

ECC



American Heart Association

Pediatric Advanced Life Support

Written Precourse Self-Assessment

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PALS Written 2006 Precourse Self-Assessment

ECG Rhythm Identification

The PALS self-assessment on ECG rhythm identification is designed to test your ability to identify rhythms you may encounter as a PALS provider. The rhythms listed below in boldface type are the core PALS rhythms that you should be able to identify during the PALS Provider Course teaching and testing stations. If you have difficulty with pediatric ECG rhythm identification, we strongly suggest that you spend additional time reviewing basic pediatric arrhythmias before the PALS Provider Course. Sources of information about pediatric ECG rhythm identification include the ECG Basics section of the student CD, the *PALS Course Guide*, and the *PALS Provider Manual*.

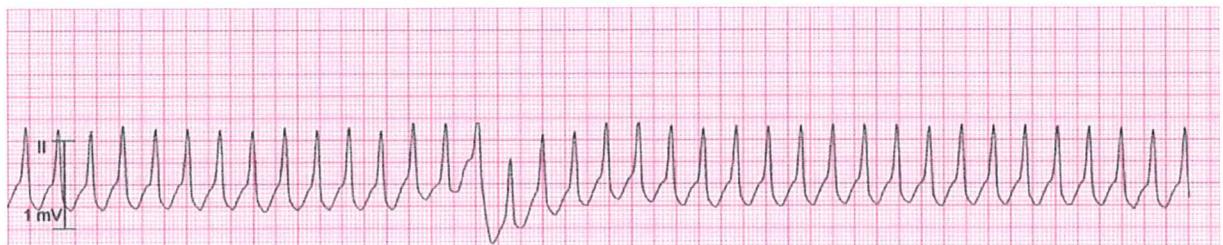
The rhythm identification self-assessment has 13 multiple choice questions. Questions 1 to 8 cover the core PALS rhythms (see rhythms in boldface below). Questions 9 to 13 contain advanced material that you don't have to know before the PALS course but that may be useful to your clinical practice. For all questions select the single best answer (ie, rhythm) from the list of 14 rhythms (A to M) below. A question may have more than one correct answer. Annotated answers that explain both correct and incorrect answer selections are located at the end of the self-assessments. The ECG Basics sections of the student CD and other sources of information are given in the annotations. There are 3 self-assessment tests: ECG Rhythm Identification, Pharmacology, and Practical Application.

Pediatric Rhythms (core PALS rhythms A to H; non-core rhythms I to M):

- A. **Normal sinus rhythm**
- B. **Sinus tachycardia**
- C. **Sinus bradycardia**
- D. **Supraventricular tachycardia (SVT)**
- E. **Wide-complex tachycardia; presumed ventricular tachycardia (monomorphic)**
- F. **Ventricular fibrillation (VF)**
- G. **Asystole**
- H. **Pulseless electrical activity (PEA)**
- I. **SVT converting to sinus rhythm with adenosine administration**
- J. **Wide-complex tachycardia (in a child with known aberrant intraventricular conduction; this is SVT with aberrant conduction)**
- K. **First-degree AV block**
- L. **Torsades de pointes (polymorphic ventricular tachycardia)**
- M. **VF converted to organized rhythm after successful shock delivery (defibrillation)**

Rhythms 1 to 8: Core PALS Rhythms (**select single best answer from rhythms A to H**)

Rhythm 1 (clinical clue: heart rate 214/min)



For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias and Chapter 7: Recognition and Management of Cardiac Arrest.

Rhythm 2 (clinical clues: heart rate 44/min; no detectable pulses)



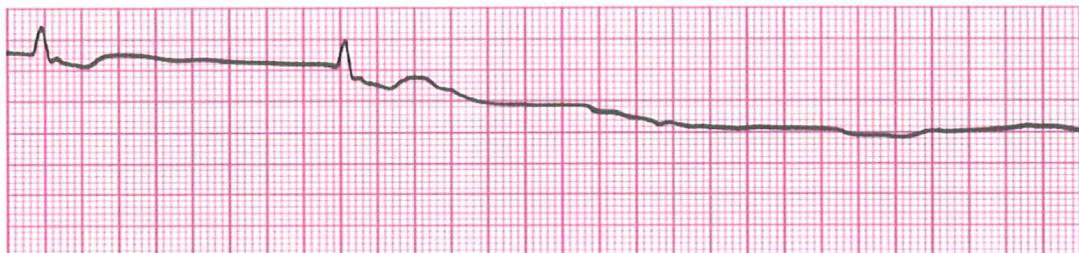
For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias.

Rhythm 3 (clinical clues: age 8 years; heart rate 50/min)



For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias.

