2020 American Heart Association Guidelines for CPR and ECC:

Pediatric Basic and Advanced Life Support

Just the Facts: Recap

High-quality CPR is the foundation of resuscitation.

- Make sure you have adequate compression rate and depth.
- Allow for full chest recoil.
- Minimize interruptions.

Give early epinephrine for patients in nonshockable rhythms.

- Early epinephrine in patients with nonshockable rhythms improves the likelihood of survival.

Use naloxone in opioid overdose.

- Naloxone will reverse only respiratory arrest due to opioid overdose.
- There is no evidence for use in cardiac arrest.

Airway Management

1. **Aim for a rate of 20 to 30 breaths per minute.**

   Why? New guidelines suggest that this is the ideal rate for all infants and children receiving CPR with advanced airway in place or rescue breathing.

2. **Do not underestimate bag-mask ventilation.**

   Why? For out-of-hospital cardiac arrest, bag-mask ventilation results in the same resuscitation outcomes as advanced airway interventions such as endotracheal intubation.

3. **Consider a cuffed endotracheal tube.**

   Why? A cuffed endotracheal tube decreases the need for endotracheal tube changes.

4. **Do not routinely use cricoid pressure.**

   Why? The routine use of cricoid pressure does not reduce the risk of regurgitation during bag-mask ventilation and may impede intubation success.

Post–Cardiac Arrest Care

Resuscitation does not end with ROSC.

For all, ensure prevention and treatment of

- Hypotension
- Hypercapnia and hypocapnia
- Hyperoxia and hypoxia

For children who do not regain consciousness, consider

- Targeted temperature management
- Continuous EEG monitoring
- Delaying prognosis decisions until at least 72 hours after return to normal temperature

After cardiac arrest, survivors can have physical, cognitive, and emotional challenges and may need ongoing therapies and interventions.

PALS SYSTEMATIC APPROACH

Appearance ?

Work of Breathing ?

Colour ?

	GCS
A.	15
V.	13
P.	8
U.	6

Find it ?
Fix it !

Primary Assessment: (30 sec)

Unconscious?	Conscious?
C. Circulation	A. Airway
A. Airway	B. Breathing
B. Breathing	C. Circulation
D. Disability	D. Disability
E. Expose	E. Expose

Secondary Assessment:

S. Signs/symptoms ?
A. Allergies ?
M. Medications ?
P. Past Med Hx ?
L. Last Meal Eaten ?
E. Events ?

Managing Respiratory Emergencies Flowchart

- Airway Positioning
- Suctioning as needed

- Oxygen
- Pulse Oximetry

- ECG monitoring
- BLS as indicated

Upper Airway Obstruction
Specific management for selected conditions

Croup

- Nebulized epinephrine
- Corticosteriods

Anaphylaxis

- IM epinephrine
- Salbutamol
- Antihistamines
- Corticosteriods

Aspiration of foreign body

- Always position for comfort
- Specialty consultation

Lower Airway Obstruction
Specific management for selected conditions

Bronchiolitis

- Nasal suctioning
- Consider brochodilator

Asthma

- Salbutamol +- ipratropium
- Corticosteriods
- Magnesium Sulphate
- IM epinephrine (If severe)

Lung tissue disease
Specific management for selected conditions

Pneumonia/pneumonitis
Infectious, chemical, aspiration

- Salbutamol
- Antibiotics (as indicated)
- Consider noninvasive or invasive ventilatory support with PEEP

Pulmonary edema
Cardiogenic or noncardigenic (ARDS)

- Consider noninvasive or invasive ventilatory support with PEEP
- Consider Vasoactive support
- Consider diuretic

