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PALS Review 2015 Guidelines

BLS CPR

BLS CPR changed in 2010. The primary change is from the "ABC" format to "CAB."

1. Scene Safety
2. Establish Unresponsiveness
3. Check for breathing – if absent or agonal (No more than 10 seconds)
4. Call for help – call "911"/code and request AED/Defibrillator
5. Check for Pulse (no more than 10 seconds)–
    i. **If no pulse or pulse less than 60**
    ii. Brachial Infant
    iii. Carotid Child
6. Start CPR
    i. Good depth – 1/3 -1/2 anterior posterior diameter
    ii. 100 – 120 compressions per minute
    iii. Ensure great Recoil
    iv. Ratio of 30:2 if one rescuer, 15:2 if two rescuer
    v. Consider encircling thumb CPR technique for infant if 2 rescuers are available
    vi. Child compressions use either one-hand or two-hand technique
7. Use AED as it becomes available
    i. Four Steps (4)
        1. Turn it on
        2. Place the pads
            a. Pediatric pads for children under 8 y/o. If pediatric pads are unavailable, adult pads are used for all ages using anterior/posterior approach
            b. Apex – Sternum Technique
            c. Anterior Posterior technique
        3. Analyze Rhythm – Stand Clear
        4. Press shock button if indicated, followed by immediate CPR
8. Rotate Rescuers every two minutes

High Quality CPR includes:

1. Effective compressions at least 100/min – no more than 120 compressions per minute
2. Minimal interruptions (<10secs)
3. Allow for recoil, monitoring via capnography *less than 10 is ineffective
4. 1.5 inches for infants, 2 inches for children compression depth
5. Rotate q2mins/10cycles

Defibrillate early (use AED)

1. Use pediatric pads or key for infants/children under the age 8 y/o
2. Use adult

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Airway

Pulse Oximetry to be between 94 – 99% to avoid hyperoxia (high oxygen tension can lead to increased tissue death)

Ventilations with Bag Valve Mask (BVM) – **breaths every 3-5 sec (12-20 breaths per minute)**

Ventilations with Advanced Airway – breaths every3-5 sec (12-20 breaths per minute) for patient with pulse greater than 60/min

Ventilate once every 6 seconds if providing CPR compressions for patient with advanced airway

Advanced Airway

Advanced airway includes Endotracheal intubation, laryngeal mask airway, supraglottic airway based on manufactures recommendation

Waveform Capnography (pETCO2)

- Best way to evaluate advanced airway placement
- Can assist in measuring cardiac output during CPR
    - ETCO2 reading must be greater than 10 during CPR **(>10)** or patient will not survive
    - Normal readings for pETCO2 for patients should be **35-40**

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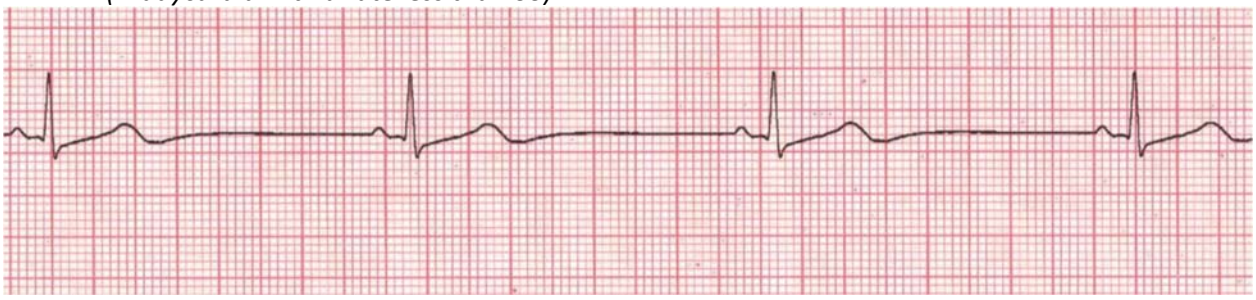
If advanced airway is compromised or patient change/decreasing SaO2 **THINK D O P E**

- **D** Dislodgement
- **O** Obstruction
- **P** Pneumothorax
- **E** Equipment

Bradycardia

*(Bradycardia with a rate less than **60**)*



START COMPRESSIONS

High quality CPR

Assign team roles

1. Team leader
2. Compressor
3. Airway
4. Medications
5. Monitor
6. Recorder

Administer **0.01mg Epinephrine** .Repeat Epinephrine every 3-5 minutes

A critical step to restoring a perfusing rhythm is to quickly identify one of the underlying/reversible causes that most frequently lead to bradycardia The most common are known as the H's & T's! As a team leader you should run through the list for consideration.