Rhythm 4 (clinical clue: no detectable pulses)



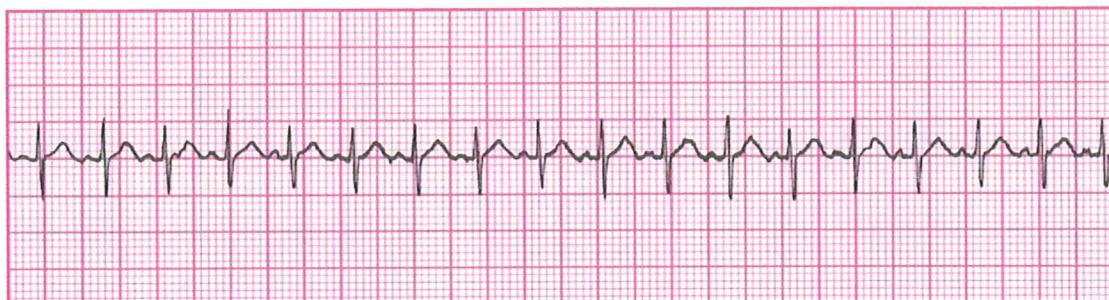
For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest.

Rhythm 5 (clinical clue: no consistent heart rate detected; no detectable pulses)



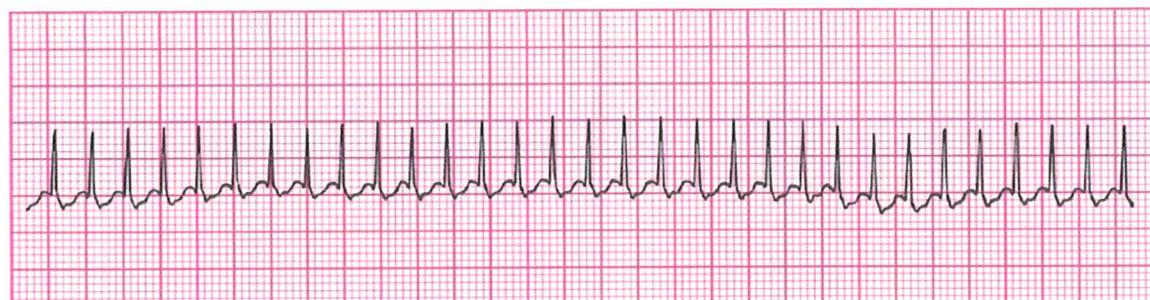
For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest.

Rhythm 6 (clinical clues: age 3 years; heart rate 188/min)



For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias.

Rhythm 7 (clinical clue: heart rate 300/min)



For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias.

Rhythm 8 (clinical clues: age 8 years; heart rate 75/min)



Rhythms 9 to 13: Non-core Rhythms

Rhythm 9 (clinical clue: initial rhythm associated with no detectable pulses)



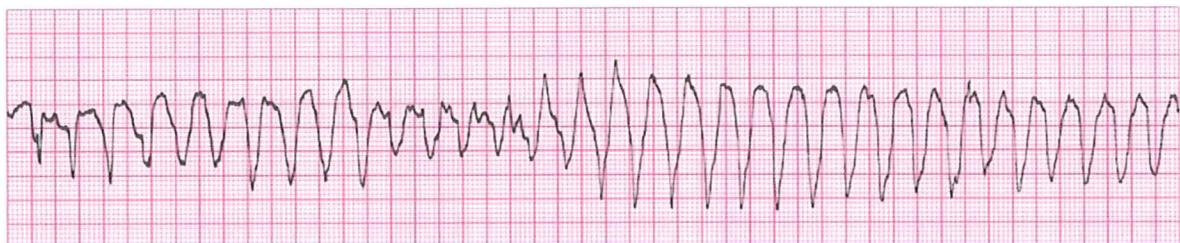
For further information: see PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest

Rhythm 10 (clinical clues: age 9 months; heart rate 38/min)



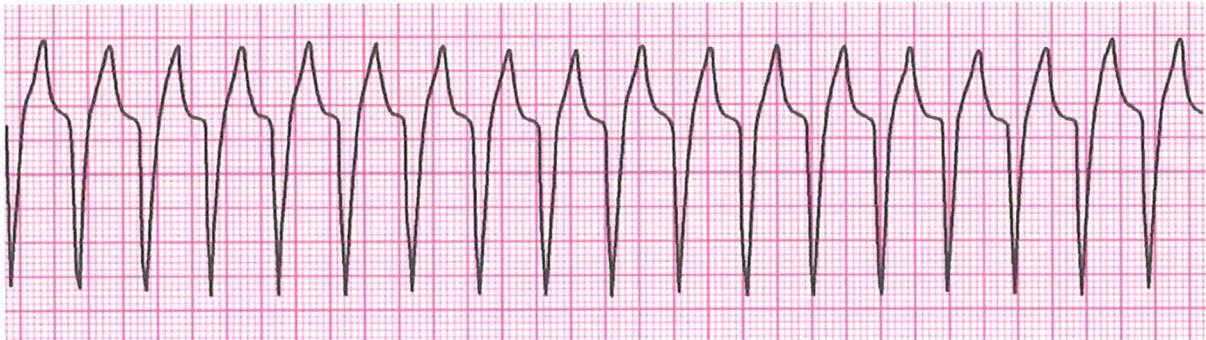
For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias.