Disordered control of breathing
Specific management for selected conditions

Increased ICP

- Avoid Hypoxemia
- Avoid hypercarbia
- Avoid hyperthermia
- Avoide hypertension

Poisoning

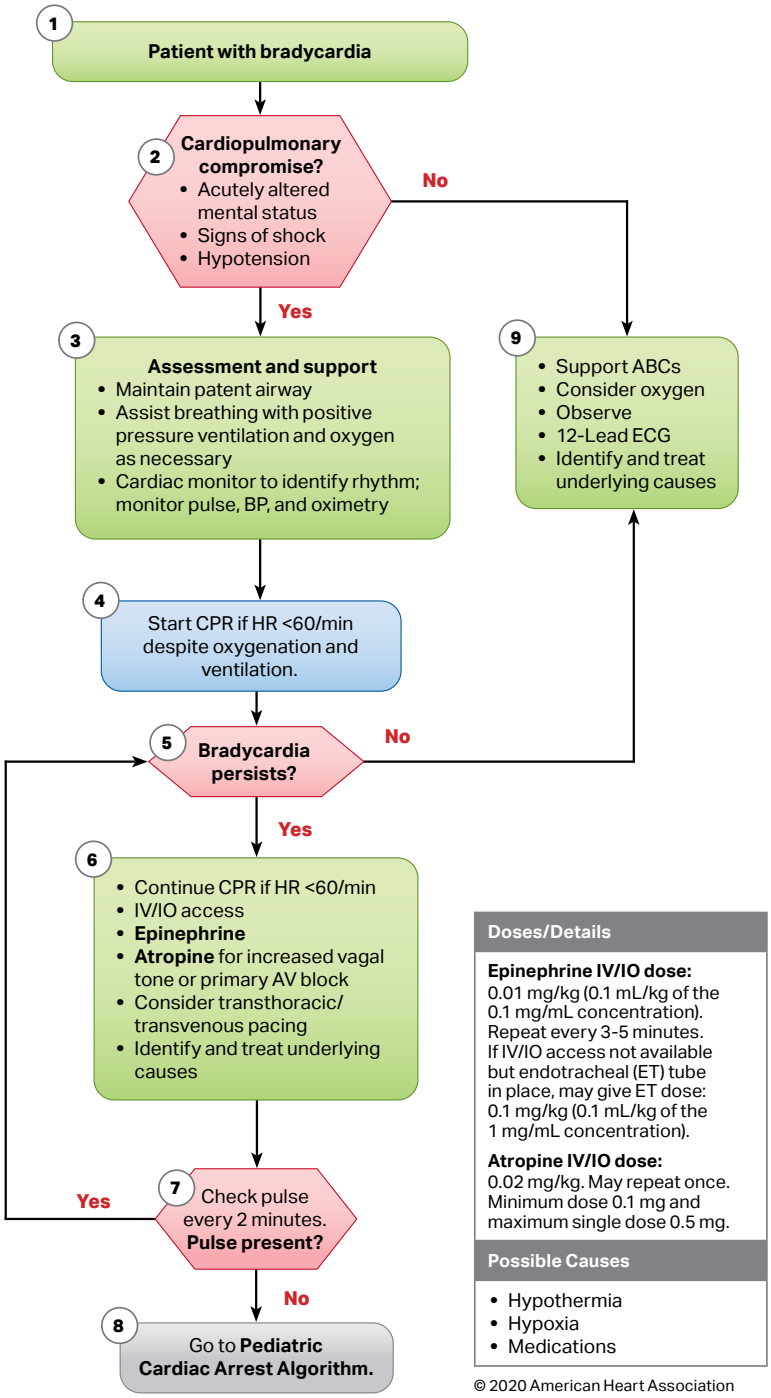
- Antidote (if available)
- Contact poison control

Neuromuscular disease

- Consider noninvasive or invasive Ventilatory support

Heart & Stroke™

Pediatric Bradycardia With a Pulse Algorithm.



