Components of Post–Cardiac Arrest Care

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Pediatric Advanced Life Support

Oxygenation and ventilation	Check
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.	☐

Pediatric Cardiac Arrest Algorithm

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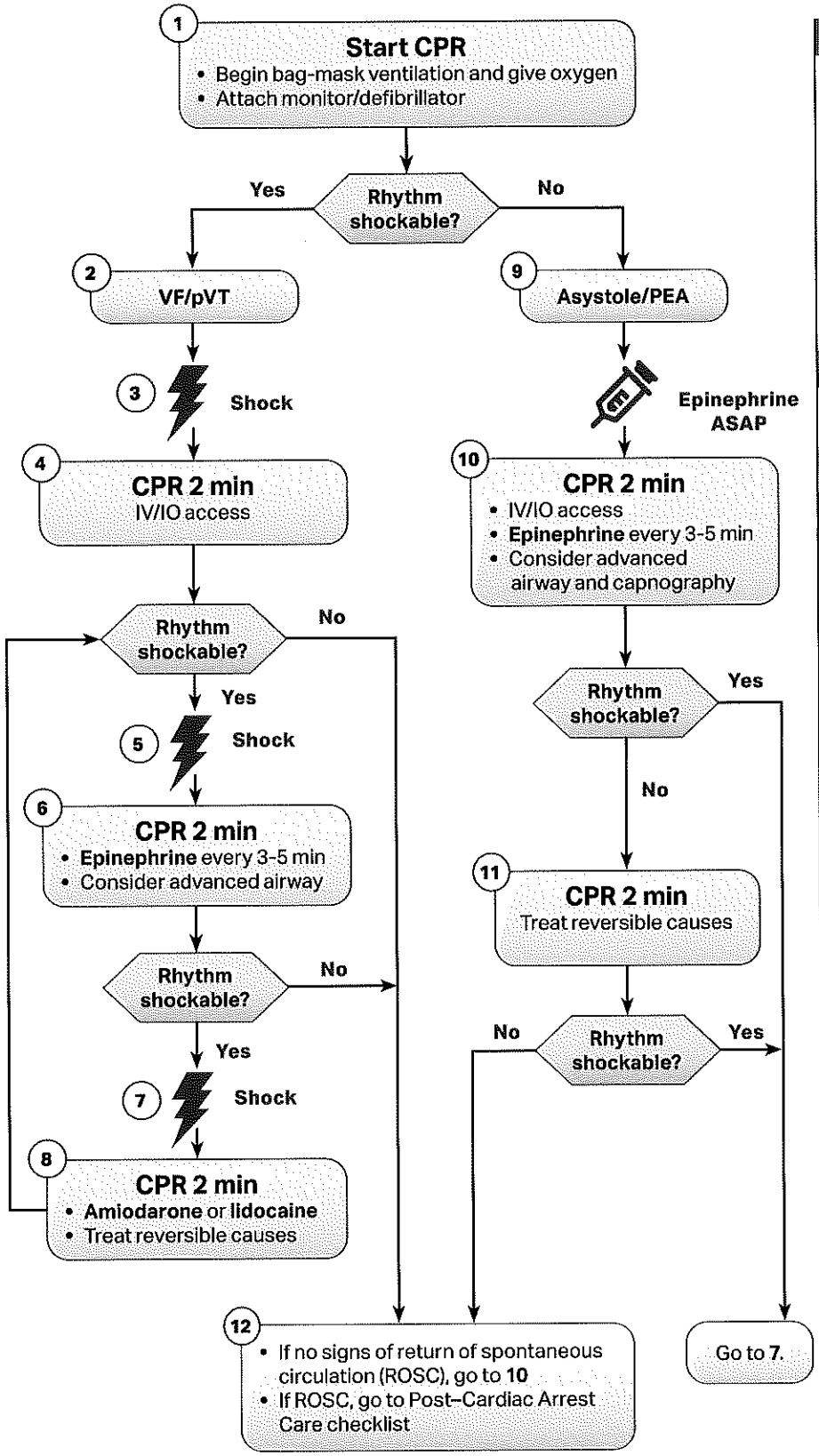
Pediatric Advanced Life Support



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

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Management of Shock After ROSC Algorithm

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Pediatric Advanced Life Support

Optimize Ventilation and Oxygenation

- Titrate FIO_2 to maintain oxyhemoglobin saturation 94%-99% (or as appropriate to the patient's condition); if possible, wean FIO_2 if saturation is 100%.
- Consider advanced airway placement and waveform capnography.
- If possible, target a PCO_2 that is appropriate for the patient's condition and limit exposure to severe hypercapnia or hypocapnia.

Assess for and Treat Persistent Shock

- Identify and treat contributing factors.
- Consider 20 mL/kg IV/IO boluses of isotonic crystalloid. Consider smaller boluses (eg, 10 mL/kg) if poor cardiac function suspected.
- Consider the need for inotropic and/or vasopressor support for fluid-refractory shock.

Possible Contributing Factors

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

Hypotensive Shock

- Epinephrine
- Norepinephrine

Normotensive Shock

- Epinephrine
- Milrinone*

- Monitor for and treat agitation and seizures.
- Monitor for and treat hypoglycemia.
- Assess blood gas, serum electrolytes, and calcium.
- If patient remains comatose after resuscitation from cardiac arrest, maintain targeted temperature management, including aggressive treatment of fever.
- Consider consultation and patient transport to tertiary care center.