H's & T's

Hypoxia	Toxins
Hypovolemia	Tension Pneumothorax
Hypo/Hyperkalemia	Tamponade
Hydrogen Ion (Acidosis)	Thrombus Cardiac
Hypothermia	Thrombus Pulmonary
Hypoglycemia	Trauma

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Tachycardia

Determine if cause of tachycardia is from underlying cause (H & Ts) or arrhythmia tachycardia.

If known cause, treat the cause (H & T) or identify rhythm

- SVT - SUSTAINED rapid narrow complex tachycardia with a:

rate greater than 220 if the infant is less than 1 y/o

or

greater than 180 if child is greater than 1 y/o

Is your patient **stable or unstable**?

Stable- Attempt vagal maneuvers like ice water to the face for young children or blowing into occluded straw if child is old enough to follow commands.

If vagal maneuvers aren't successful in slowing their heart rate, administer **0.1 mg/kg of Adenosine**. What is unique about administering Adenosine is that it is a fast-push and fast-acting drug. It may cause a second or two of asystole. Patient also must be monitored.

If the first dose of 0.1 mg/kg isn't successful, PALS allow you to repeat the **Adenosine 0.2 mg/kg**

Unstable/ Symptomatic – this patient is showing signs of poor perfusion (low B/P, feels faint, decreased or altered mental status, cool or clammy/diaphoretic) it may be due to their heart rate is too fast to deliver an adequate volume of blood to the body and requires rapid treatment/ intervention. Provide synchronized cardioversion of 0.5 - 1 joules/kg.

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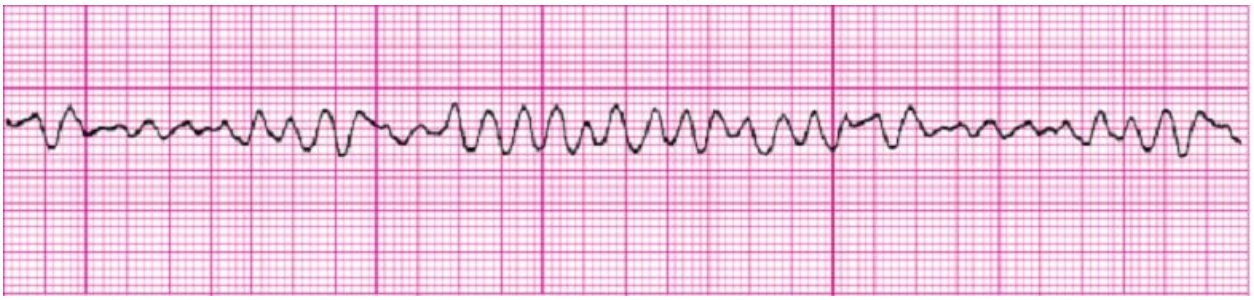
VENTRICULAR FIBRILLATION-



VFib is a chaotic and disorganized rhythm that generates absolutely no perfusion! The heart is quivering as it is dying and requires **IMMEDIATE defibrillation**…do not delay! The sooner the heart in VF can be defibrillated, the higher the chances of successfully converting to an organized rhythm.

Quickly….

1. Rapidly assemble your team
2. Begin chest compressions
3. Apply defibrillator (hands-free) pads to patient, clear your co-workers from touching the patient or the bed and deliver **2 – 4 J/kg** shock as quickly as you can. Hands free defibrillation allows for rapid defibrillation. Ensure oxygen sources are

Immediately after the shock is delivered, resume compressions and bag mask ventilations. (CPR should not stop for more than 10 seconds.)

You will continue CPR for 2 minutes (make sure your timer/recorder is tracking this for you) and prepare your first drug – your first medication will be **Epinephrine 0.0**1mg, Ensure IV or IO access if not already established.

