SECTION: Pediatric Cardiovascular Emergencies

PROTOCOL TITLE: General – Cardiac Arrest

REVISED: 06/2017

Protocol
8-2

ALS PULSELESS ARREST

OVERVIEW:
During cardiac arrest, there is no effective pumping activity, pulse, or blood pressure. Most commonly, the rhythms that cause pulseless arrest are: ventricular fibrillation, ventricular tachycardia, pulseless electrical activity or asystole. The ECG of ventricular fibrillation shows a fine to coarse zigzag pattern without discernible P waves or QRS complexes. Ventricular fibrillation / ventricular tachycardia is most commonly seen in patients with severe ischemic heart disease and is the most frequently encountered rhythm in sudden cardiac death in adults. Defibrillation is required to stop VF / VT. It constitutes the most important aspect of therapy for VF / VT. The sooner the shocks are given, the more likely they are to be successful.

HPI	Signs and Symptoms	Considerations
• Estimated down time • Past medical history • Medications • Events leading to arrest • Renal failure / dialysis • DNR or living will	• Unresponsive, apneic, pulseless • Ventricular fibrillation or pulseless ventricular tachycardia on ECG	• Asystole • Artifact / Device failure • Cardiac • Endocrine / metabolic • Drugs • Respiratory Arrest

POSSIBLE CAUSES OF PULSELESS ARREST			
A	Alcohol, Abuse, Acidosis	**T**	Toxidromes, Trauma, Temperature, Tumor
E	Endocrine, Electrolytes, Encephalopathy	**I**	Infection, Intussusception
I	Insulin	**P**	Psychogenic, Porphyria, Pharmacological
O	Oxygenation, Overdose, Opiates	**S**	Space occupying lesion, Sepsis, Seizure, Shock
U	Uremia		

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ALS PULSELESS ARREST

Infant Dosing Chart

Age	Term	6 months
Weight (lb/kg)	6.6 lb 3 kg	17.6 lb 8 kg
Defibrillation 2 joules / kg	6 joules	16 joules
Defibrillation 4 joules / kg	12 joules	32 joules
Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg	0.03 mg	0.08mg
Amiodarone 5 mg / kg	15 mg	40 mg
Magnesium Sulfate 25 - 50 mg / kg	75 mg	200 mg

Ensure you are operating according to the specifications of the manufacturer of your particular monitor.

Pediatric Dosing Chart

Age	1 years	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Defibrillation 2 joules / kg	20 joules	28 joules	40 joules	50 joules	68 joules	80 joules	100 joules
Defibrillation 4 joules / kg	40 joules	56 joules	80 joules	100 joules	136 joules	160 joules	200 joules
Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg	0.1 mg	0.14 mg	0.2 mg	0.25 mg	0.34 mg	0.4 mg	0.5 mg
Amiodarone 5 mg / kg	50 mg	70 mg	100 mg	125 mg	170 mg	200 mg	250 mg
Magnesium Sulfate 25 - 50 mg / kg	250 mg	350 mg	500 mg	625 mg	850 mg	1 gm	1.25 gm

PEARLS:

1. If airway maintainable initially with BVM, delay advanced airway insertion until after initial medication administration. The best airway is an effective airway with the least potential complications.
2. Do not stop CPR to give ventilations once advanced airway has been secured.
3. CPR should not be stopped for any reason, if at all avoidable, other than to check for rhythm change. Any stop of compressions should kept as short as possible, preferably a maximum of 10 seconds. IV / IO access and advanced airway placement should be performed while compressions are being performed.
4. Pay close attention to rate of manual ventilation. Hyperventilation produces decrease in preload, cardiac output, coronary perfusion, and cerebral blood flow.