Doses/Details

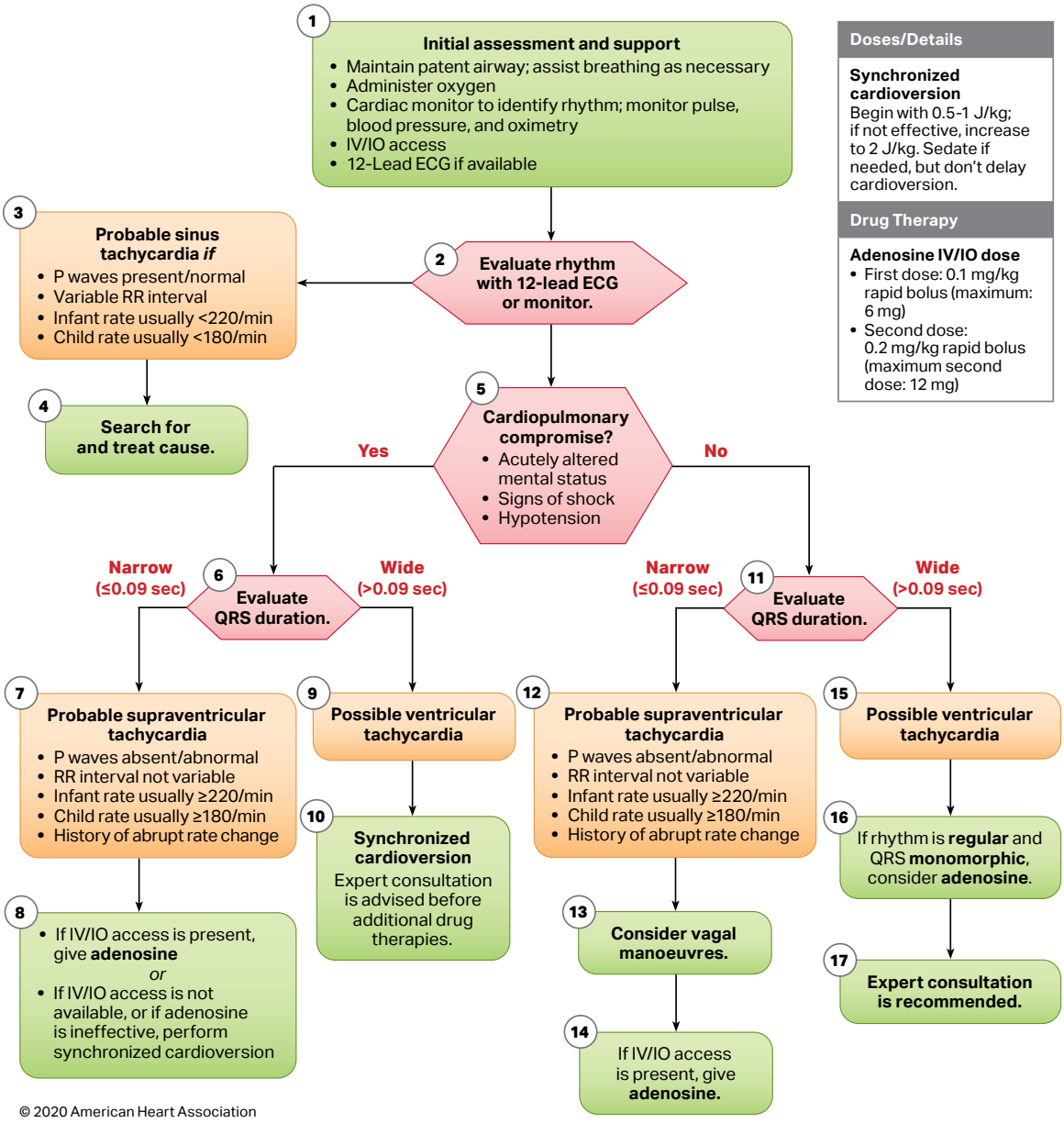
Epinephrine IV/IO dose:
0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Repeat every 3-5 minutes. If IV/IO access not available but endotracheal (ET) tube in place, may give ET dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).

Atropine IV/IO dose:
0.02 mg/kg. May repeat once. Minimum dose 0.1 mg and maximum single dose 0.5 mg.

