**PALS Provider Exam** has 50 multiple-choice questions. Passing score is 84%. Student may miss 8 questions. All AHA exams are “open resource” so Student may use books and/or handouts for the exam.

**Mandatory Precourse Self-Assessment Score at least 70% to pass. Bring proof of completion to class.**

How to Find Precourse Self-Assessment Course for Traditional PALS Course and Traditional PALS Update Course click on link.

How to Find Precourse Self-Assessment Course and Precourse Work for PALS Course and PALS Update Course click on link.

**Basic Dysrhythmias knowledge is required** in relation to asystole, ventricular fibrillation, tachycardias in general and Bradycardias in general. Student does not need to know the “ins and outs” of each one. Tachycardias need to differentiate wide complex (ventricular tachycardia) and narrow complex (supraventricular tachycardia or SVT).

*Systematic Approach Algorithm*

**Initial Impression**

* Appearance
* Work of Breathing
* Circulation

**EVALUATE-IDENTIFY-INTERVENE**



**A continuous sequence.**

**\*\*Determine if problem is life threatening.**

**EVALUATE**

**PRIMARY ASSESSMENT**

* **A**irway
* **B**reathing
* **C**irculation
* **D**isability
	+ AVPU – Alert, Voice, Painful, Unresponsive
	+ Glasgow Coma Scale, Pupils
	+ Blood glucose
* **E**xposure

**SECONDARY ASSESSMENT**

**6 Hs 5 Ts - Search for Reversible Causes**

|  |  |
| --- | --- |
| **H’s** | **T’s** |
| **H** ypovolemia**H** ypoxia**H** ydrogen ion **(acidosis)****H** ypoglycemia**H** ypo /hyper kalemia**H** ypothermia | **T** ension pneumothorax**T** amponade, cardiac**T** oxins – poisons, drugs**T** hrombosis – coronary (AMI)**T** hrombosis – pulmonary (PE) |

* Focused medical history
* A focused physical exam
* Ongoing reassessment

**S** - Signs & symptoms (What hurts?)

**A** - Allergies

**M** - Medications

**P** - Past medical history

**L** - Last meal

**E** - Events Preceding, what happened

**DIAGNOSTIC ASSESSMENT**

* ABG, Venous blood gas, arterial lactate
* Central venous O2 saturation, CVP
* CXR, ECG, Echo
* Peak expiratory flow rate

**IDENTIFY**

**Type and Severity of Potential Problems**

|  |  |
| --- | --- |
| **Respiratory** | **Circulatory** |
| Respiratory DistressORRespiratory Failure | Compensated ShockORHypotensive Shock |
| Upper airway obstructionLower airway obstructionLung tissue diseaseDisordered control of breathing | Hypovolemic shockDistributive shockCardiogenic shockObstructive shock |
| **Cardiopulmonary Failure****Cardiac Arrest** |

**INTERVENE**

* Positioning the child to maintain a patent airway
* Activating emergency response
* Starting CPR
* Obtaining the code cart and monitor
* Placing the child on a cardiac monitor and pulse oximeter
* Administering O2
* Supporting ventilation
* Starting medications and fluids using nebulizer, IV/IO fluid bolus

**An intubated patient’s condition deteriorates; consider the following possibilities (DOPE):**

* **D**isplacement of the tube from the trachea
* **O**bstruction of thetube
* **P**neumothorax
* **E**quipment failure

