

**Pulseless Unresponsive Child - BLS Provider with AED****BLS**

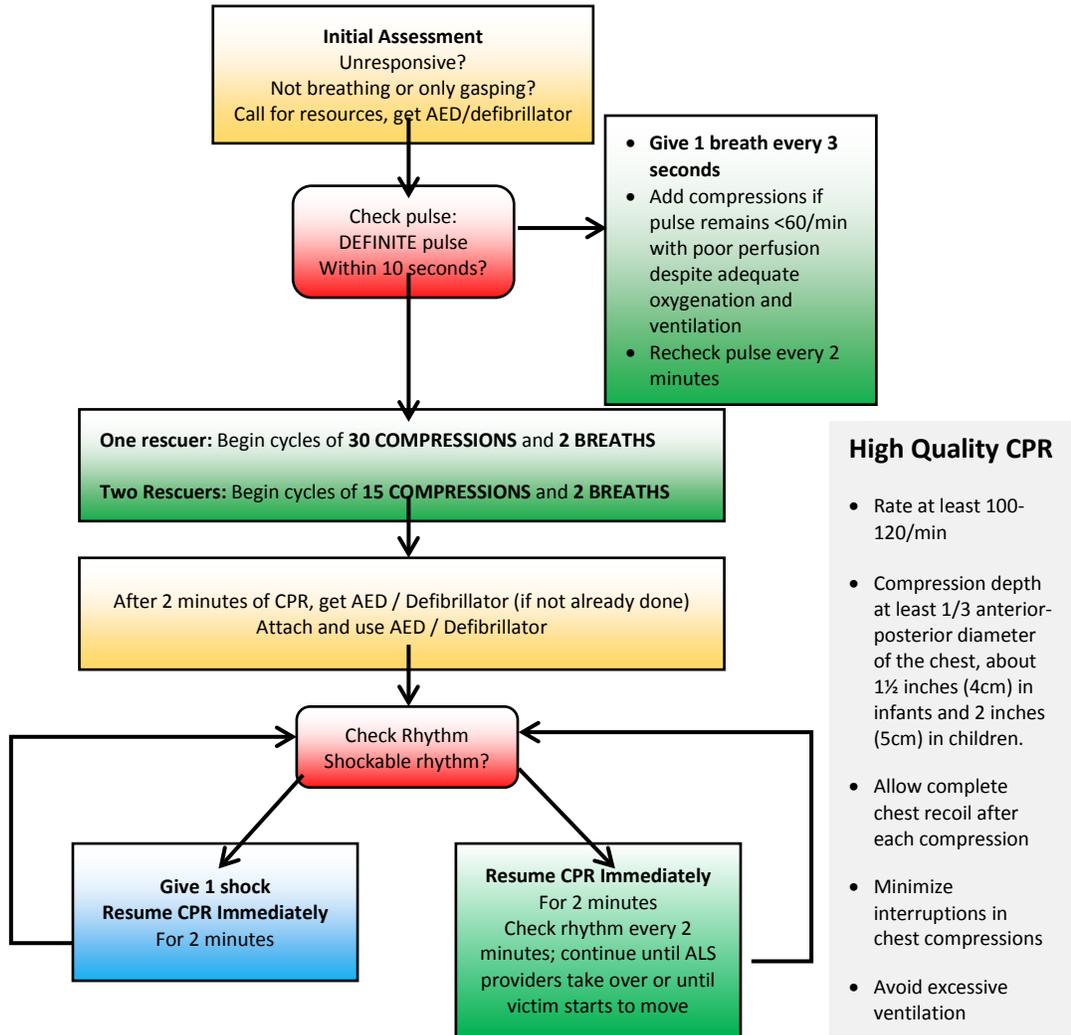
1. Initial Assessment/Care (**Protocol 1**).
2. Initiate CPR according to American Heart Association Standards.
3. If AED is available, place device on patient using pediatric appropriate attachments. If no pediatric attachments are available, use adult size pads.
4. Follow AED procedures.
5. Airway Management (**Protocol 7**).

Note: The priority in cardiac arrest is circulation with minimal interruptions to CPR. “Push hard, push fast” with compressions at a rate of 100-120/minute. Continuous uninterrupted compressions are the utmost importance for patient survival.