At **2 minutes** clear to reevaluate your rhythm- if VF persists charge and **defibrillate a second time at 4 J/kg**, clear the patient and deliver the shock. Immediately resume compressions **(make sure to rotate compressor and person bagging every 2 minutes for optimal compressions- you will get tired quickly)**

During this 2 minute cycle administer the **Epinephrine** and prepare the second medication- **Amiodarone 5 mg/kg**

Consider H & Ts

H's & T's

Hypoxia	Toxins
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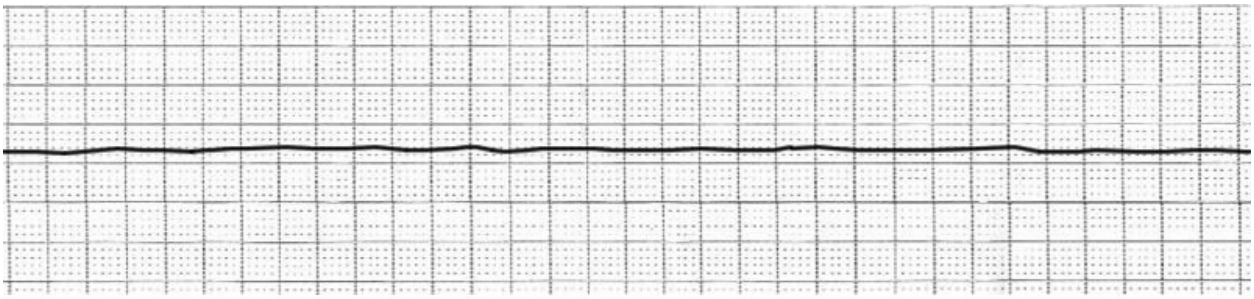
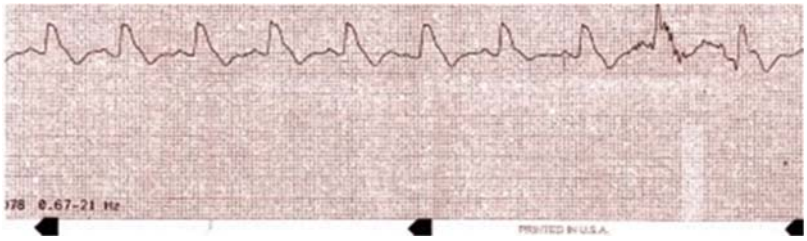
Asystole/PEA



– Electrical Activity without mechanical contractility – rhythm without a pulse



Asystole/PEA requires immediate intervention

1. Begin compressions and airway management, good CPR.
2. Assign team roles
3. Administer **Epinephrine 0.01mg/kg** IVP as soon as it's available.
4. 0.01 mg/kg of Epinephrine (1:10,000 used in cardiac arrest) is given every 3-5 minutes and there is no maximum dose.

A critical step to restoring a perfusing rhythm is to quickly identify one of the underlying/reversible causes that most frequently lead to asystole. The most common are known as the H's & T's! As a team leader you should run through the list for consideration.

H's & T's

Hypoxia	Toxins
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SHOCK

Definition – Inadequate tissue delivery of oxygen and nutrients to meet metabolic demand, characterized by inadequate peripheral and end organ perfusion.

Shock can result from:

Inadequate volume or blood (**hypovolemic/hemorrhagic shock**)

- Diarrhea
- Hemorrhage (internal and external)
- Vomiting
- Inadequate fluid intake
- Osmotic diuresis (eg, DKA)
- Third space losses (fluid leak into tissues)
- burns

Inappropriate distribution of blood volume and/or flow (**distributive shock**)

- septic shock
- anaphylactic shock
- neurogenic shock

Obstructed blood flow (**obstructive shock**)

- cardiac Tamponade
- tension pneumothorax
- massive pulmonary embolism

Impaired cardiac function (**cardiogenic shock**)

- congenital defects
- myocarditis
- cardiomyopathy
- arrhythmias
- myocardial injury (trauma or thrombosis)

Signs and symptoms for shock:

Changes in mental status

Subtle changes (uncomfortable, crying) in early shock and severe (lethargic or unconscious) in late shock