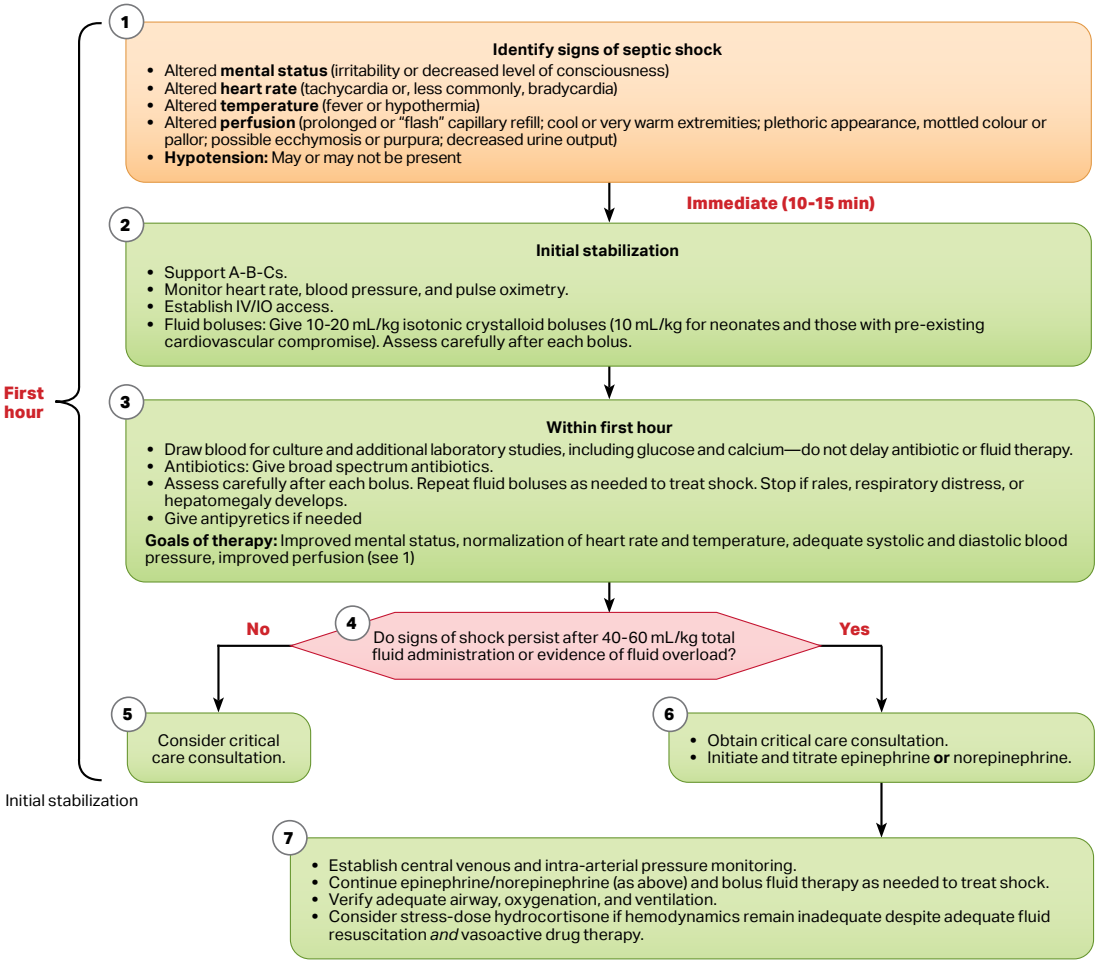
Possible Causes

- Hypothermia
- Hypoxia
- Medications

Pediatric Tachycardia With a Pulse Algorithm.