IMPORTANT PALS STATEMENTS

* Airway – 2-year-old child is grunting - immediate intervention
* Airway – deteriorates after oral airway, next provide bag-mask ventilation
* Airway – snoring with poor chest rise and poor air entry bilaterally - reposition patient, insert an oral airway
* AVPU (Alert, Voice, Painful, Unresponsive) Pediatric Response Scale - findings normal - rated as Alert
* CPR – 1-rescuer 30:2 compression-to-ventilation ratio; 2-rescuer 15:2 compression-to-ventilation
* CPR – after defibrillation resume compressions
* CPR – high quality component - allow complete chest wall recoil after each compression
* CPR – simultaneous pulse and breathing check no more than 10 seconds
* CPR – you are alone with infant - Begin CPR for 2 minutes before leaving to activate emergency response system
* Defibrillation – initial dosage for 20 kg child is 2 to 4 J/kg; child is 20 kg (2J x 20 kg) use 40 J
* Fluid resuscitation – 20 mL/kg normal saline over 5 to 10 minutes
* IO method of rapid vascular access for cardiac arrest, an extremity with slow capillary refill time
* Motor vehicle accident, immediate intervention for decreased level of consciousness
* Oxygen sat – below 90 while on oxygen - immediate intervention - ideal 94% to 99% (not 94% to 100%)
* Respiratory – respiratory distress - audible inspiratory stridor
* Respiratory – respiratory failure - lethargic, rapid respiratory rate, most indicative of a low oxygen saturation
* Respiratory – signs of respiratory failure 1-year-old child - lethargic, decreasing respiratory rate, severe subcoastal retractions
* Respiratory – respiratory failure with fever, antibiotic is the most appropriate medication
* Respiratory – lower airway obstruction - prolonged expiratory phase and wheezing
* Respiratory – seizures, slow respirations - disordered control of breathing
* Respiratory – unresponsive, respirations 6 per minute - provide bag-mask ventilation with 100% O2
* Respiratory – upper airway obstruction - increased work of breathing, inspiratory effort with retractions, stridor, nut allergy
* Respiratory – upper airway obstruction drug - Epinephrine, nebulized
* Respiratory distress from lung tissue disease - crackles
* Rhythm – Sinus Bradycardia, no pulse - pulseless electrical activity (PEA)
* Rhythm – hypoxia most likely cause of Sinus Bradycardia in an infant
* Rhythm – pulse above 180 narrow complex, regular - Supraventricular Tachycardia (SVT)
* Rhythm – rate slow, Sinus Bradycardia
* Rhythm – Supraventricular Tachycardia, hypotensive - synchronized cardioversion
* Shock – distributive, septic - fever, lactic acidosis, antibiotic administration as an additional early intervention
* Shock – fever, hypotensive - IV 20 mL/kg of normal saline over 5 to 10 minutes
* Shock – hypotensive - best assessment variable is blood pressure-59/29 mm Hg for 3-month-old boy; 55/40 mm Hg for 2-week-old infant
* Shock – hypovolemic shock - history vomiting, diarrhea
* Shock – severity, compensated or not is determined by the blood pressure, not other variables
* Team dynamics – out of scope of practice: team member should ask for a new task or role
* Team dynamics – wrong dose by team leader; Respond “I think the correct dose is . . . should I give instead?"
* Vital Signs – Heart rate 88 is normal for a 10-year-old; respiratory rate 24 normal for 3-year-old
* 18-month-old child with vomiting, diarrhea assess blood glucose first

**Vital Signs in Children - Normal Ranges**

|  |  |  |  |
| --- | --- | --- | --- |
| Age | Systolic BP | Pulse (awake) | Respirations |
| Neonate | 67-84 | 100-205 |  |
| Infant | 72-104 | 100-180 | 30-53 |
| Toddler | 86-106 | 98-140 | 22-37 |
| Preschooler | 89-112 | 80-120 | 20-28 |
| School-aged | 97-115 | 75-118 | 18-25 |
| Adolescent | 110-131 | 60-100 | 12-20 |

**Treatment of Dysrhythmias - General Overview. See PALS text for details**

***Bradycardia***

* Maintain patent airway, assist breathing positive pressure ventilation, O2 if needed, monitor
* ABCs, consider oxygen, observe, 12 lead ECG, identify and treat underlying causes
* Bradycardia persists: IV/IO, Epinephrine 0.01 mg/kg, Atropine 0.02 mg/kg may repeat 1x, consider pacing, treat underlying causes
* Continuous CPR if heart rate below 60

