

Pediatric Cardiac Care

(PC-1) Pediatric Bradycardia

Most pediatric bradycardia is a result of respiratory/ventilation. Be sure to correct all problems relative to airway and breathing in rapid fashion. Other possible causes to R/O are Overdose, hypothermia and trauma.

- 1) Rapid medical assessment
- 2) O₂, IV and cardiac monitor.
 - a) Be aggressive with oxygen and airway support
- 3) If Heart rate is less than 60 with signs of poor perfusion, begin CPR if not rapidly responding to airway management
- 4) Consider pharmacological therapy as follows
 - a) **Epinephrine 1:10,000 @ 0.01mg/kg** IV push
 - b) If parasympathetic in nature or unresponsive to Epi administer **Atropine 0.02mg/kg** minimum single dose is 0.1mg maximum for child 0.5mg maximum for adolescent 1mg may repeat once
 - c) For patients unresponsive to pharmacological therapy consider TCP contact medical control for instruction.

(PC-2) Pediatric V-fib/Pulseless V-tach

General notes: Refer to resuscitation based tapes/Pediatric card for resuscitation information. Allow parents to be involved in the resuscitation efforts. ETT intubation is controversial in the pre-hospital setting and all efforts must be made to confirm and secure the ETT in the proper place. All intubated patients must be immobilized on LSB with head secured.

- 1) Rapid medical assessment
- 2) Begin CPR and assess the underlying rhythm
- 3) Defibrillate @ 2j/kg and continue CPR while attempting to find vascular access and preparing to secure airway.
- 4) Assess rhythm and if V-fib/V-tach defib @ 4j/kg
- 5) First line drug is **Epinephrine 1:10,000 0.01mg/kg** every 3-5 minutes
- 6) First line antidysrhythmic is **Amiodarone 5mg/kg** rapid IV bolus
 - a) Max dose in 24 hours 15mg/kg
- 7) Continue CPR as indicated 30:2 ratio or for 2 rescuer 15:2 ratio should rotate compressor/ventilator role every two minutes at rhythm check
- 8) Utilize drug/shock as necessary and minimize interruption of CPR. Drugs should be administered close to rhythm check and shock. Prepare drugs prior to rhythm check to avoid delay
- 9) Patient shock should be at 4j/kg from second shock forward

(PC-3) Pediatric Asystole/PEA

R/O reversible causes as soon as possible.

Hypoxia (high flow O₂)

Hypovolemia (Fluid or dopamine)

Acidosis (Bicarb)

Thrombus (consider AMI or PE)

Tamponade (Look for S&S)

Hypothermia (blankets and removes wet clothes)

Hypo/hyperkalemia (Bicarb or Calcium Gluconate)

Drug OD (Appropriate reversal agent see protocol)

Trauma (fluid or decompression)

Hypoglycemia (See protocol)

- 1) Rapid medical assessment
 - a) Emphasis on airway and breathing as this is the most common cause of arrest
- 2) CPR and rhythm identification
- 3) IV access and airway measures
- 4) Pharmacological therapy as follows:
 - a) **Epinephrine 1:10,000 0.01mg/kg** every 3-5 minutes
- 5) R/O and treat underlying conditions

(PC-4) Pediatric Tachycardia

Try to differentiate between sinus tach, SVT, and V-tach.

(pc-4a) Sinus Tachycardia

- 1) Rapid medical assessment
 - a) Underlying history is very important. Treatment directed at underlying causes.
 - b) Focus on history of recent illness
 - c) Look for R to R variability relative to respiration
- 2) Normally heart rates less than 220 for infants less than 1 year and 180 for child less than 8 years will be sinus tach
- 3) Consider hypovolemia and fluid replacement
 - a) 10-20ml/kg of NS over 10-20 minutes
 - b) Possibly antipyretic or antibiotics

(pc-4b) Supraventricular Tachycardia

- 1) Rapid medical assessment
 - a) Normally sudden onset with no history or illness over past several days
 - b) No R to R variability
 - c) Pediatric patients generally tolerate high rates well treat only if symptomatic
- 2) O₂, IV and cardiac monitor
- 3) If stable have the patient perform vagal maneuvers
 - a) Blow through a straw
 - b) Bare down to have bowel movement
 - c) Ice pack directly to the forehead and bridge of nose for infants and toddlers

