



# Pediatric Cardiac Arrest

(Ages 31 days to 15 years)



## History

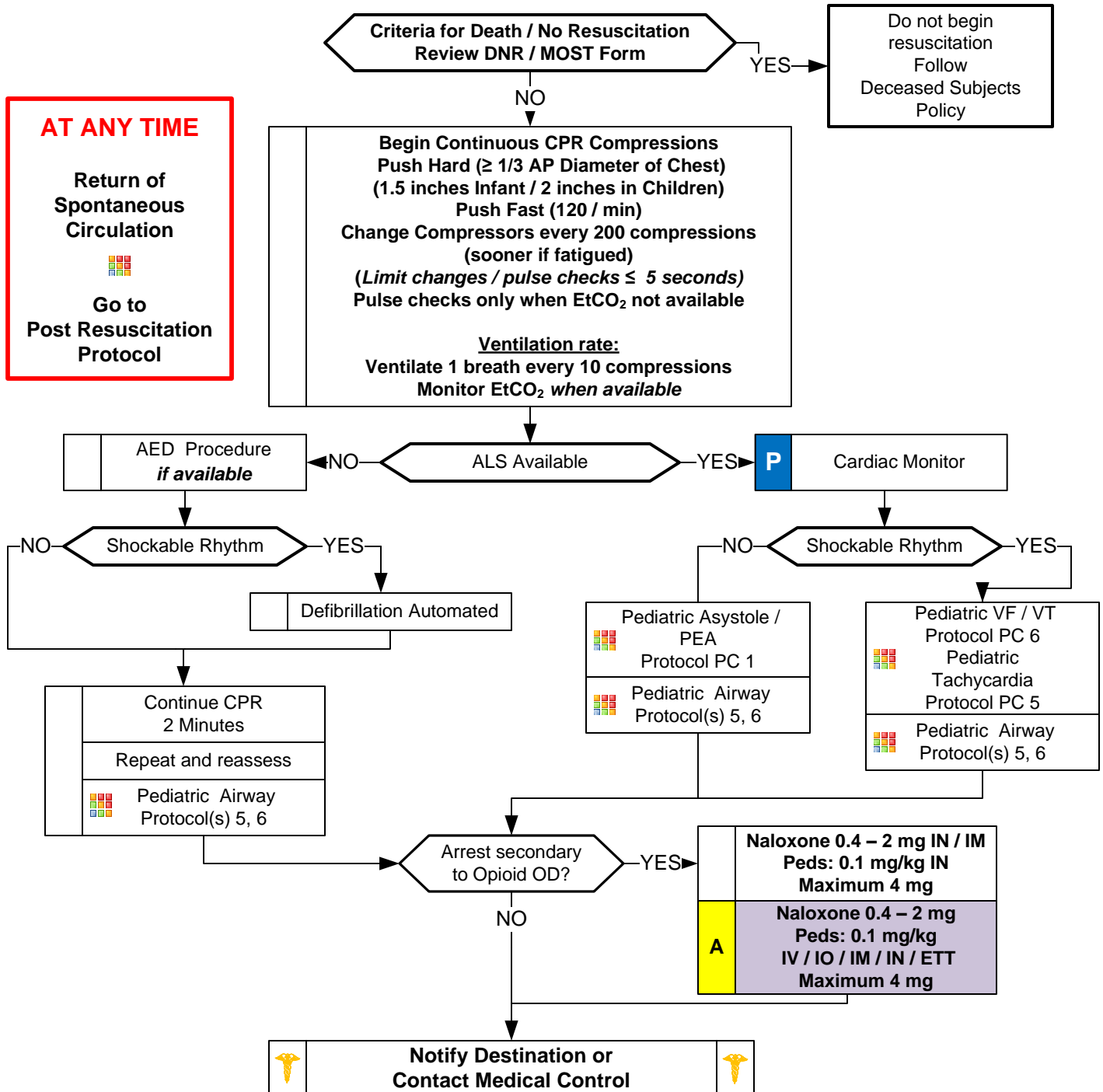
- Time of arrest
- Medical history
- Medications
- Possibility of foreign body
- Hypothermia