***Tachycardia with a Pulse***

* Maintain patent airway, assist breathing as necessary, oxygen, monitor, pulse, BP oximetry
* Sinus Tach – treatable causes, rhythm in infants/children may be slightly regular or irregular
* SVT asymptomatic consider vagal maneuvers and give adenosine if IV/IO present
* SVT – rhythm regular - infant rate above 220, child above 180 SVT - Adenosine 0.1 mg/kg rapid bolus (max 6 mg), repeat 0.2 mg/kg rapid bolus (max 12 mg)
* F
* QRS wide? – Probable V Tach – 12 lead ECG, adenosine as above, synchronized cardioversion 0.5 to 1 J/kg then 2 J/kg. Sedate if needed. Do not delay cardioversion

***Pediatric Cardiac Arrest - H's T's***

* CPR – If no advanced airway 15:2 compression-to-ventilation. If advanced airway breath every 2-3 seconds, bag/mask, 02, monitor/defib
* Shockable (VF/VT) – CPR 2 min,
	+ Shock 2 J/kg, then 4 J/kg to max of 10 or adult dose
	+ Epinephrine 0.1 mg/kg repeat 3 to 5 min (max 1 mg)
	+ Amiodarone 5mg/kg repeat up to 3 times or Lidocaine 1 mg/kg
* Non-shockable (Asystole/PEA) – CPR 2 minutes
	+ Epinephrine ASAP Epinephrine 0.1 mg/kg repeat 3 to 5 min (max 1 mg)
	+ Treat reversible causes

**Respiratory - See PALS text for full details**

|  |
| --- |
| **Managing Respiratory Emergencies Flowchart** |
| * Airway positioning
* Suction as needed
 | * Oxygen
* Pulse Oximetry
 | * ECG as Indicated
* BLS as indicated
 |
| Upper Airway | Croup | * Nebulized Epinephrine
* Corticosteroids
 |
| Anaphylaxis | * IM Epinephrine (or autoinjector)
* Albuterol
* Antihistamines
* Corticosteroids
 |
| Aspiration foreign body | * Allow position of comfort
* Specialty consultation
 |
| Lower Airway Obstruction | Bronchiolitis | * Nasal Suctioning
* Consider bronchodilator trial
 |
| Asthma | * Albuterol + Ipratropium
* Corticosteroids
* Magnesium sulfate
* IM Epinephrine (if severe)
* Terbutaline
 |
| Lung Tissue DiseaseSpecific management for selected conditions | Pneumonia/pneumonitisInfectiousChemicalAspiration | * Albuterol
* Antibiotics (if indicated)
* Consider noninvasive or invasive ventilatory support with PEEP
 |
| Pulmonary edemaCardiogenic or noncardiogenic (ARDS) | * Consider noninvasive or invasive ventilatory support with PEEP
* Consider vasoactive support
* Consider diuretic
 |
| Disordered Control of BreathingSpecific management for selected conditions | Increased ICP | Avoid:* Hypoxemia
* Hypercarbia
* Hyperthermia
* Hypotension
 |
| Poisoning/overdose | * Antidote (if available)
* Contact poison control
 |
| Neuromuscular disease | * Consider noninvasive or invasive ventilatory support
 |

**Shock - See PALS text for full details**

|  |
| --- |
| **Managing Shock Flowchart**  |
| * Oxygen
* Pulse Oximetry
 | * ECG Monitor
* IV/IO access
 | * BLS as indicated
* Point-of-care glucose testing
 |
| Hypovolemic Shock | Nonhemorrhagic | * 20 mL/kg NS/LR bolus, repeat as needed
* Consider colloid fluid10 to 20mL/kg
 |
| Hemorrhagic | * Control external bleeding
* 20 mL/kg NS/LR bolus, repeat 2 or 3x as needed
* Transfuse PRBC’s as needed
 |
| Distributive Shock | Septic | * See Septic Shock Algorithm
	+ Support ABCs
	+ HR, BP, Pulse Oximetry, IV/IO
	+ 10-20 mL/kg colloid fluid bolus (assess). Stop if resp distress, hepatomegaly
	+ Blood culture, lab studies, glucose
	+ Broad spectrum antibiotics (after cultures)
	+ Antipyretics if needed
 |
| Anaphylactic | * IM Epinephrine (or autoinjector)
* Fluid bolus (10-20 mL/kg NS/LR)
* Albuterol, Antihistamines, Corticosteroids
* Epinephrine infusion
 |
| Cardiogenic Shock | BradycardiaTachycardia | * Management algorithms
 |
| Other: CHD, myocarditis, cardiomyopathy, poisoning | * 5-10 mL/kg NS/LR bolus, repeat PRN
* Inotropic and/or vasoactive infusions
* Consider expert consultation
* Antidote for poisoning
 |
| Obstructive Shock | Ductal-dependent (LV outflow obstruction) | * Prostaglandin E1
* Expert consultation
 |
| Tension pneumothorax | * Needle decompression
* Tube thoracostomy
 |
| Cardiac tamponade | * Pericardiocentesis
* 20 mL/kg NS/LR bolus
 |
| Pulmonary embolism | * 20 mL/kg NS/LR bolus, repeat PRN
* Consider thrombolytics, anticoagulants
* Expert consultation
 |

