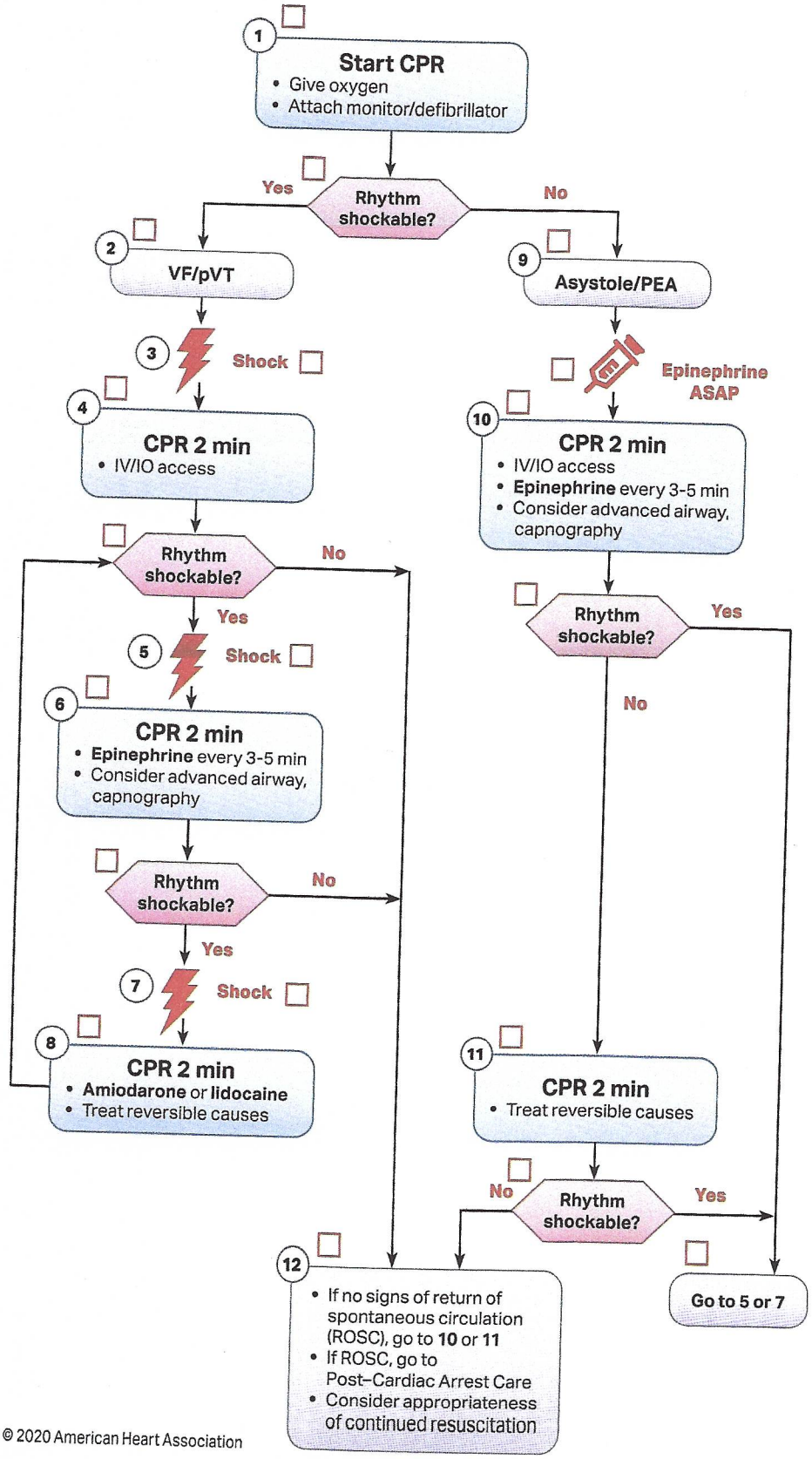
Adult Cardiac Arrest Learning Station Checklist (VF/pVT/Asystole/PEA)

Adult Cardiac Arrest Algorithm (VF/pVT/Asystole/PEA)



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 $PETCO_2$ 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.
  or
  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)