**ALS**

6. Initiate appropriate advanced airway procedures.
7. Establish IV/IO access (**Procedures 13 or 14**).
8. Follow the appropriate protocol (**Sections A-I below**).
9. **Refer to Handtevy System** as a guide for proper dosage volume and sizing of equipment.

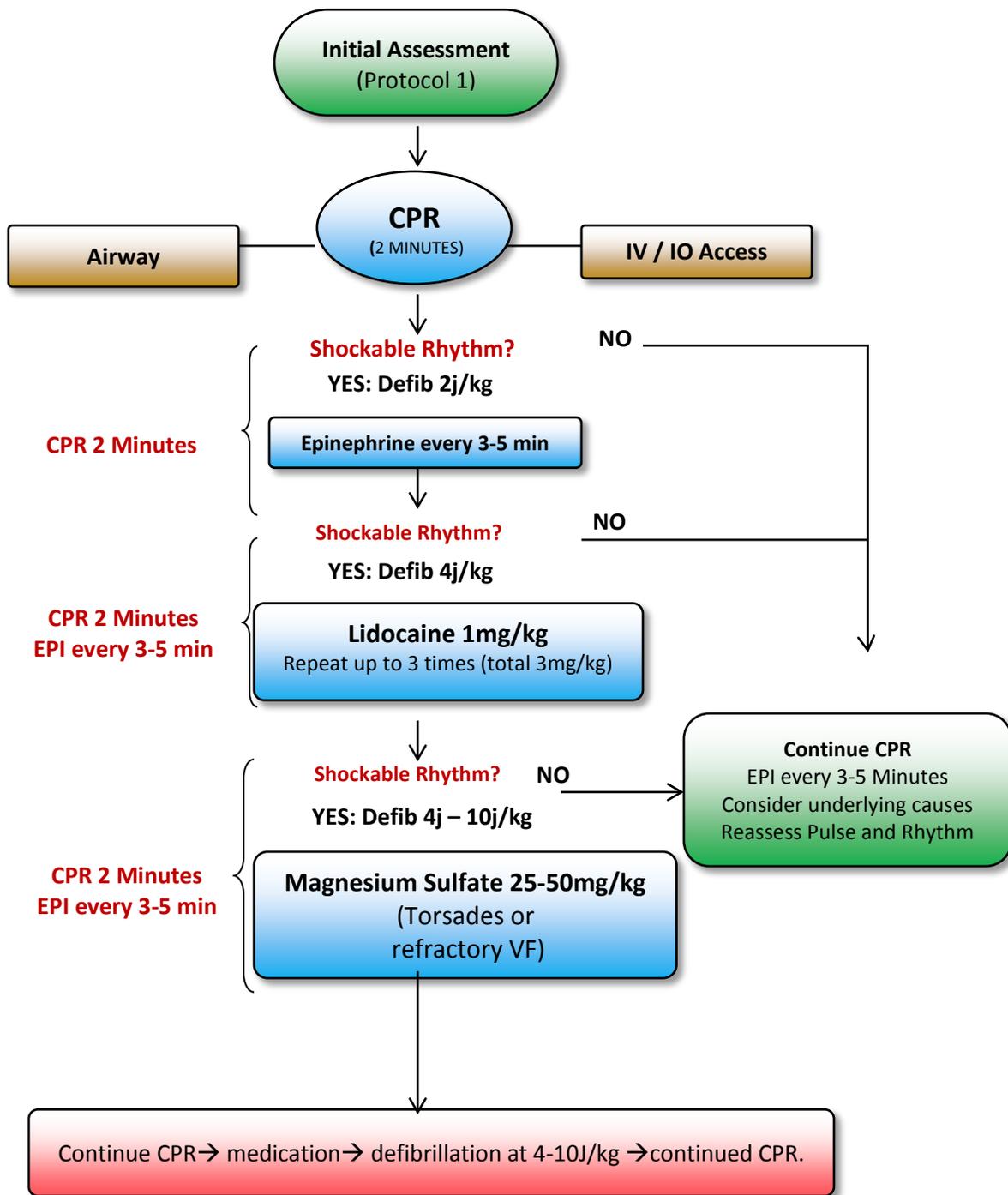
**Pulseless Unresponsive Child – BLS Provider with AED**