## Signs and Symptoms

- Unresponsive
- Cardiac arrest

## Differential

- Respiratory failure: Foreign body, Secretions, Infection (croup, epiglottitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax, cardiac tamponade, pulmonary embolism
- Hypothermia
- Toxin or medication
- Electrolyte abnormalities (Glucose, K)
- Acidosis





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**PRIMARY FOCUS IS ON HIGH-QUALITY, CONTINUOUS, AND UNINTERRUPTED COMPRESSIONS AT A RATE OF:**

## Compressor Responsibilities:

- Compress at rate of 120/ minute
- Push  $\geq 2$  inches depth of compression
- Allow complete recoil of chest on upstroke
- **Call out every 10<sup>th</sup> compression**
- Next compressor moves into ready position at compression 180
- Do not interrupt compressions > 5 seconds

## ALS Responsibility:

- Ensure adequate compressions and ventilations
- Establish IV or IO access and administer first epinephrine
- Charge defibrillator every sequence at the 180<sup>th</sup> compression

## Ventilator Responsibilities:

- **Ventilate ONLY at every 10<sup>th</sup> compressions**
- Same rate with BVM, BIAD, or ETT
- May help compressor count
- **DO NOT HYPERVENTILATE**

## LUCAS Mechanical CPR:

- Ventilate ONLY every 6 seconds (GREEN LIGHT FLASHES)
- Charge defibrillator at the 2-minute mark (3-BEEP)
- When fully charged, pause LUCAS for rhythm check

**Airway takes precedence if cardiac event or a primary respiratory event, drug overdose, drowning, hanging, suffocation, or trauma.**

## Medication Dosing:

- If EtCO<sub>2</sub> falls below 30 mmHg during the first 30 minutes of the resuscitation give the additional 1 mg of Epinephrine.
- Atropine not likely beneficial and no longer indicated with PEA or Asystole (can give at discretion of team leader to max of 3 mg.)
- **Hyperkalemia: Unknown in field setting.** End stage renal dialysis patient is at risk and **Sodium bicarbonate 1 mEq/kg IV / IO and Calcium gluconate 60 mg/kg IV / IO** should be given. ECG findings may not reflect common teaching such as peaked T waves. PEA with a bizarre or widened complex may indeed be hyperkalemia.
- **Toxicology:** Consider Calcium Channel Blocker (CCB) and Beta Blocker (BB) overdose with PEA and asystole. If suspected BB overdose give **Glucagon 0.1 mg/kg IV / IO**. If you see ECG improvement you may repeat and then contact medical control. Large doses of Glucagon may be needed. Calcium Chloride (or Ca gluconate - preferred) may be beneficial in BB overdose. If suspected CCB overdose administer **Calcium gluconate 60 mg/kg (Calcium Chloride 20m mg/kg)** over 3 minutes. If you see ECG improvement you may repeat and then contact medical control.

## Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress  $\geq 1/3$  anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches.**
- **Majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When advanced airway not in place perform 15 compressions with 2 ventilations.**
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **DO NOT HYPERVENTILATE:**
- **Patient survival is often dependent on proper ventilation and oxygenation / airway Interventions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **High-Quality CPR:**
  - Make sure chest compressions are being delivered at 120 / min.
  - Make sure chest compressions are adequate depth for age and body habitus.
  - Make sure you allow full chest recoil with each compression to provide maximum perfusion.
  - Minimize all interruptions in chest compressions to < 5 seconds.
  - Use AED or apply ECG monitor / defibrillator as soon as available.
- **Defibrillation:**
  - Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  - Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  - Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO<sub>2</sub> (EtCO<sub>2</sub>)**
  - If EtCO<sub>2</sub> is < 10 mmHg, improve chest compressions. Goal is  $\geq 20$  mmHg.
  - If EtCO<sub>2</sub> spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation.**
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Special Considerations**
  - **Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  - **Renal Dialysis / Renal Failure** - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  - **Opioid Overdose** - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol UP 7 while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  - **Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** - Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.**