Rhythm 11 (clinical clues: heart rate 200/min; no detectable pulses)



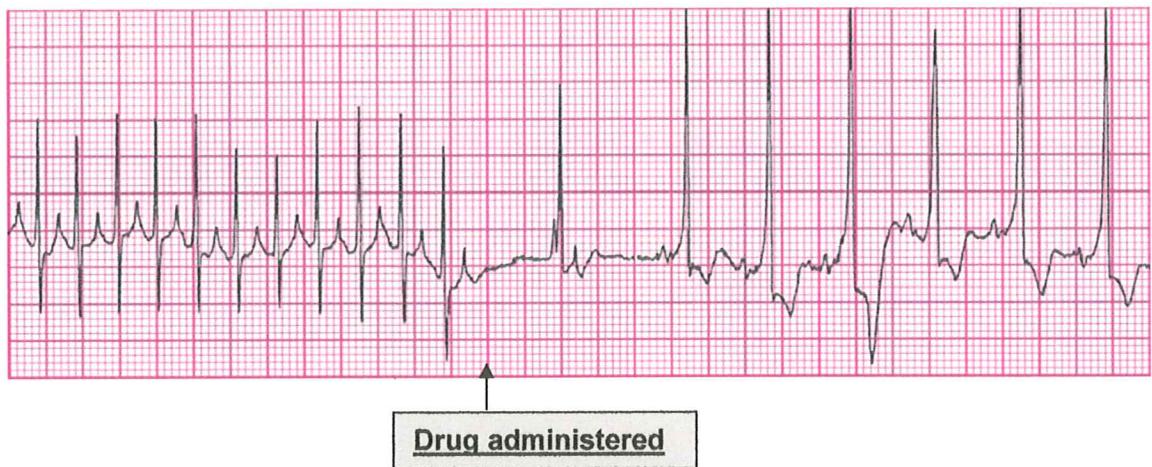
For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias and Chapter 7: Recognition and Management of Cardiac Arrest.

Rhythm 12 (clinical clue: heart rate 150/min)



For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias.

Rhythm 13 (clinical clue: initial rhythm associated with heart rate 300/min)



For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias.

PALS Written 2006 Precourse Self-Assessment

Pharmacology

The PALS Pharmacology Self-Assessment is designed to test your knowledge of core drugs that will be used in the PALS Provider Course. This drug knowledge includes the indications, contraindications, and methods for administration of these agents. This exercise tests your ability to correctly use these drugs in scenarios similar to those you are likely to encounter in the PALS Provider Course teaching and testing stations. The stations are designed to simulate the knowledge you will need to care for seriously ill or injured children.

If this self-assessment shows that your knowledge of the pharmacology and indications for these drugs is deficient, we strongly suggest that you spend additional time reviewing basic resuscitation drug pharmacology before taking a PALS course. Sources of PALS drug information include the student CD, the *PALS Course Guide*, the *PALS Provider Manual*, and the *Handbook of Emergency Cardiovascular Care* (ECC Handbook).

The Pharmacology self-assessment consists of 11 multiple choice questions. Select the single best answer. Annotated answers that explain both correct and incorrect answer selections are located at the end of the self-assessments. The Pharmacology section of the student CD and other appropriate sources of further information are provided in the annotations. There are 3 self-assessment tests: ECG Rhythm Identification, Pharmacology, and Practical Application.

1. You are called to help resuscitate an infant with severe symptomatic bradycardia associated with respiratory distress. The bradycardia persists despite establishment of an effective airway, oxygenation, and ventilation. There is no heart block present. Which of the following is the *first drug* you should administer?

 - A. Atropine
 - B. Dopamine
 - C. Adenosine
 - D. Epinephrine

For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

2. Which of the following statements about the effects of epinephrine during attempted resuscitation is true?

 - A. Epinephrine decreases peripheral vascular resistance and reduces myocardial afterload so that ventricular contractions are more effective
 - B. Epinephrine improves coronary artery perfusion pressure and stimulates spontaneous contractions when asystole is present
 - C. Epinephrine is contraindicated in ventricular fibrillation because it increases myocardial irritability
 - D. Epinephrine decreases myocardial oxygen consumption

For further information: see the PALS Provider Manual Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

3. General assessment of a 2-year-old female reveals her to be alert with mild breathing difficulty during inspiration and pale skin color. On primary assessment, she makes high-pitched inspiratory sounds (mild stridor) when agitated; otherwise her breathing is quiet. Her SpO₂ is 92% in room air, and she has mild inspiratory intercostal retractions. Lung auscultation reveals transmitted upper airway sounds with adequate distal breath sounds bilaterally. Which of the following is the most appropriate initial therapy intervention for this child?