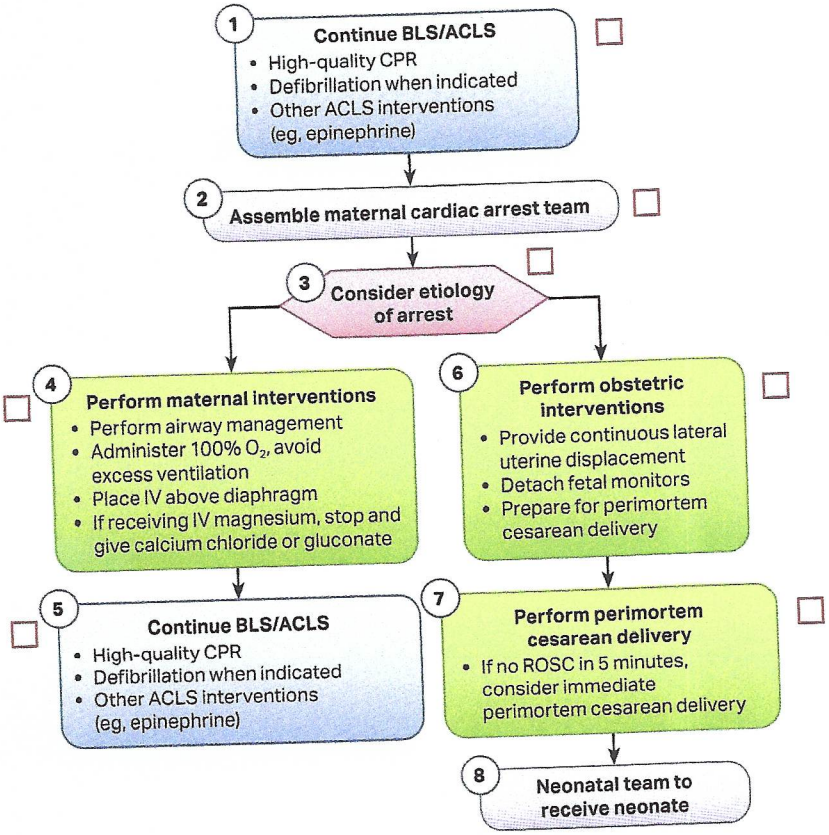
- Pulse and blood pressure
- Abrupt sustained increase in $PETCO_2$ (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **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

Cardiac Arrest in Pregnancy In-Hospital ACLS Learning Station Checklist

Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm



Maternal Cardiac Arrest

- Team planning should be done in collaboration with the obstetric, neonatal, emergency, anesthesiology, intensive care, and cardiac arrest services.
- Priorities for pregnant women in cardiac arrest should include provision of high-quality CPR and relief of aortocaval compression with lateral uterine displacement.
- The goal of perimortem cesarean delivery is to improve maternal and fetal outcomes.
- Ideally, perform perimortem cesarean delivery in 5 minutes, depending on provider resources and skill sets.