**A. Ventricular Fibrillation/Pulseless Ventricular Tachycardia****ALS**

1. For a patient with an unwitnessed onset of V-Fib or Pulseless V-Tach (pVT), initiate CPR for 2 minutes
2. **Defibrillate at 2 joules/kg** and subsequent defibrillations should escalate beginning at 4j/kg up to **MAX dose** of 10j/kg (or adult dose) every 2 minutes, **continue CPR** for a minimum of two minutes. Then re-assess ECG Rhythm. If still VF:
3. **Defibrillate at 4 joules/kg.** Resume CPR
4. Administer **Epinephrine (1:10,000), 0.01mg/kg**, (0.1mL/kg) IV/IO push, circulate with 2 minutes of CPR.
5. **Defibrillate at 6 joules/kg.** Resume CPR
6. Administer **Amiodarone, 5mg/kg**, IV/IO push, circulate with 2 minutes of CPR
7. **Defibrillate at 8 joules/kg.** Resume CPR
8. Administer **Epinephrine (1:10,000), 0.01mg/kg**, (0.1mL/kg) IV/IO push, circulate with 2 minutes of CPR.
9. **Defibrillate at 10 joules/kg.** Resume CPR
10. Administer **Amiodarone, 5mg/kg**, IV/IO push, circulate with 2 minutes of CPR
11. **Defibrillate at 10 joules/kg.** Resume CPR
12. Administer **Epinephrine (1:10,000), 0.01mg/kg**, (0.1mL/kg) IV/IO push, circulate with 2 minutes of CPR.
13. **Defibrillate at 10 joules/kg.** Resume CPR
14. Administer **Amiodarone, 5mg/kg**, IV/IO push, circulate with 2 minutes of CPR
15. **Defibrillate at 10 joules/kg.** Resume CPR
16. Administer **Epinephrine (1:10,000), 0.01mg/kg**, (0.1mL/kg) IV/IO push, circulate with 2 minutes of CPR.
17. **Defibrillate at 10 joules/kg.** Resume CPR
18. Administer **Magnesium Sulfate 25-50mg/kg IV/IO (Max dose of 2G) over 2 min.**, if patient is in polymorphic ventricular tachycardia (Torsades de Pointes) or refractory V-Fib (can be done at any time after the first epinephrine)
19. Consider underlying causes and manage as soon as possible, indicated in “**Potentially Reversible Causes in Cardiac Arrest**” at the end of Section E., PEA.

**Ventricular Fibrillation / Pulseless Ventricular Tachycardia**



If pulses are restored (ROSC), refer to the Post Resuscitative Care Protocol (**Section G**)

**B. Regular, Wide Complex Tachycardia with a Pulse**

Infants: Rate  $\geq 220$ /min./Children: Rate  $\geq 180$ /min.

**Wide Complex Tachycardia - Stable Patient****BLS**

1. Initial Assessment/Care (**Protocol 1**).
2. Provide oxygen (**Procedure 1**).

**ALS**

3. Obtain EKG and determine **regularity of R-R waves**.
4. Consider **Adenosine 0.1mg/kg** rapid IVP (max dose 6mg) if rhythm is regular and QRS complexes are monomorphic as a diagnostic tool.
5. Administer **Amiodarone 5mg/kg IV over 20-60 minutes**.
6. If the patient's condition deteriorates at anytime, move immediately to "*unstable pediatric patient*" above, or to VF/Pulseless VT, Section A.

**Wide Complex Tachycardia - Unstable Patient**

Regular, Wide Complex (QRS > 0.09 sec) Tachycardia with a Pulse.

"Unstable" includes patients presenting with any of the following signs related to the wide complex tachycardia:

- a. **Chest pain/discomfort**
  - b. **Acutely altered mental status**
  - c. **Shortness of breath**
  - d. **Hypotension**
2. Initial Assessment/Care (**Protocol 1**).
  3. Provide oxygen (**Procedure 1**).
  4. Obtain EKG and determine **regularity of R-R waves**.
  5. If conscious, attempt to sedate by administering **Versed (midazolam), 0.1 mg slow IVP**. \*DO NOT delay cardioversion to sedate patient and obtain a 12-lead EKG if they are unstable.