- 4) If unstable consider the following
 - a) Cardioversion 0.5-1j/kg
 - b) Cardioversion 2-4j/kg
 - c) Can consider Lorazepam 0.1mg/kg IV over 2 minutes (2mg/min) to sedate patient for cardioversion.
- 5) Consider Adenosine 0.1mg/kg rapid IV push max single dose 6mg
- 6) If no response administer Adenosine 0.2mg/kg max single dose 12mg
- 7) Contact medical control for further orders

(pc-4c) Ventricular Tachycardia

Remember that pediatric patient will rarely be in V-tach and they tolerate high heart rates extremely well. Treat only in symptomatic.

- 1) Rapid medical assessment
- 2) O2, IV and cardiac monitor
- 3) If stable consider Amiodarone 5mg/kg over 30-60 minutes slow IV bolus (max dose is 15mg/kg in 24 hours)
- 4) If unstable consider the following
 - a) Cardioversion 0.5-1j/kg
 - b) Cardioversion 2-4j/kg
 - c) Can consider Lorazepam 0.1mg/kg IV over 2 minutes (2mg/min) to sedate patient for cardioversion.
- 5) Contact the medical physician for further orders

(PC-5) Post-Resuscitative care

Post resuscitative care is directed at vital support, maintaining a perfusing pressure and adequate oxygen saturation. Focus primarily on adequate airway and respiration.

- 1) Fluid boluses of 10-20ml/kg NS as necessary to ensure normal volumetric status up to 1 liter.
- 2) **Dopamine 2-20mcg/kg/min** for patients unresponsive to or ineligible for fluid bolus (ensure normal volume status) or for patients who's systemic vascular resistance is low.
 - a) **Dopamine** should be mixed **75 mg in 250cc** of NS using a 60 gtt/set. This will give a solution were 1gtt/kg/min will give you 5mcg/kg/min
- 3) **Lidocaine** may be administered **if no other antidysrhythmic** has been given during the course of arrest with conversion from V-fib or VT. Dose is **1mg/kg** with max single dose 100mg. BP must be greater than 100mmHg. Begin drip @ 20-50mcg/kg/min and titrate.
- 4) Initiate appropriate maintenance drip of the antidysrhythmic that was utilized during arrest.
- 5) See appropriate algorithm for whichever dysrhythmias are present.

Maintenance infusion as follows;

Lidocaine 300mg in 250ml of NS creates

20-50mcg/kg/min is dose range

1gtt/kg/min yields 20mcg/kg/min

Amiodarone 150mg in 100cc NS infused at 40gtt/min with 60gtt/set

(PC-6) Newborn Resuscitation/Stabilization

- 1) Newborn assessment to include
 - a) Appearance (Good skin color, acrocyanosis not uncommon for first 4 hrs)
 - b) Pulse (Above 100 is good, auscultate apical pulse)
 - c) Grimace
 - d) Activity
 - e) Respiration (A good strong cry is positive, respiratory rate around 40)
- 2) Suction, dry, warm and stimulate
- 3) If baby assesses well allow mother to hold and breast feed if she is planning to.

Stressed Newborn

Meconium stained fluid---This indicates a fetus that was stressed in utero.

- 1) Aggressive suctioning is indicated with bulb suction prior to complete delivery as described in the OB section
- 2) Once baby delivers suction as appropriate. For depressed infants deep endotracheal suctioning is indicated using the meconium aspirator. If the baby is active and not depressed aggressively suction all you can get from the oral pharynx
- 3) Monitor heart rate as suction is applied and be ready to oxygenate and support ventilatory status. Heart rate should not be allowed to get below 80.

Heart Rate parameters

100 and above good

Below 100 BVM support

Below 60 CPR and consider medication if not rapidly responding

Medications as follows

Epinephrine 1:10000 only for newborns **0.01mg/kg**

Dextrose for hypoglycemia however for first 4 hours treat 50mg/dl and below with **D10W 1-2ml/kg**

Naloxone 0.1mg/kg use with caution with short term narcotic and not a dependent mother

Volume expansion NS 10ml/kg over 10-15 minutes

CPR guidelines (Ratio for CPR in infants less than 1 month is 3:1)