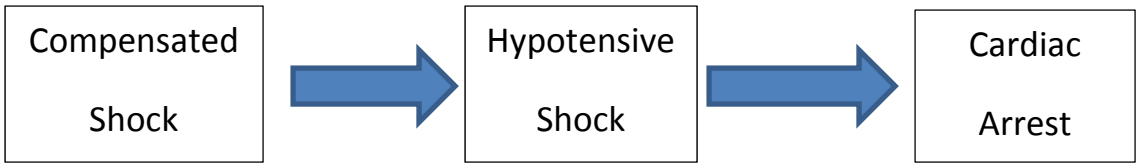
Changes in breathing

Tachypnea without increased effort, good SaO2, usually due to increased cardiac workload and decreased oxygen delivery

Signs and symptoms for shock (continued):

Changes in circulation and end organ perfusion:

- Tachycardia
- Normal blood pressure (compensated) or hypotension (hypotensive)
- Weak or absent peripheral pulses
- Delayed capillary refill
- Cool, pale, and diaphoretic skin



Hypotension Formula

Newborn – 1 month (>60 mm Hg)

1 month – 1 year (> 60-70 mm Hg)

1 year – 10 years (> 70 + [2 x age] mm Hg)

If the child has a systolic blood pressure **less than the Hypotension Formula**, the child is in **Hypotensive Shock**.

If the child is exhibiting signs of shock with a systolic blood pressure **greater than the Hypotension Formula**, the child is in **Compensated Shock**.

Treatment for Shock

General management of shock:

- Positioning
- Oxygen (94 – 99% SaO2)
- Vascular Access (IV or intraosseous)
- Fluid Resuscitation (20 cc/kg isotonic crystalloid given rapidly over 5 – 10 min)
    - Repeat as necessary to ensure adequate perfusion
    - Vasopressor consideration after fluid resuscitation (usually consider 3 boluses prior to vasopressor, certain distributive and cardiogenic shock may require early vasopressor support)
- Monitoring
- Frequent Reassessment

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Respiratory Distress and Failure

The main role of the respiratory system is to exchange gases. Oxygen is taken in through the upper airway into the lower airway (lungs) where the lung tissue (alveoli) exchange oxygen and CO2 gases with the blood cells. This is all controlled by the child's mechanism to breath.

The pediatric patient has a high metabolic rate; therefore, oxygen demand is much higher than that in adults. If there is a complication with respiration and or ventilation, potential hypoxia/hypoxemia can develop more rapidly in the child than the adult.

Respiratory Distress is characterized by increased respiratory rate and increased effort but is still able to meet the minimal oxygen demands of the body.

Respiratory Failure is a clinical state of inadequate oxygenation, ventilation, or both. Failure to meet the oxygen demands of the body.

Respiratory Distress and Failure can result from:

Upper Respiratory Emergencies

Causes	Clinical Signs
• Foreign body aspiration • Anaphylaxis • Croup • Epiglottitis	• Tachypnea • Increased respiratory effort • Change in voice or cry • Seal bark like cough • Stridor (inspiration noise) • Poor chest rise

Lower Respiratory Emergencies

Causes	Clinical Signs
• Reactive Airway Disease (RAD)/Asthma • Bronchioitis	• Tachypnea • Wheezing (expiratory noise) • Increased respiratory effort • Prolonged expiratory phase

Lung Tissue Disease

Causes	Clinical Signs
• Pneumonia (bacterial, viral, or chemical) • Pulmonary Edema • Acute Respiratory Distress Syndrome (ARDS) • Pulmonary contusion	• Tachypnea • Tachycardia • Increased respiratory effort • Grunting (Auto PEEP) • Hypoxemia • Crackles • Diminished breath sounds

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Disorder of Breathing

Causes	Clinical Signs
• Neurological Disorders (seizure, head injury) • Toxin • Drug overdose • Drug reaction	• Variable respiratory rate • Variable respiratory effort • Shallow breathing • Apnea

Initial Management of Respiratory Distress or Failure

Airway

- Support the airway or open the airway
  - If possible, allow the child to remain in a position of comfort
- Clear the airway
- Insert oropharengeal airway(OPA) or nasopharengeal airway (NPA)

Breathing

- Assist ventilation as needed (BVM)
- Provide oxygen (humidified if possible)
- Continuously monitor oxygen saturation by pulse oximetry 94-99%
- Prepare for advanced airway (ie, intubation) as necessary
- Administer medication as needed for the clinical condition

Circulation

- Monitor heart rate and rhythm
- Establish vascular access as indicated