 - A. Perform immediate endotracheal intubation
 - B. Administer an IV dose of dexamethasone
 - C. Nebulize 2.5 mg of albuterol
 - D. Administer humidified supplementary oxygen as tolerated and continue evaluation

For further information: see the PALS Provider Manual Chapter 2: Recognition of Respiratory Distress and Failure, Chapter 3: Management of Respiratory Distress and Failure, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

4. Which of the following most reliably delivers a high (90% or greater) concentration of inspired oxygen in a toddler or older child?

- A. Nasal cannula with 4 L/min oxygen flow
 - B. Simple oxygen mask with 15 L/min oxygen flow
 - C. Nonrebreathing face mask with 12 L/min oxygen flow
 - D. Face tent with 15 L/min oxygen flow
-

5. Which of the following statements about endotracheal drug administration is true?

- A. Endotracheal drug administration is the preferred route of drug administration during resuscitation because it results in predictable drug levels and drug effects
- B. Endotracheal doses of resuscitation drugs in children have been well established and are supported by evidence from clinical trials
- C. Intravenous drug doses for resuscitation drugs should be used whether you give the drugs by the IV, intraosseous (IO), or the endotracheal route
- D. Endotracheal drug administration is the least desirable route of administration because this route results in unpredictable drug levels and effects

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

6. Which of the following statements most accurately reflects the PALS recommendations for the use of magnesium sulfate in the treatment of cardiac arrest?

- A. Magnesium sulfate is indicated for VF refractory to repeated shocks and amiodarone or lidocaine
- B. Routine use of magnesium sulfate is indicated for shock-refractory monomorphic VT
- C. Magnesium sulfate is indicated for torsades de pointes or suspected hypomagnesemia
- D. Magnesium sulfate is contraindicated in VT associated with an abnormal QT interval during the preceding sinus rhythm

For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias, Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

7. You enter a room to perform a general assessment of a previously stable 10-year-old male and find him unresponsive and apneic. A code is called and bag-mask ventilation is performed with 100% oxygen. The cardiac monitor shows a wide-complex tachycardia. The boy has no detectable pulses. You deliver an unsynchronized shock with 2 J/kg. The rhythm check after 2 minutes of CPR reveals VF. You then deliver a shock of 4 J/kg and resume immediate CPR beginning with compressions. A team member had established IO access, so you give a dose of epinephrine, 0.01 mg/kg (0.1 mL/kg of 1:10,000 dilution) IO when CPR is restarted after the second shock. At the next rhythm check, persistent VF is present. You administer a 4 J/kg shock and resume CPR. Based on the PALS Pulseless Arrest Algorithm, what are the next drug and dose to administer when CPR is restarted?
- A. Epinephrine 0.1 mg/kg (0.1 mL/kg of 1:1,000 dilution) IO
 - B. Atropine 0.02 mg/kg IO
 - C. Amiodarone 5 mg/kg IO
 - D. Magnesium sulfate 25 to 50 mg/kg IO

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

8. Parents of a 1-year-old female phoned the Emergency Response System when they picked up their daughter from the baby-sitter. Paramedics perform a general assessment revealing an obtunded infant with irregular breathing, bruises over the abdomen, abdominal distention, and cyanosis. Assisted bag-mask ventilation with 100% oxygen is initiated. On primary assessment heart rate is 36/min, peripheral pulses cannot be palpated, and central pulses are barely palpable. Cardiac monitor shows sinus bradycardia. Chest compressions are started with a 15:2 compression-to-ventilation ratio. In the emergency department the infant is intubated and ventilated with 100% oxygen, and IV access is established. The heart rate is now up to 150/min but there are weak central pulses and no distal pulses. Systolic blood pressure is 74 mm Hg. Of the following, which would be most useful in management of this infant?
- A. Epinephrine 0.01 mg/kg (0.1 mL/kg of 1:10,000 dilution) IV
 - B. Rapid bolus of 20 mL/kg of isotonic fluid
 - C. Atropine 0.02 mg/kg IV
 - D. Synchronized cardioversion

For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

9. Which of the following statements about calcium is true?

- A. Routine administration of calcium is not indicated during cardiac arrest.
- B. The recommended dose is 1 to 2 mg/kg of calcium chloride
- C. Calcium chloride 10% has the same bioavailability of elemental calcium as calcium gluconate in critically ill children
- D. Indications for administration of calcium include hypercalcemia, hypokalemia, and hypomagnesemia

For further information: see the PALS Provider Manual Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

10. An infant with a history of vomiting and diarrhea arrives by ambulance. During your primary assessment the infant responds only to painful stimulation. The upper airway is patent, the respiratory rate is 40/min with good bilateral breath sounds, and 100% oxygen is being administered. The infant has cool extremities, weak pulses, and a capillary refill time of more than 5 seconds. The infant's blood pressure is 85/65 mm Hg, and glucose concentration (measured by bedside test) is 30 mg/dL. Which of the following is the most appropriate treatment to provide for this infant?