Advanced Airway

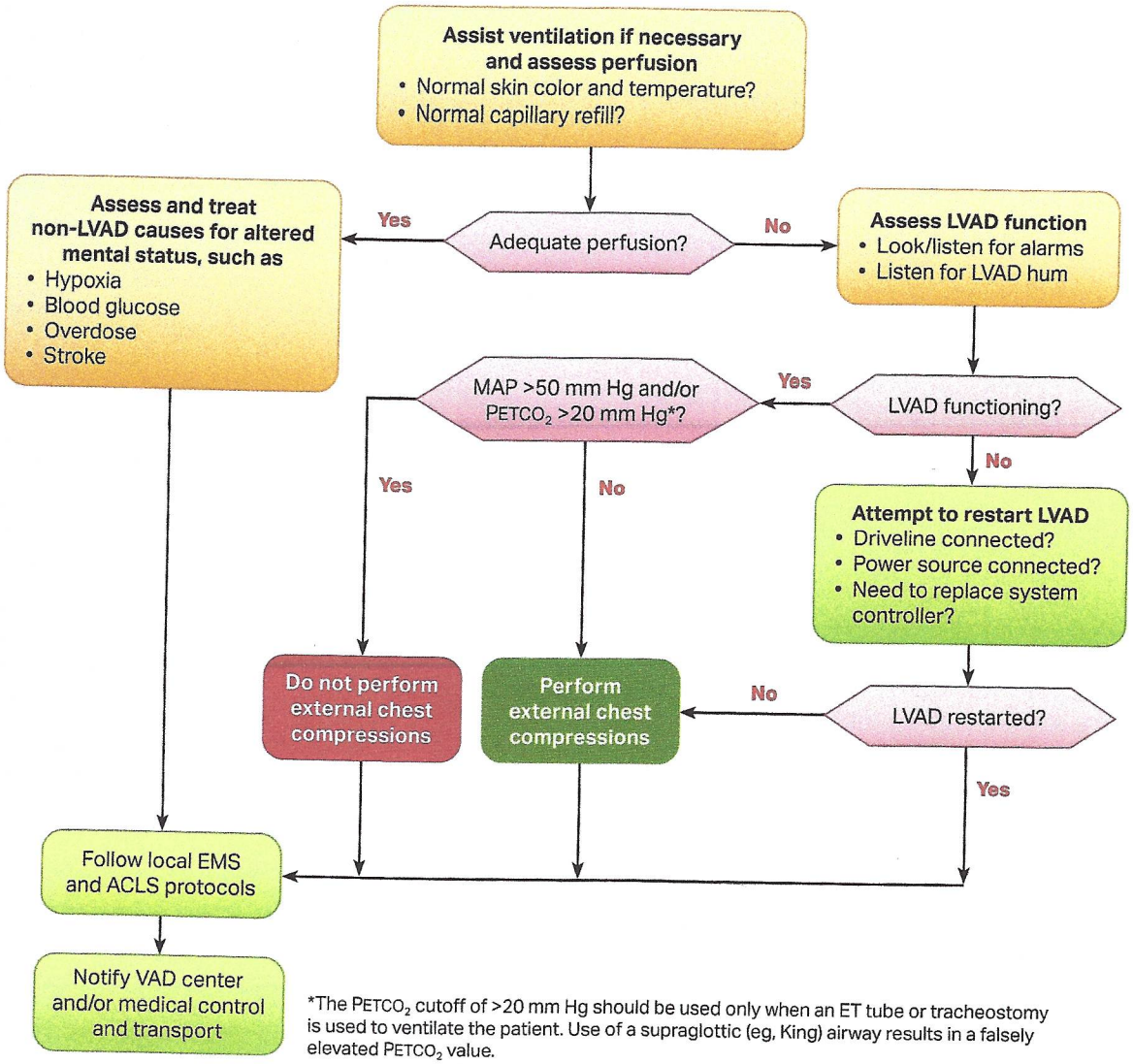
- In pregnancy, a difficult airway is common. Use the most experienced provider.
- Provide endotracheal intubation or supraglottic advanced airway.
- Perform waveform capnography or capnometry to confirm and monitor ET tube placement.
- Once advanced airway is in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.

Potential Etiology of Maternal Cardiac Arrest

A Anesthetic complications
B Bleeding
C Cardiovascular
D Drugs
E Embolic
F Fever
G General nonobstetric causes of cardiac arrest (H's and T's)
H Hypertension

