Pediatric Asystole / PEA

History
- Events leading to arrest
- Estimated downtime
- SAMPLE
- Existence of terminal illness
- Airway obstruction
- Hypothermia
- Suspected abuse

Signs and Symptoms
- Pulseless
- Apneic
- No electrical activity on ECG
- No heart tones on auscultation

Differential
- Respiratory failure
- Foreign body
- Infection (croup, epiglotitis)
- Congenital heart disease
- See Reversible Causes below

Pediatric Pulseless Arrest Protocol

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES

Decomposition
Rigor mortis
Dependent lividity
Blunt force trauma
Injury incompatible with life
Extended downtime with asystole

Do not begin resuscitation

Follow Deceased Subjects Policy

NO

Begin Continuous CPR Compressions
Push Hard (≥ 1/3 AP Diameter of Chest)
(1.5 inches Infant / 2 inches in Children)
Push Fast (120 / min)
Change Compressors every 200 compressions (sooner if fatigued)
(Limit changes / pulse checks ≤ 5 seconds)
Pulse checks only when $EtCO_2$ not available

Ventilation rate:
Ventilate 1 breath every 10 compressions
Monitor $EtCO_2$ *when available*

AED Procedure
if available

P Cardiac Monitor

IV or IO Access Protocol UP 6

A

Epinephrine 1:10,000
0.01 mg/kg IV / IO
Maximum Single Dose 1mg

At 5 minutes from initial Epinephrine Dose
Second Dose is based on EtCO2 level

If EtCO2 is < 30 mmHg
Epinephrine (1:10,000) 0.01 mg/kg IV / IO
Maximum Single Dose 1 mg

If EtCO2 ≥ 30
Do not repeat Epinephrine
Maximum 2 mg Total Dose

Search for Reversible Causes

Blood Glucose Analysis Procedure
if applicable

Notify Destination or Contact Medical Control

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Pediatric Cardiac Protocol Section

Pediatric Asystole / PEA

Pediatric Cardiac Protocol Section

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

Compressor Responsibilities:
- Compress at rate of 120/ minute
- Push ≥ 2 inches depth of compression
- Allow complete recoil of chest on upstroke
- **Call out every 10th 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 180th compression

Ventilator Responsibilities:
- **Ventilate ONLY at every 10th compressions**
- Same rate with BVM, BIAD, or ETT
- May help compressor count
- DO NOT HYERVENTILATE

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 EtCO2 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 AC 11 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 ≥ 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:**
- **Airway is a more important intervention in pediatric arrests. This should be accomplished quickly with BVM or BIAD.**
- **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.
- **End Tidal CO2 (EtCO2)**
  - If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  - If EtCO2 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.