- A. Establish IV or IO access and administer 20 mL/kg D₅0.45% sodium chloride bolus over 15 minutes
- B. Establish IV or IO access and administer 20 mL/kg Lactated Ringer's solution over 60 minutes
- C. Perform endotracheal intubation and administer epinephrine 0.1 mg/kg 1:1,000 via the endotracheal tube
- D. Establish IV or IO access, administer 20 mL/kg isotonic crystalloid over 10 to 20 minutes, and simultaneously administer D₂₅W 2 to 4 mL/kg in a separate infusion

For further information: see the PALS Provider Manual Chapter 4: Recognition of Shock, Chapter 5: Management of Shock, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

11. General assessment of a 9-year-old male with increased work of breathing, reveals the boy to be agitated and leaning forward on the bed with obvious respiratory distress. You administer 100% oxygen by nonrebreathing mask. The patient is speaking in short phrases and tells you that he has asthma but does not carry an inhaler. He has nasal flaring, severe suprasternal and intercostal retractions, and decreased air movement with prolonged expiratory time and wheezing. His SpO₂ is 92% (on nonrebreathing mask). What is the next medical therapy to provide to this patient?
- A. Adenosine 0.1 mg/kg
 - B. Amiodarone 5 mg/kg IV/IO
 - C. Albuterol by nebulization
 - D. Procainamide 15 mg/kg IV/IO

For further information: see the PALS Provider Manual Chapter 3: Recognition of Respiratory Distress and Failure, Chapter 4: Management of Respiratory Distress and Failure, Chapter 9: Pharmacology, and the PALS Course Guide Part 10: Pharmacology.

PALS Written 2006 Precourse Self-Assessment

Practical Application

The PALS practical application self-assessment is designed to test your knowledge of appropriate treatment selections based on pediatric assessment information provided in case scenarios. This exercise specifically evaluates your ability to identify core PALS rhythms (if presented), knowledge of core drugs, knowledge of the PALS flowcharts and algorithms for respiratory distress/respiratory failure and shock, and knowledge of the PALS algorithms for rhythm disturbances.

In previous self-assessments you practiced your pediatric rhythm identification skills (ECG Rhythm Identification) and your knowledge of core drugs (Pharmacology). Ideally you should demonstrate proficiency in these subjects before continuing with this test.

If you have difficulty with the practical application questions, we strongly suggest that you review the core the PALS rhythms, core drug information, the PALS flowcharts and algorithms for respiratory distress/failure and shock, and the PALS algorithms for rhythm disturbances.

Sources of this information include the student CD (see Practice Cases), the *PALS Course Guide*, the *PALS Provider Manual*, and the *Handbook of Emergency Cardiovascular Care*.

This self-assessment consists of 19 multiple choice questions. Select the single best answer. Annotated answers that explain both correct and incorrect answer selections are located at the end of the self-assessments. The ECG Basics and Pharmacology sections of the student CD and other appropriate sources of information are in the annotations. There are 3 self-assessment tests: ECG Rhythm Identification, Pharmacology, and Practical Application.

1. An 8-month-old male is brought to the emergency department (ED) for evaluation of severe diarrhea and dehydration. In the ED the child becomes unresponsive and pulseless. You shout for help and start CPR at a compression rate of 100/min and a compression-to-ventilation ratio of 30:2. Another provider arrives, at which point you switch to 2-rescuer CPR with a compression-to-ventilation ratio of 15:2. The cardiac monitor shows the following rhythm:



The infant is intubated and ventilated with 100% oxygen. An IO line is rapidly established and a dose of epinephrine is given. Of the following choices for management, which would be most appropriate to give next?

- A. Defibrillation 2 J/kg
- B. Normal saline 20 mL/kg IV rapidly
- C. High-dose epinephrine, 0.1 mg/kg (0.1 mL/kg of 1:1,000 dilution), IO
- D. Amiodarone 5 mg/kg IO

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, the PALS Course Guide Part 6: Cardiac Arrest, and Part 10: Pharmacology.

2. General assessment of a 10-month-old male in the emergency department reveals a lethargic pale infant with slow respirations. You begin assisted ventilation with a bag-mask device using 100% oxygen. On primary assessment heart rate is 38/min, central pulses are weak but distal pulses cannot be palpated, blood pressure is 60/40 mm Hg, and capillary refill is 4 seconds. During your assessment a colleague places the child on a cardiac monitor and you observe the following rhythm:



The rhythm remains unchanged despite ventilation with 100% oxygen. What are your next management steps?