Adult Ventricular Assist Device Learning Station Checklist

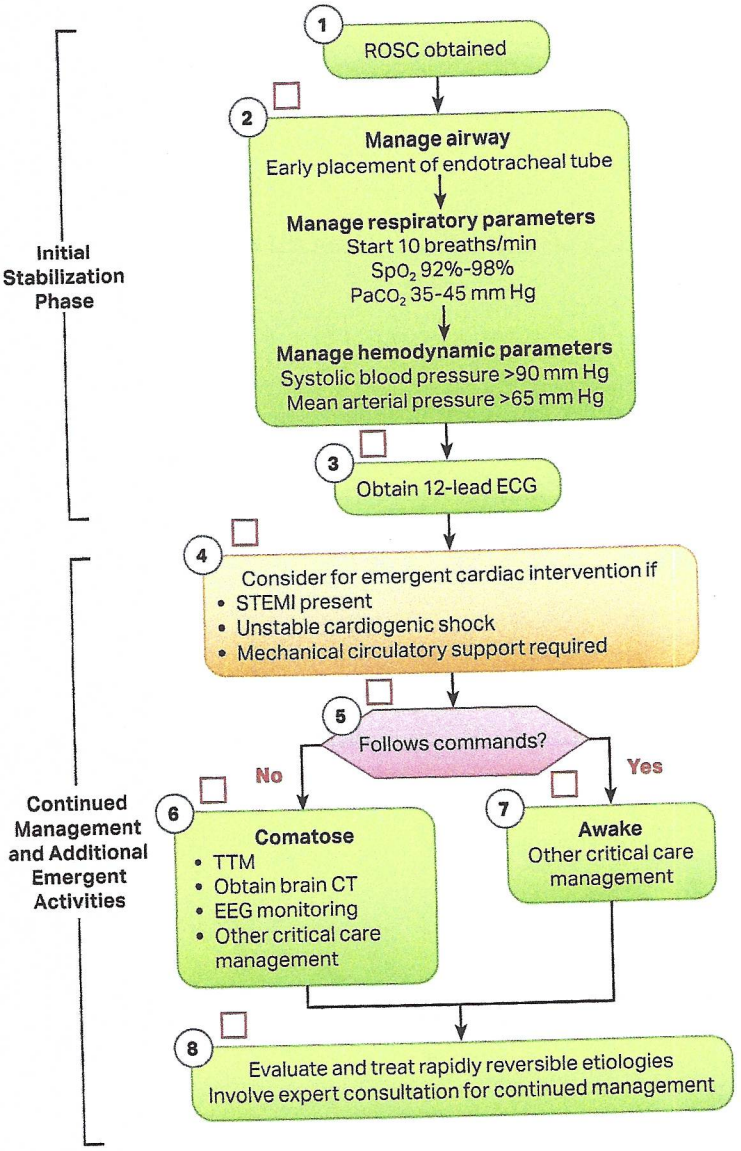
Adult Ventricular Assist Device Algorithm



*The $PETCO_2$ cutoff of >20 mm Hg should be used only when an ET tube or tracheostomy is used to ventilate the patient. Use of a supraglottic (eg, King) airway results in a falsely elevated $PETCO_2$ value.

Adult Post–Cardiac Arrest Care Learning Station Checklist

Adult Post–Cardiac Arrest Care Algorithm



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_2 for SpO_2 92%-98%; start at 10 breaths/min; titrate to $PaCO_2$ 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.

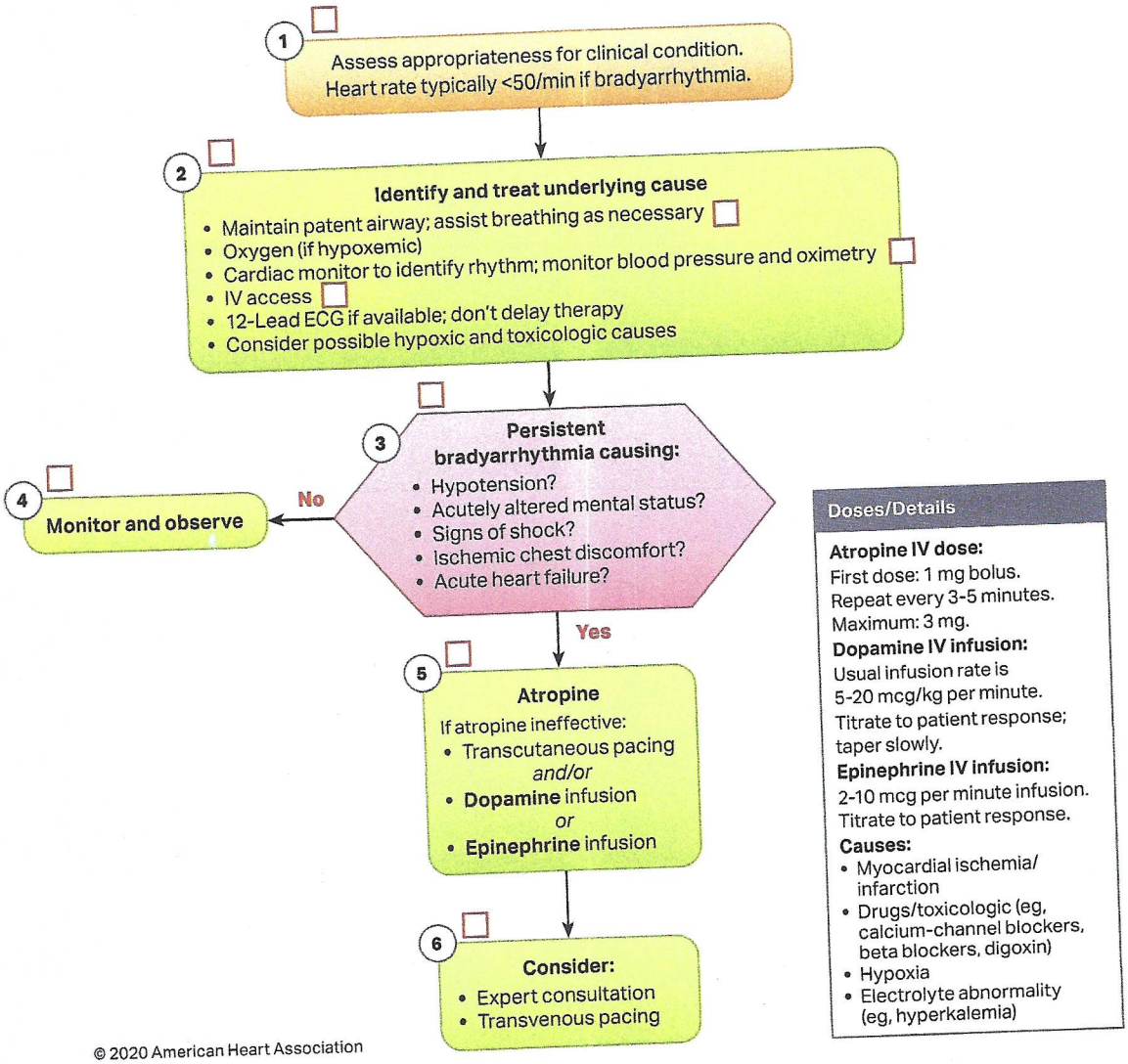
- Emergent cardiac intervention: Early evaluation of 12-lead electrocardiogram (ECG); consider hemodynamics for decision on cardiac intervention
- TTM: If patient is not following commands, start TTM as soon as possible; begin at 32-36°C for 24 hours by using a cooling device with feedback loop
- Other 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/**h**yperkalemia
Hypothermia
Tension pneumothorax
Tamponade, cardiac
Toxins
Thrombosis, pulmonary
Thrombosis, coronary