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

Estimation of Maintenance Fluid Requirements

- **Infants <10 kg:** 4 mL/kg per hour

  Example: For an 8-kg infant, estimated maintenance fluid rate
  = 4 mL/kg per hour × 8 kg
  = 32 mL per hour

- **Children 10-20 kg:** 4 mL/kg per hour for the first 10 kg + 2 mL/kg per hour for each kg above 10 kg

  Example: For a 15-kg child, estimated maintenance fluid rate
  = (4 mL/kg per hour × 10 kg)
  + (2 mL/kg per hour × 5 kg)
  = 40 mL/hour + 10 mL/hour
  = 50 mL/hour

- **Children >20 kg:** 4 mL/kg per hour for the first 10 kg + 2 mL/kg per hour for 11-20 kg + 1 mL/kg per hour for each kg above 20 kg.

  Example: For a 28-kg child, estimated maintenance fluid rate
  = (4 mL/kg per hour × 10 kg)
  + (2 mL/kg per hour × 10 kg)
  + (1 mL/kg per hour × 8 kg)
  = 40 mL per hour + 20 mL per hour
  + 8 mL per hour
  = 68 mL per hour

After initial stabilization, adjust the rate and composition of intravenous fluids based on the patient's clinical condition and state of hydration. In general, provide a continuous infusion of a dextrose-containing solution for infants. Avoid hypotonic solutions in critically ill children; for most patients use isotonic fluid such as normal saline (0.9% NaCl) or lactated Ringer's solution with or without dextrose, based on the child's clinical status.

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Pediatric Tachycardia With a Pulse Algorithm

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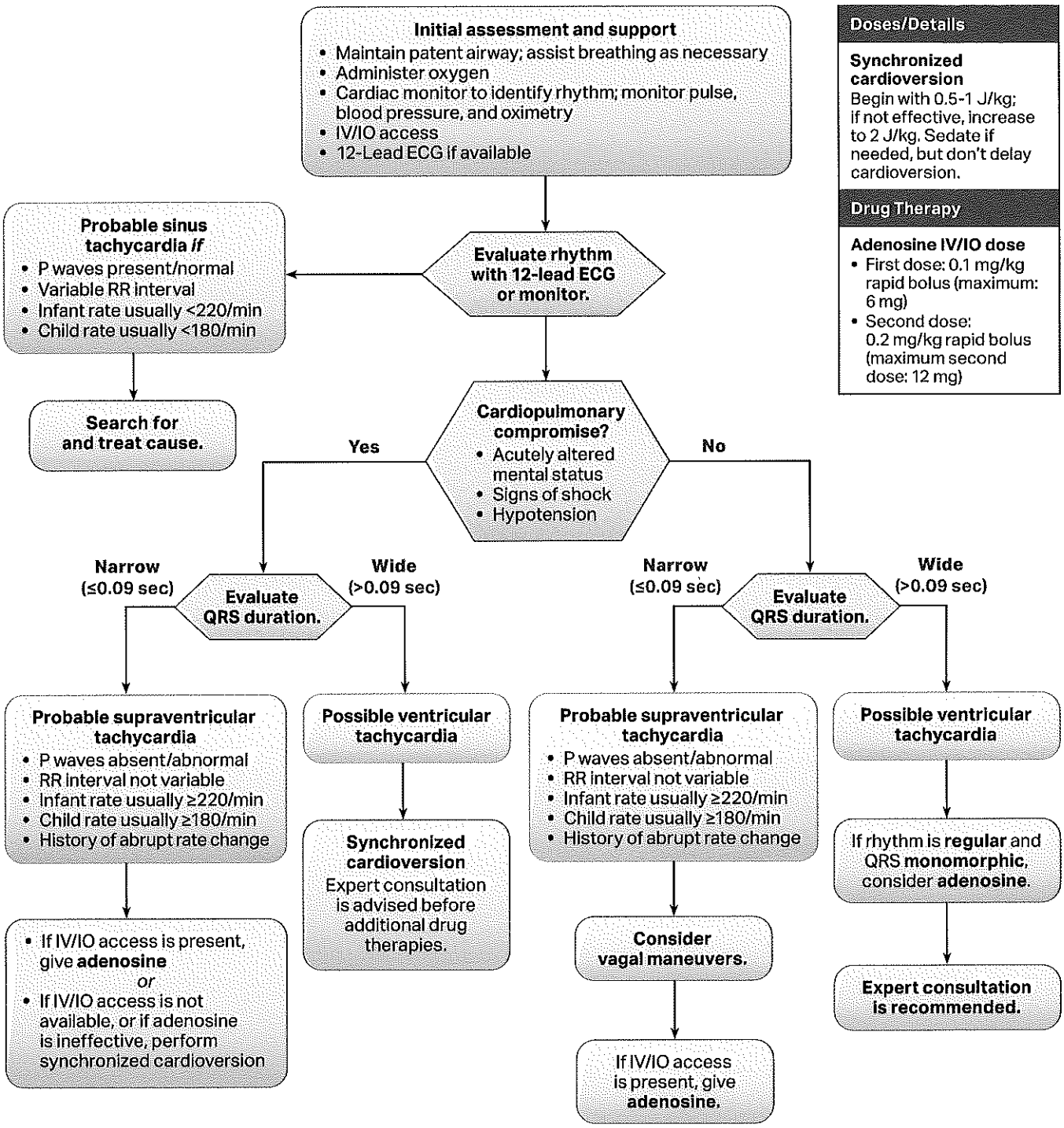

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