- A. Administer adenosine 0.1 mg/kg rapid IV/IO and prepare for synchronized cardioversion
- B. Start chest compressions and give epinephrine 0.1 mg/kg (0.1 mL/kg of 1:1,000 dilution) IV/IO
- C. Start chest compressions and give epinephrine 0.01 mg/kg mL/kg of 1:10,000 dilution) IV/IO
- D. Administer 20 mL/kg isotonic crystalloid and epinephrine 0.1 mg/kg mL/kg of 1:10,000 dilution) IV/IO

For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias, Chapter 9: Pharmacology, the PALS Course Guide Part 7: Bradyarrhythmias and Tachyarrhythmias and Part 10: Pharmacology.

3. A 3-year-old unresponsive, apneic child is brought to the emergency department. EMS personnel report that the child became unresponsive as they arrived at the hospital. The child is receiving CPR, including bag-mask ventilation with 100% oxygen and chest compressions at a rate of 100/min. Compressions and ventilations are being coordinated at a ratio of 15:2. You confirm that apnea is present and that ventilation is producing bilateral breath sounds and chest expansion while a colleague confirms absent pulses. Cardiac monitor shows the following rhythm:

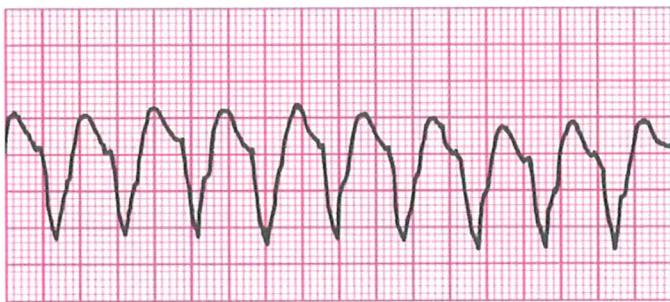


A biphasic manual defibrillator is present. You quickly use the crown-heel length of the child on a length-based, color-coded resuscitation tape to estimate the approximate weight as 15 kg. Which of the following therapies is most appropriate for this child at this time?

- A. Establish IV/IO access and administer amiodarone 5 mg/kg IV/IO
- B. Establish IV/IO access and administer lidocaine 1 mg/kg IV/IO
- C. Attempt defibrillation at 30 J, then resume CPR beginning with compressions
- D. Establish IV/IO access and administer epinephrine 0.01 mg/kg (0.1 mL/kg of 1:10,000 dilution) IV/IO

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, the PALS Course Guide Part 6: Cardiac Arrest, and Part 10: Pharmacology.

4. General assessment of a 10-year-old male shows him to be unresponsive. You shout for help, check breathing, find he is apneic, and give 2 breaths. After finding that he is pulseless, you begin cycles of compressions and ventilations with a compression rate of 100/min and compression-to-ventilation ratio of 30:2. A colleague arrives and places the child on a cardiac monitor, revealing the following rhythm:

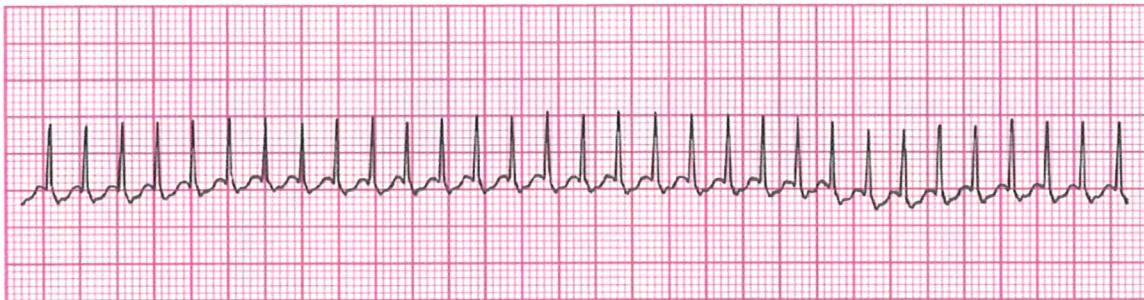


The two of you attempt defibrillation at 2 J/kg and give 2 minutes of CPR. The rhythm persists at the second rhythm check, at which point you attempt defibrillation using 4 J/kg. A third colleague establishes IO access and administers one dose of epinephrine 0.01 mg/kg (0.1 mL/kg of 1:10,000 dilution) during the compressions following the second shock. If VF or pulseless VT persists after 2 minutes of CPR, what is the *next* drug/dose to administer?

- A. Epinephrine 0.1 mg/kg (0.1 mL/kg of 1:1,000 dilution) IV
- B. Adenosine 0.1 mg/kg IV
- C. Amiodarone 5 mg/kg IV
- D. Atropine 0.02 mg/kg IV

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, the PALS Course Guide Part 6: Cardiac Arrest, and Part 10: Pharmacology.