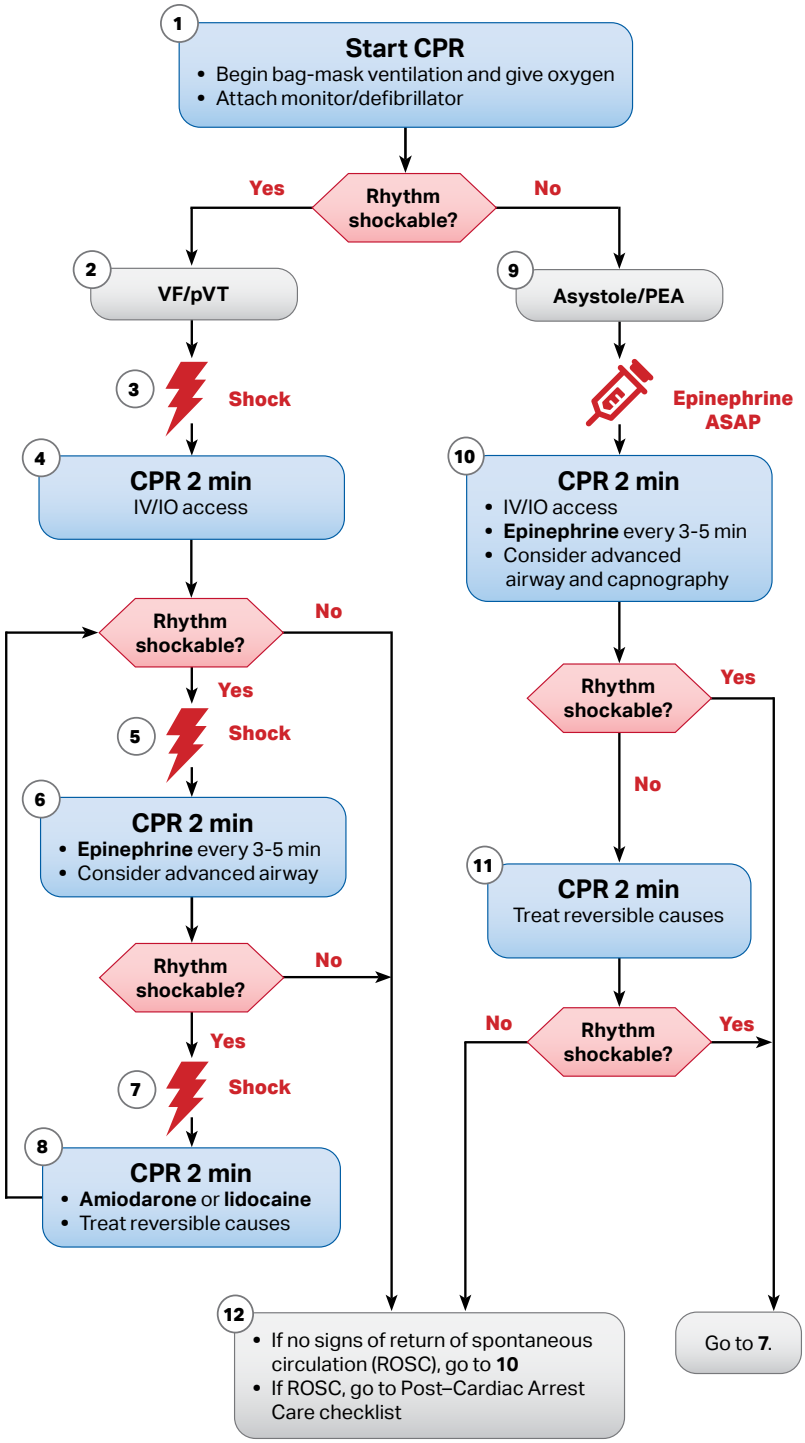


Pediatric Septic Shock Algorithm



Brierley J, Carcillo JA, Choong K, et al. Clinical practice parameters for hemodynamic support of pediatric and neonatal septic shock: 2007 update from the American College of Critical Care Medicine. *Crit Care Med.* 2009;37(2):666-688. Kissoon N, Orr RA, Carcillo JA. Updated American College of Critical Care Medicine—pediatric advanced life support guidelines for management of pediatric and neonatal septic shock: relevance to the emergency care clinician. *Pediatr Emerg Care.* 2010;26(11):867-869.

Pediatric Cardiac Arrest Algorithm



CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

Shock Energy for Defibrillation

- First shock 2 J/kg
- Second shock 4 J/kg
- Subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

Drug Therapy

- **Epinephrine IV/IO dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT
  or
  Lidocaine IV/IO dose: Initial: 1 mg/kg loading dose