6. Begin **synchronized cardioversion at 0.5 J/kg**. (If impossible to synchronize, defibrillate as in Section "A. Ventricular Fibrillation/Pulseless Ventricular Tachycardia" Pediatric section). If patient does not convert after initial cardioversion of 0.5 J/kg, increase doses:
  - a. **1 J/kg** Synchronized
  - b. **2 J/kg** Synchronized
7. Consider **Adenosine 0.1mg/kg rapid IVP** (Max dose of 6mg) as a diagnostic tool, if rhythm is regular and the QRS are monomorphic.

### C. Sustained Narrow Complex Tachycardia

#### Sustained Sinus Tachycardia – Stable Patient

Infants: Rate <220/min./Children: Rate <180/min.

Sinus tachycardia is usually greater than the normal rate, but the rate may vary. Upon acquiring history, it is compatible and consistent with known cause; P waves are present and normal, variable R-R with a constant PR interval.

#### BLS

1. Initial Assessment/Care (**Protocol 1**).
2. Provide oxygen (**Procedure 1**).

#### ALS

3. Obtain EKG and determine **regularity of R-R waves**.
4. Consider underlying causes of tachycardia, probable sinus tachycardia.
  - a) Refer to Handtevy system as a guide for appropriate pediatric vital signs.
  - b) Seek for and treat the underlying cause. (*Examples of causes: hyperthermia, dehydration,...*)
  - c) Contact MCP for consultation.

**SVT - Stable Patient**

Regular, Narrow Complex (QRS  $\leq$  0.09 sec)

Infants: Rate  $\geq$ 220/min./Children: Rate  $\geq$ 180/min.

Pediatric patient with a history of abrupt rate change, P waves are absent and/or abnormal, HR is not variable with activity.

**BLS**

5. Initial Assessment/Care (**Protocol 1**).
6. Provide oxygen (**Procedure 1**).

**ALS**

7. Obtain EKG and determine **regularity of R-R waves**.
8. Consider underlying causes of tachycardia.
  - a) Refer to **Handtevy system** as a guide for appropriate pediatric vital signs
9. Consider vagal maneuvers.
10. Administer **Adenosine, 0.1 mg/kg rapid IVP** (Max first dose of 6mg). This may be repeated in 1-2 minutes at 0.2 mg/kg rapid IVP (Max second dose of 12mg).
  - a) Adenosine should be administered through a large-bore catheter preferably at the antecubital fossa and followed by a rapid flush of 5-10mL of IV solution.
11. If the QRS width is thought to be wide ( $>$  0.09 sec) then follow section Protocol 9 B, "Regular, Wide Complex Tachycardia with a Pulse" pediatric section, 9.8).
12. If the patient's condition deteriorates at any time, move immediately to "*unstable patient*" below.

**SVT (Unstable Pediatric Patient)**

Regular, Narrow Complex (QRS  $\leq$  0.09 sec)

Infants: Rate  $\geq$ 220/min./Children: Rate  $\geq$ 180/min.

Patient presents with vague/nonspecific history of abrupt rate changes, P waves absent and/or abnormal, HR is not variable with activity.

“Unstable” includes patients presenting with any of the following signs related to the wide complex tachycardia:

- a. **Chest pain/discomfort**
- b. **Acutely altered mental status**
- c. **Shortness of breath**
- d. **Hypotension**