5. A 1-year-old male is brought to the emergency department for evaluation of poor feeding, fussiness, and sweating. On general assessment he is lethargic but arousable and has labored breathing and a dusky color. Primary assessment reveals a respiratory rate of 68/min, heart rate 300/min that does not vary with activity or sleep, blood pressure 70/45 mm Hg, weak brachial pulses and absent radial pulses, capillary refill 6 seconds, SpO₂ 85% in room air, and good bilateral breath sounds. You administer high-flow oxygen and place the child on a cardiac monitor. You see the following rhythm with little beat-to-beat variability of the heart rate:

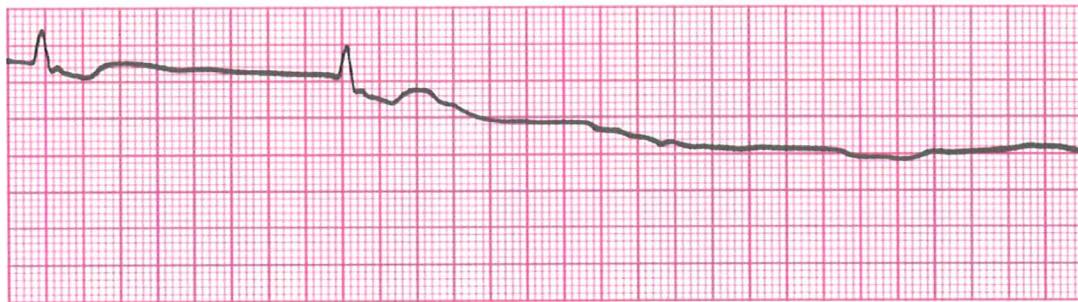


Secondary assessment reveals no history of congenital heart disease. IV access has been established. Which of the following therapies is most appropriate for this infant?

- A. Make an appointment with a pediatric cardiologist for later in the week
- B. Adenosine 0.1 mg/kg IV rapidly; if adenosine is not immediately available, perform synchronized cardioversion
- C. Perform immediate defibrillation without waiting for IV access
- D. Establish IV access and administer a fluid bolus of 20 mL/kg isotonic crystalloid

For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias, and the PALS Course Guide Part 7: Bradyarrhythmias and Tachyarrhythmias.

6. A child becomes unresponsive in the emergency department and is not breathing. You provide ventilation with 100% oxygen. You are uncertain if a faint pulse is present with the following rhythm:



What is your next action?

- A. Begin high-quality chest compressions with ventilations
- B. Order transcutaneous pacing
- C. Start an IV and give atropine 0.01 mg/kg IV
- D. Start an IV and give epinephrine 0.01 mg/kg IV (0.1 mL/kg of 1:10,000 dilution)

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, the PALS Course Guide Part 6: Cardiac Arrest, and Part 10: Pharmacology.

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7. You are preparing to use a manual defibrillator and paddles in the pediatric setting. When would it be most appropriate to use the smaller “pediatric” sized paddles for shock delivery?

- A. To attempt synchronized cardioversion but not defibrillation
- B. If the patient weighs less than approximately 25 kg or is less than 8 years of age
- C. If the patient weighs less than approximately 10 kg or is less than 1 year of age
- D. Whenever you can compress the victim's chest using only the heel of one hand

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, and the PALS Course Guide Part 6: Cardiac Arrest.

8. A 7-year-old boy is found unresponsive, apneic, and pulseless. CPR is ongoing. The child is intubated and vascular access is established. The ECG monitor reveals an organized rhythm, but a pulse check reveals no palpable pulses. Effective ventilations and compressions are resumed, and an initial IV dose of epinephrine is administered. Which of the following therapies should you perform next?
- A. Attempt to identify and treat reversible causes (using the H's and T's as a memory aid)
 - B. Attempt defibrillation at 4 J/kg
 - C. Administer epinephrine 0.1 mg/kg IV (0.1 mL/kg of 1:1,000 dilution)
 - D. Administer synchronized cardioversion at 1 J/kg

For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, and the PALS Course Guide Part 6: Cardiac Arrest.

9. You are evaluating an irritable 6-year-old girl with mottled color. On primary assessment she is febrile (temperature 40°C [104°F]), and her extremities are cold (despite a warm ambient temperature in the room) with capillary refill of 5 seconds. Distal pulses are absent and central pulses are weak. Heart rate is 180/min, respiratory rate is 45/min, and blood pressure is 98/56 mm Hg. Which of the following most accurately describes the categorization of this child's condition using the terminology taught in the PALS Provider Course?
- A. Hypotensive shock associated with inadequate tissue perfusion
 - B. Hypotensive shock associated with inadequate tissue perfusion and significant hypotension
 - C. Compensated shock requiring no intervention
 - D. Compensated shock associated with tachycardia and inadequate tissue perfusion

For further information: see the PALS Provider Manual Chapter 4: Recognition of Shock, Chapter 5: Management of Shock, and the PALS Course Guide Part 9: Shock.