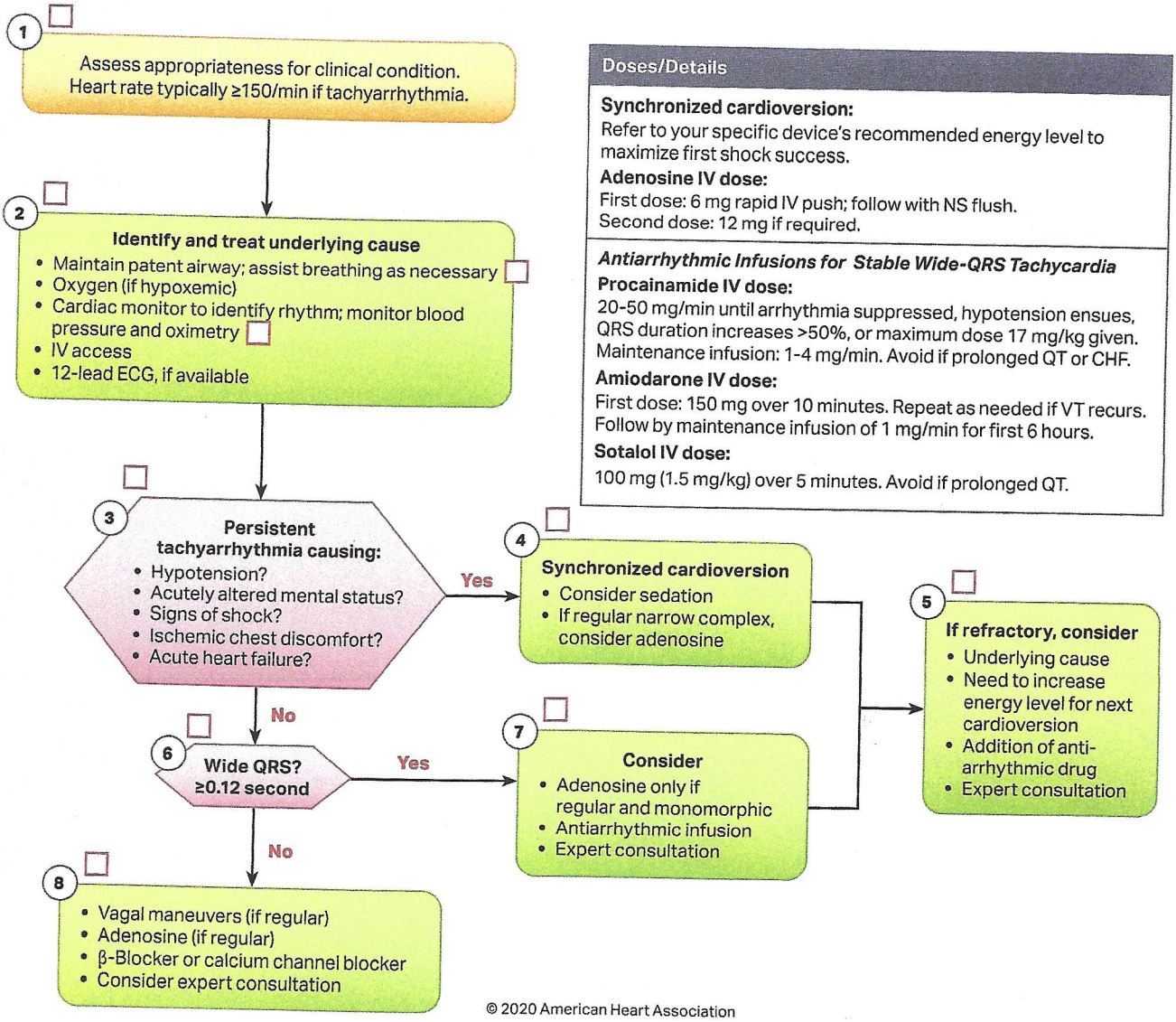
Adult Bradycardia Learning Station Checklist