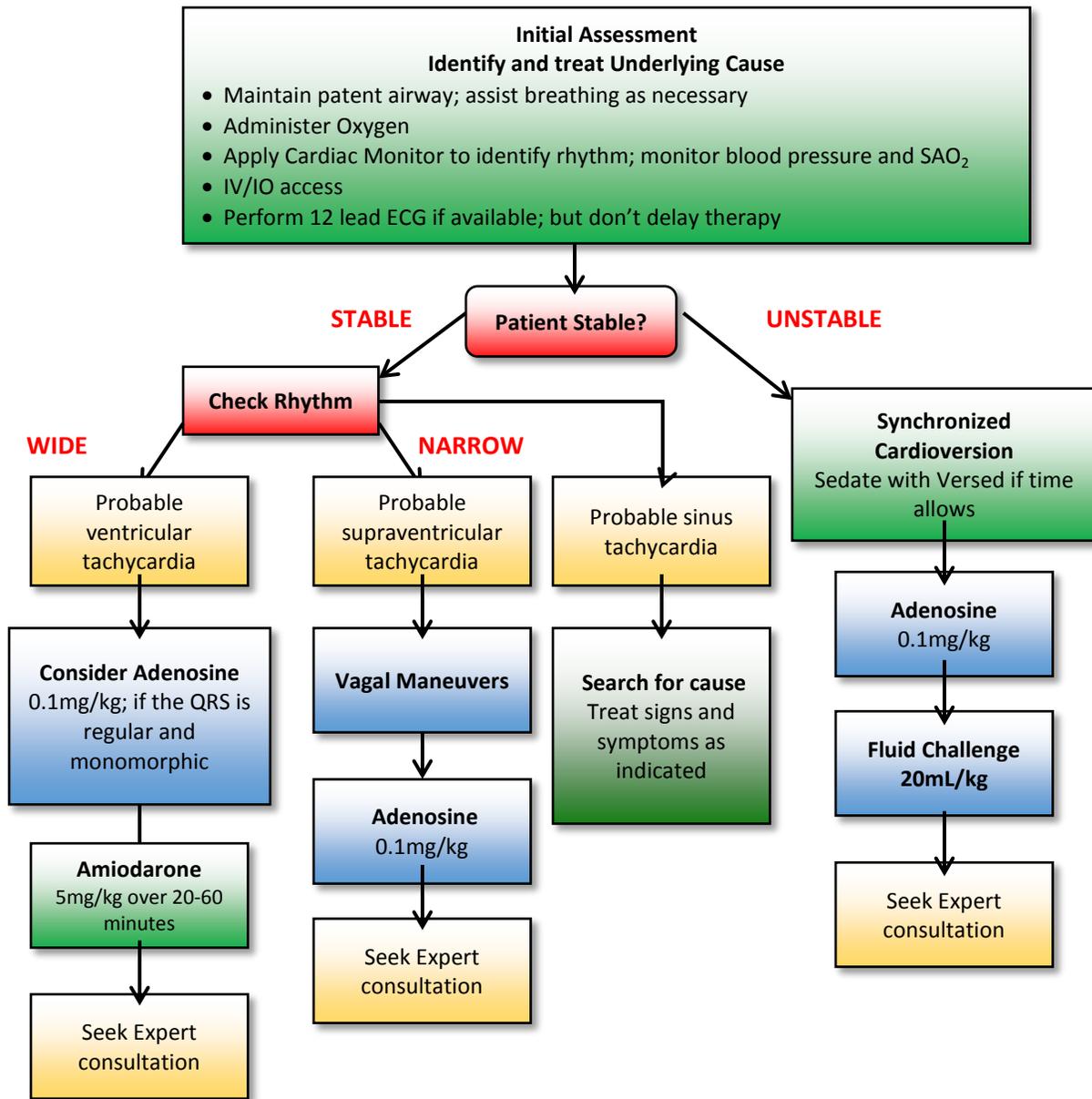
**BLS**

1. Initial Assessment/Care (**Protocol 1**).
2. Provide oxygen (**Procedure 1**).

**ALS**

3. Obtain EKG and determine **regularity of R-R waves**.
4. If conscious, attempt to sedate by administering **Versed (midazolam), 0.1 mg/kg slow IVP/IO/IM (Procedure 15)**.
5. Begin **synchronized cardioversion at 0.5 J/kg**. (If impossible to synchronize, defibrillate as in Section “A. Ventricular Fibrillation /Pulseless Ventricular Tachycardia” Pediatric section). If patient does not convert after initial cardioversion of 0.5 J/kg, increase doses:
  - a) **1 J/kg Synchronized**
  - b) **2 J/kg Synchronized**
6. Administer **Adenosine, 0.1 mg/kg rapid IVP** (Max dose of 6mg).
7. Administer a **fluid challenge of 20 mL/kg**.
8. If the patient’s rhythm fails to convert, consult MCP for further treatment instructions.

**Pediatric Tachycardia**



**D. Asystole, Agonal rhythm, Idioventricular with rate  $\leq$ 20 bpm or Pulseless Bradycardias**

If heart rate is  $<60$ /min. in an infant or child, along with poor systemic perfusion, begin chest compressions.