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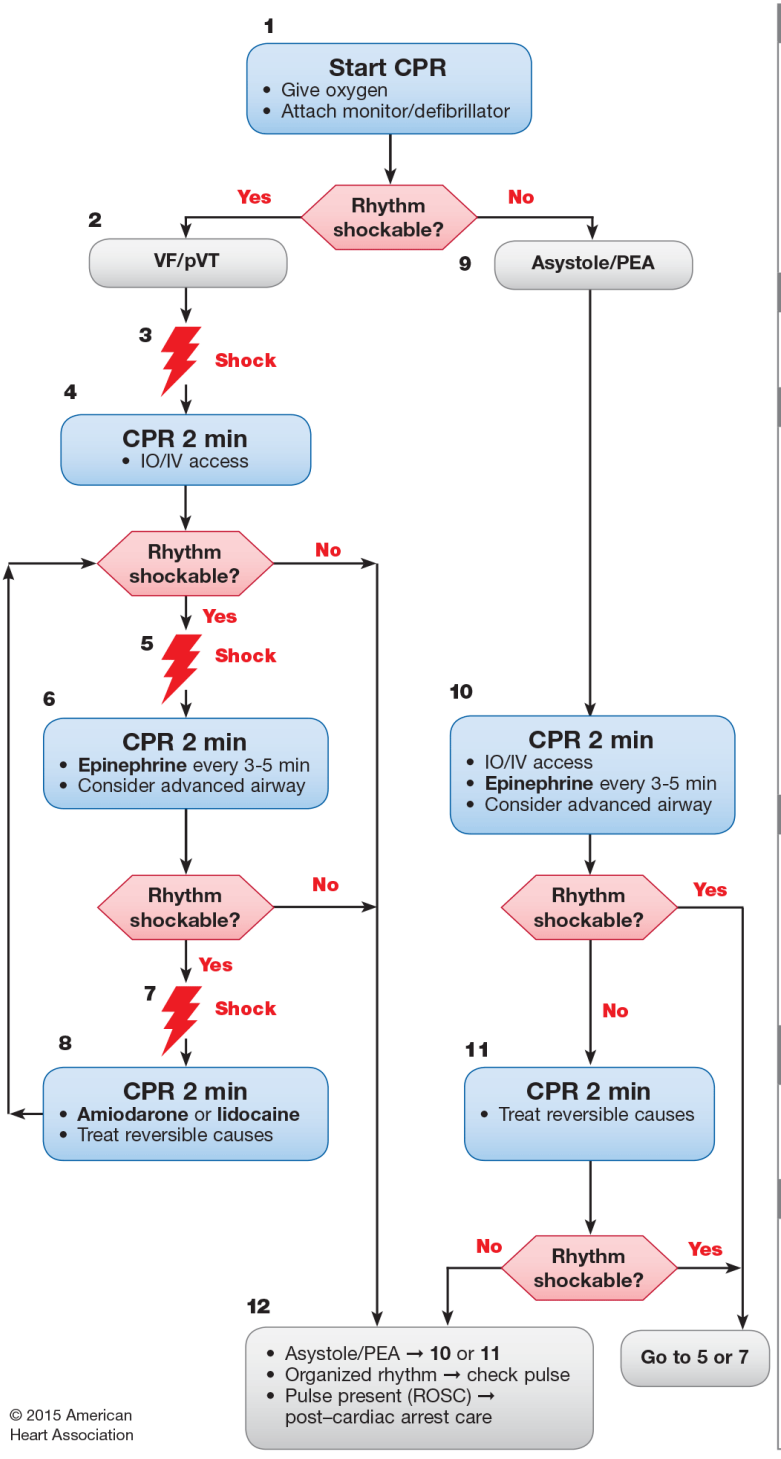
ALS PULSELESS ARREST

Pediatric Cardiac Arrest Algorithm—2015 Update



CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 15:2 compression-ventilation ratio.

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 IO/IV dose:** 0.01 mg/kg (0.1 mL/kg of 1:10 000 concentration). Repeat every 3-5 minutes.
  If no IO/IV access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of 1:1000 concentration).
- **Amiodarone IO/IV dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VF/pulseless VT.
- **Lidocaine IO/IV dose:** Initial: 1 mg/kg loading dose. Maintenance: 20-50 mcg/kg per minute infusion (repeat bolus dose if infusion initiated >15 minutes after initial bolus therapy).

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
- Spontaneous arterial pressure waves with intra-arterial monitoring

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