Adult Bradycardia Algorithm



Adult Tachycardia With a Pulse Learning Station Checklist

Adult Tachycardia With a Pulse Algorithm



2020 Science Summary Table

This table compares 2015 with 2020, providing a quick reference to what has changed and what is new in the science of advanced cardiovascular life support.

Table. Topical Comparison of 2015 and 2020 ACLS Science

ACLS topic	2015	2020
Ventilation	• 1 breath every 5 to 6 seconds for respiratory arrest, with a bag-mask device • 1 breath every 6 seconds for ventilation with an advanced airway in place	• 1 breath every 6 seconds for respiratory arrest with or without an advanced airway and also for cardiac arrest with an advanced airway (use this rate with a bag-mask device if your local protocol is continuous compressions and asynchronous ventilations for cardiac arrest)
Bradycardia	• Atropine dose: 0.5 mg • Dopamine dosing: 2 to 20 mcg/kg per minute	• Atropine dose: 1 mg • Dopamine dosing: 5 to 20 mcg/kg per minute
Tachycardia	• Synchronized cardioversion initial recommended doses: – Narrow QRS complex, regular rhythm: 50 to 100 J – Narrow QRS complex, irregular rhythm: 120 to 200 J – Wide QRS complex, regular rhythm: 100 J • Wide QRS complex, irregular rhythm: defibrillation dose (not synchronized)	• Follow your specific device's recommended energy level to maximize the success of the first shock • Wide QRS complex, irregular rhythm: defibrillation dose (not synchronized)
Post–Cardiac Arrest Care	• Titrate oxygen saturation to 94% or higher	• Titrate oxygen saturation to 92% to 98%
Adult Chain of Survival	• 5 links for both chains (in-hospital cardiac arrest and out-of-hospital cardiac arrest)	• 6 links for both chains (in-hospital cardiac arrest and out-of-hospital cardiac arrest): added a Recovery link to the end of both chains
IV/IO Access	• IV access and IO access are equivalent	• IV preferred over IO access, unless IV fails (then OK to proceed to IO)
ACLS topic	**2020**	
Cardiac Arrest	• Epinephrine 1 mg every 3 to 5 minutes or every 4 minutes as a midrange (ie, every other 2-minute rhythm check) • Amiodarone and lidocaine are equivalent for treatment (ie, either may be used) • Added maternal cardiac arrest information and algorithms (in-hospital) • Added ventricular assist device information (left and right ventricular assist device) and algorithm • Added new prognostication diagram and information • Recommend using waveform capnography with a bag-mask device	
Stroke	• Revised stroke algorithm • New stroke triage algorithm for EMS destination • Focus on large vessel occlusion for all healthcare providers • Endovascular therapy: treatment window up to 24 hours (previously up to 6 hours) • Both alteplase and endovascular therapy can be given/performed if time criteria and inclusion criteria are met • Consider having EMS bypass the emergency department and go straight to the imaging suite (computed tomography [CT]/magnetic resonance imaging); initial assessment can be performed there to save time • Titrate oxygen saturation to >94%	

Figure 16. Acute Coronary Syndromes Algorithm.