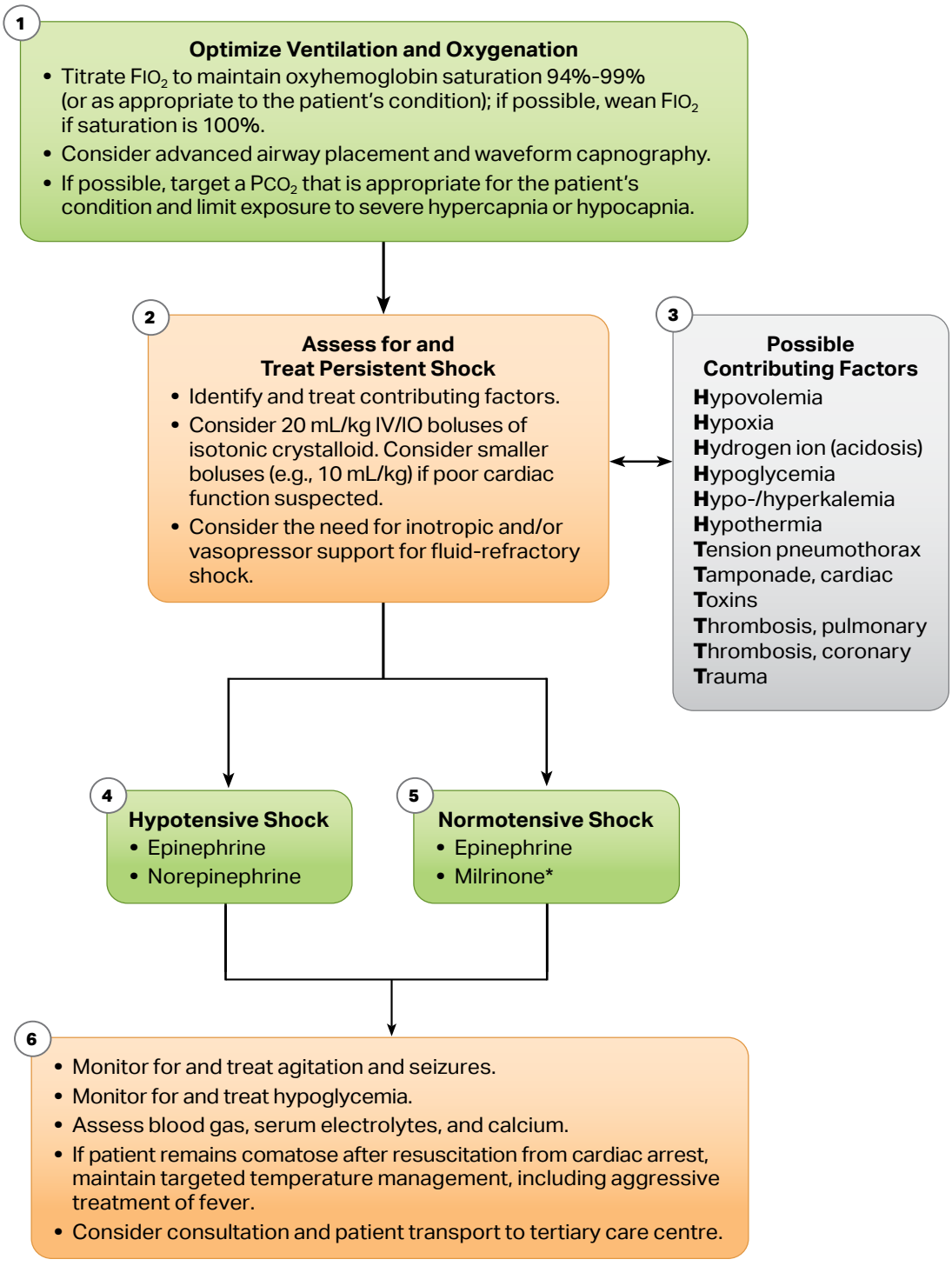
Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypoglycemia
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

PALS Management of Shock After ROSC Algorithm.



*Milrinone can cause hypotension, so use and initiation of it should generally be reserved for those experienced with its use, initiation, and side effects (e.g., ICU personnel).

Components of Post–Cardiac Arrest Care	Check
Oxygenation and ventilation	
Measure oxygenation and target normoxemia 94%-99% (or child's normal/appropriate oxygen saturation).	☐
Measure and target $Paco_2$ appropriate to the patient's underlying condition and limit exposure to severe hypercapnia or hypocapnia.	☐
Hemodynamic monitoring	
Set specific hemodynamic goals during post–cardiac arrest care and review daily.	☐
Monitor with cardiac telemetry.	☐
Monitor arterial blood pressure.	☐
Monitor serum lactate, urine output, and central venous oxygen saturation to help guide therapies.	☐
Use parenteral fluid bolus with or without inotropes or vasopressors to maintain a systolic blood pressure greater than the fifth percentile for age and sex.	☐
Targeted temperature management (TTM)	
Measure and continuously monitor core temperature.	☐
Prevent and treat fever immediately after arrest and during rewarming.	☐
If patient is comatose apply TTM (32˚C-34˚C) followed by (36˚C-37.5˚C) or only TTM (36˚C-37.5˚C).	☐
Prevent shivering.	☐
Monitor blood pressure and treat hypotension during rewarming.	☐
Neuromonitoring	
If patient has encephalopathy and resources are available, monitor with continuous electroencephalogram.	☐
Treat seizures.	☐
Consider early brain imaging to diagnose treatable causes of cardiac arrest.	☐
Electrolytes and glucose	
Measure blood glucose and avoid hypoglycemia.	☐
Maintain electrolytes within normal ranges to avoid possible life-threatening arrhythmias.	☐
Sedation	
Treat with sedatives and anxiolytics.	☐
Prognosis	
Always consider multiple modalities (clinical and other) over any single predictive factor.	☐
Remember that assessments may be modified by TTM or induced hypothermia.	☐
Consider electroencephalogram in conjunction with other factors within the first 7 days after cardiac arrest.	☐
Consider neuroimaging such as magnetic resonance imaging during the first 7 days.	☐