**ALS**

1. Initiate CPR according to AHA standards. Two minutes of CPR will be done prior to stopping and assessing the rhythm.
2. Airway Management (**Protocol 7**) and
3. IV/IO Access (**Procedure's 13 & 14**) will be done concurrently with CPR. Medication administration will begin as soon as an appropriate route becomes available.
4. Administer **Epinephrine 1:10,000, 0.01 mg/kg IVP/IO** (0.1 mL/kg), MAX DOSE of 1mg.
  - a. Subsequent doses of **Epinephrine 1:10,000, 0.01 mg/kg IVP/IO** (0.1 mL/kg) should be administered every 3-5 minutes, MAX 1mg per dose.
5. Consider underlying causes and manage as soon as possible, indicated in "**Potentially Reversible Causes in Cardiac Arrest**" at end of Section E., PEA.

**E. Pulseless Electrical Activity (PEA)****ALS**

1. Initiate CPR according to AHA standards. Two minutes of CPR will be done prior to stopping and assessing the rhythm.
2. Airway Management (**Protocol 7**) and
3. IV/IO Access (**Procedure's 13 & 14**) will be done concurrently with CPR. Medication administration will begin as soon as an appropriate route becomes available.
4. Administer **Epinephrine 1:10,000, 0.01 mg/kg IVP/IO** (0.1 mL/kg) or IO, MAX DOSE 1mg.
  - a) Subsequent doses of **Epinephrine 1:10,000, 0.01 mg/kg IVP/IO** (0.1 mL/kg) should be administered every 3-5 minutes.
5. Consider causes and manage as soon as possible, indicated in the following chart, "**Potentially Reversible Causes in Cardiac Arrest.**"

Potentially Reversible Causes in Cardiac Arrest	
Hypovolemia	Fluid bolus of 20mL/kg; 10mL/kg for neonates (<1 month), rapid transport
Hypoxemia	Confirm adequacy of oxygenation, airway management, consider establishing advanced airway.
Hydrogen-ions (Acidosis)	Give Sodium Bicarbonate, 1 mEq/kg IV/IO, airway management, consider advanced airway.
Hypothermia	Warming of patient
Hypoglycemia	Treat per <b>Protocol 14P</b> , Impaired Consciousness
Hyperkalemia	Calcium Chloride and/or Sodium Bicarbonate.
Tension Pneumothorax	Needle decompression per <b>Procedure 5</b> .
Cardiac Tamponade	
(Toxin): Beta Blocker OD	<i>Poison Control:</i> Glucagon IVP. Dosage per MCP.
(Toxin): Calcium Channel Blocker OD	<i>Poison Control:</i> Calcium Chloride and/or Glucagon IVP. Dosage per MCP.
(Toxin): Suspected Narcotic OD	Narcan, 0.4 mg IV/IO/IN per dose as needed.
Thrombosis	Coronary: Consider 12-Lead ECG; Pulmonary Embolism
Trauma	

**F. Symptomatic Bradycardia**

Causes of bradycardia in the pediatric population is may be caused by hypoxemia, heart block, heart defects, hypothermia, head injury, and/or toxin/drug induced.

Care must be taken to ensure the adequacy of oxygenation and airway patency. Hypoxemia is the leading cause of bradycardia in children. If heart rate is <60/min. in an infant or child, along with poor systemic perfusion, begin chest compressions.

**ALS**

1. Initial Assessment/Care (**Protocol 1**).
2. Begin assisting ventilations and oxygenate patient via BVM if HR <100, reassess every 2 min.
3. Initiate CPR according to AHA standards if patient's heart rate ≤60 or despite of assistance of ventilations & oxygenation.

Two minutes of CPR will be done prior to stopping and assessing the rhythm. Airway Management (**Protocol 7**) and IV/IO Access (**Procedure's 13 & 14**) will be done concurrently with CPR. Medication administration will begin as soon as an appropriate route becomes available.

4. Administer **Epinephrine (1:10,000), 0.01 mg/kg IVP/IO** (0.1 mL/kg). For ET use 1:1,000, 0.1 mg/kg. May be repeated every 3-5 min. (No max dose)
5. Administer **Atropine, 0.02 mg/kg IVP/IO**. 0.1 mg is the minimum single dose (0.5 mg is maximum single dose), for increased vagal tone or primary AV block, may be repeated once in 3-5 min. (not to exceed a maximum dose of 0.04mg/kg)
6. Consider causes and manage as indicated in the following chart, "**Potentially Reversible Causes in Cardiac Arrest.**"

**MCP**

7. Epinephrine infusion.
8. Dopamine infusion.
9. External pacing (TCP), (**Procedure 23**).

**Pediatric Bradycardia**