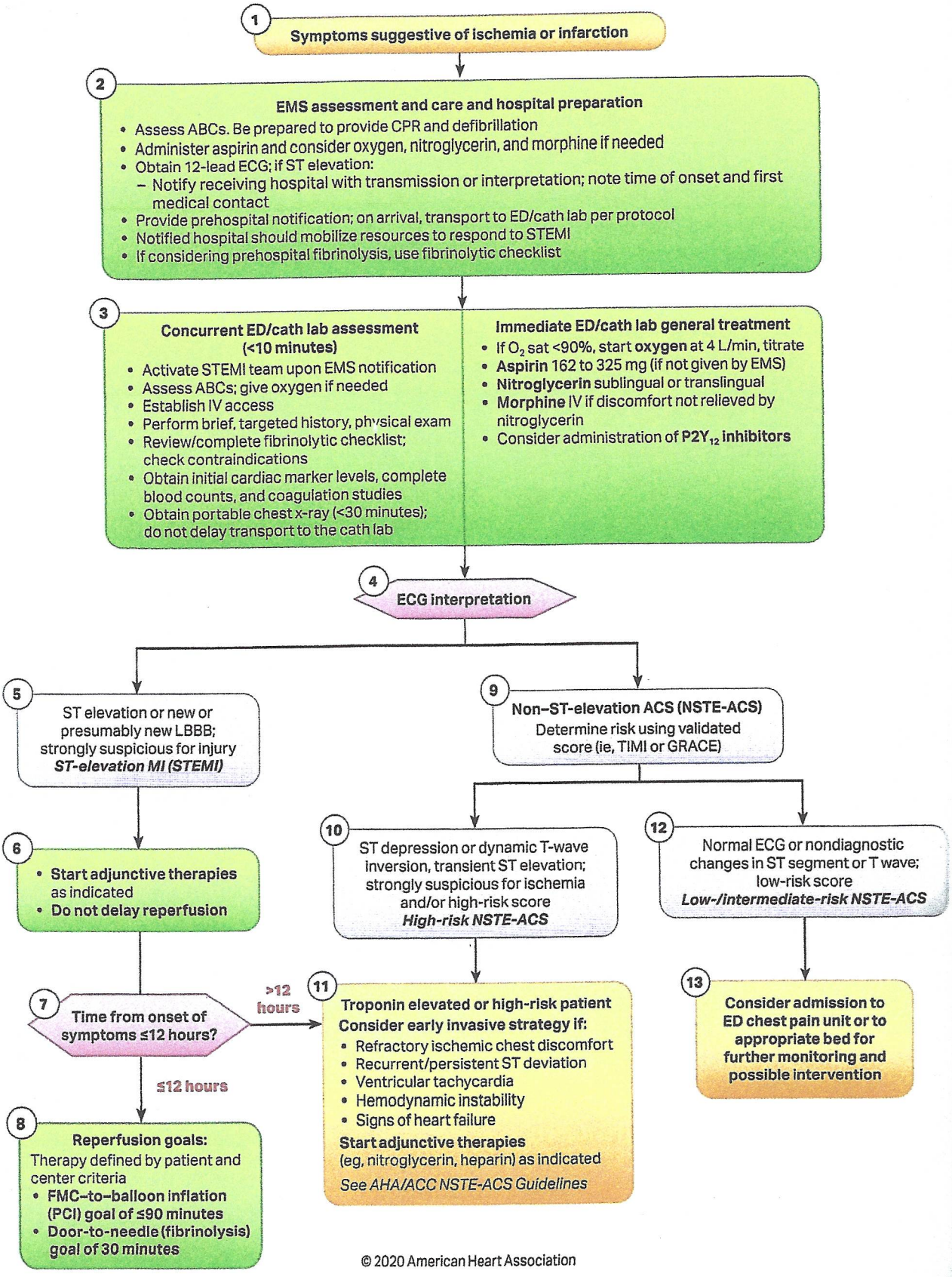


Figure 21. Adult Suspected Stroke Algorithm.