**Signs of compensated shock include (poor perfusion, NORMAL systolic BP)**

* Tachycardia
* Increased SVR
* Skin - cold, pale, mottled, diaphoretic
	+ - Peripheral circulation - delayed capillary refill
* Pulses - weak peripheral pulses, narrowed pulse pressure
* Increases renal and splanchnic vascular resistance (redistribution of blood flow)
* Kidney - decreased urine output, oliguria
	+ - Intestine - vomiting, ileus
* Cerebral auto regulation - brain, altered mental status, anxiety, coma
* **Normalblood pressure**

**Signs of decompensated shock include**

As compensatory mechanisms fail, signs of inadequate end-organperfusion develop. In addition to the above, these signs include:

* Depressed mental status, decreased urine output
* Metabolicacidosis, Tachypnea, Weak central pulses
* **Hypotension**

The most common cause of shock is hypovolemia, one form of whichis hemorrhagic shock. Distributive and cardiogenic shock areseen less often

* Capillary refill time aloneis not a good indicator of circulatoryvolume, but a capillaryrefill time of >2 seconds is a usefulindicator of moderatedehydration when combined with a decreasedurine output, absenttears, dry mucous membranes, and a generallyill appearance
* Tachycardia also results from othercauses (e.g., pain, anxiety,fever)
* Pulses may be boundingin anaphylactic, neurogenic, and septicshock

In compensated shock, blood pressure remains normal; it is lowin decompensated shock. Hypotension is a *systolic* blood pressureless than the 5th percentile of normal for age

**Pediatric Cardiac Arrest Medications**

|  |  |  |
| --- | --- | --- |
| **Medication** | **Dose** | **Remarks** |
| Epinephrine | Pulseless arrest, symptomatic Bradycardia0.01 mg/kg IV/IO q 3 to 5 min0.1 mg/kg ET q 3 to 5minSymptomatic Brady - 0.01 mg/kg | Doses vary for other conditions and situations |
| Atropine | Bradycardia - 0.02 mg/kg IV/IO q 3 to 5 min0.04 to 0.06 mg/kg ET | Child max 1 mg total doseAdolescent max 3 mg total dose |
| Adenosine | SVT 0.1 mg/kg IV/IO rapid push max 6 mgRepeat 0.02 mg/kg max 12 | Rapid push closest port followed by fluid bolus 5-10 ml NS |
| Amiodarone | SVT, VT with pulse 5 mg/kg IV/IOPulseless arrest 5 mg/kg IV/IOTotal 15 mg/kg, max single dose 300 mg | load over 20-60 minmay produce prolonged QT |
| Naloxone | 0.1 mg/kg IV/IO/IM bolus q 2 min | max 2 mg½ life is short, repeated dosingMay wake up agitated |
| Lidocaine | VF/ Pulseless VT1 mg/kg IV/IO bolus. 2 to 3 mg/kg ET | Maintain 20 to 50 mcg/kg/min |
| DextroseGlucose | 0.5 to 1 g/kg IV/IO | Use bedside glucose check to confirm hypoglycemia |
| Magnesium Sulfate | Asthma refractory 25 to 50 mg/kg IV/IOPulseless V-Tach Torsades 25-50 mg/kg | Max 2 GMay cause Bradycardia |