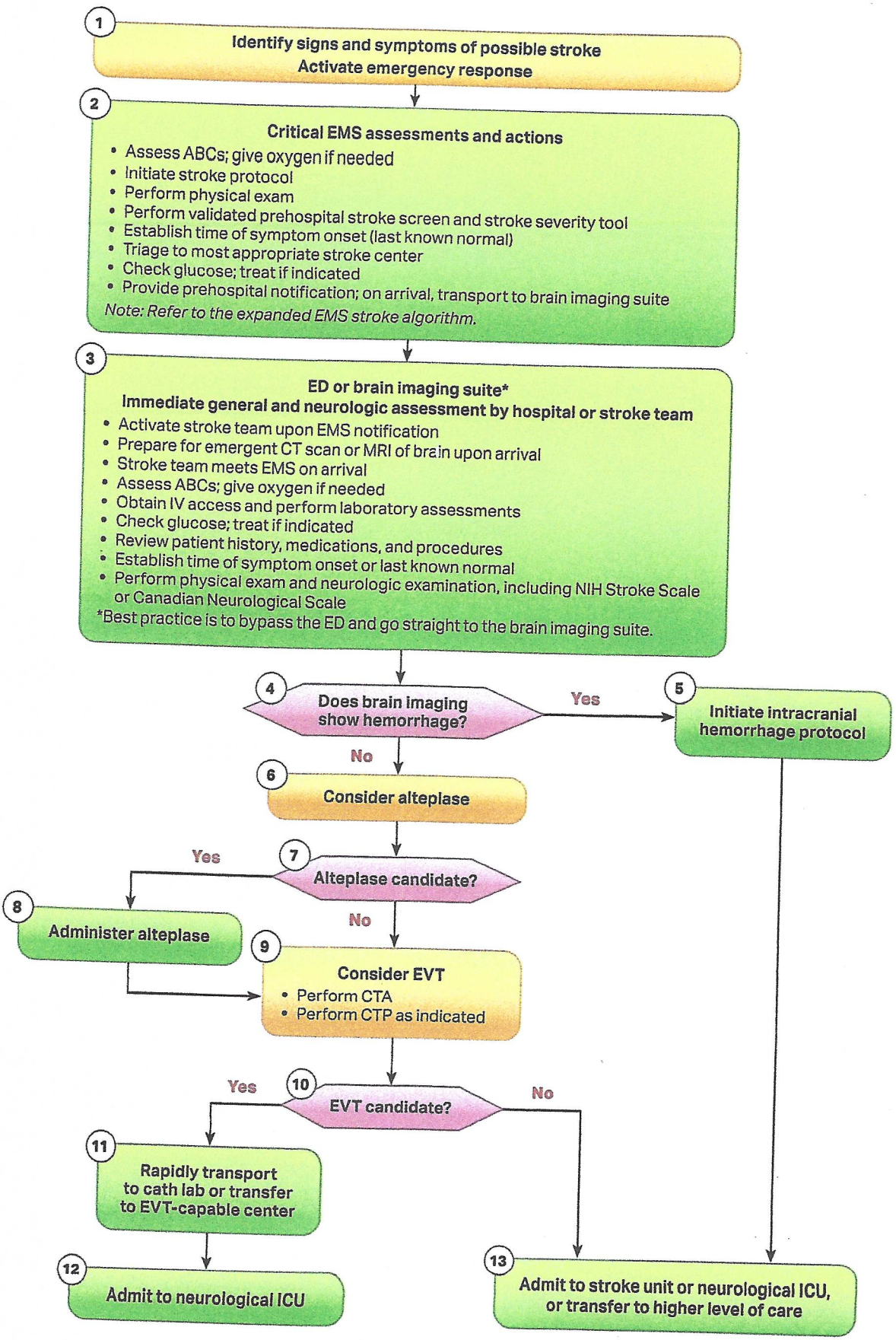


Figure 22. Emergency Medical Services Acute Stroke Routing Algorithm.