10. An 8-year-old child was struck by a car. He arrives in the emergency department alert, anxious, and in respiratory distress. His cervical spine is immobilized, and he is receiving a 10 L/min flow of 100% oxygen by nonrebreathing face mask. Primary assessment reveals respiratory rate 60/min, heart rate 150/min, systolic blood pressure 70 mm Hg, and SpO₂ 84% on supplementary oxygen. Breath sounds are absent over the right chest, and the trachea is deviated to the left. He has weak central pulses and absent distal pulses. Which of the following is the most appropriate immediate intervention for this child?

- A. Perform endotracheal intubation and call for a STAT chest x-ray
- B. Provide bag-mask ventilation and call for a STAT chest x-ray
- C. Establish IV access and administer a 20 mL/kg normal saline fluid bolus
- D. Perform needle decompression of the right chest and assist ventilation with a bag and mask if necessary

For further information: see the PALS Provider Manual Chapter 4: Recognition of Shock, Chapter 5: Management of Shock, and the PALS Course Guide Part 9: Shock.

11. An 18-month-old child presents with a 1-week history of cough and runny nose. You perform a general assessment, which reveals a toddler responsive only to painful stimulation with slow respirations and diffuse cyanosis. You begin a primary assessment and find that the child's respiratory rate has fallen from 65/min to 10/min, severe inspiratory intercostal retractions are present, heart rate is 160/min, SpO₂ is 65% in room air, and capillary refill is less than 2 seconds. Which of the following is the most appropriate immediate treatment for this toddler?

- A. Establish vascular access and administer a 20 mL/kg bolus of isotonic crystalloid
- B. Open the airway and provide positive-pressure ventilation using 100% oxygen and a bag-mask device
- C. Administer 100% oxygen by face mask, establish vascular access, and obtain a STAT chest x-ray
- D. Administer 100% oxygen by face mask, obtain an arterial blood gas, and establish vascular access

For further information: see the PALS Provider Manual Chapter 3: Recognition of Respiratory Distress and Failure, Chapter 4: Management of Respiratory Distress and Failure.

12. You are supervising another healthcare provider who is inserting an intraosseous (IO) needle into an infant's tibia. Which of the following signs should you tell the provider is the best indication of successful insertion of a needle into the bone marrow cavity?

- A. Pulsatile blood flow will be present in the needle hub
- B. Fluids can be administered freely without local soft tissue swelling
- C. You are unable to aspirate any blood through the needle
- D. Once inserted, the needle shaft of the needle moves easily in all directions within the bone

For further information: see the PALS Provider Manual Chapter 4: Recognition of Shock, Chapter 5: Management of Shock, and the PALS Course Guide Part 9: Shock.

13. A pale and obtunded 3-year-old child with a history of diarrhea is brought to the hospital. Primary assessment reveals respiratory rate of 45/min with good breath sounds bilaterally. Heart rate is 150/min, blood pressure is 90/64 mm Hg, and SpO₂ is 92% in room air. Capillary refill is 5 seconds and peripheral pulses are weak. After placing the child on a nonrebreathing face mask (10 L/min flow) with 100% oxygen and obtaining vascular access, which of the following is the most appropriate immediate treatment for this child?

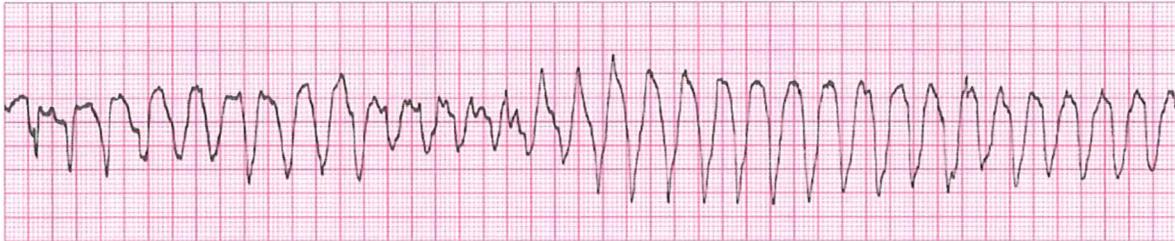
- A. Obtain a chest x-ray
- B. Begin a maintenance crystalloid infusion
- C. Administer a bolus of 20 mL/kg isotonic crystalloid
- D. Administer a dopamine infusion at 2 to 5 ug/kg per minute

For further information: see the PALS Provider Manual Chapter 4: Recognition of Shock, Chapter 5: Management of Shock, and the PALS Course Guide Part 9: Shock.

14. You have just assisted with the elective endotracheal intubation of a child with respiratory failure and a perfusing rhythm. Which of the following provides the most reliable, prompt assessment of correct endotracheal tube placement in this child?
- A. Absence of audible breath sounds over the abdomen during positive-pressure ventilation
 - B. Auscultation of breath sounds over the lateral chest bilaterally plus presence of mist in the endotracheal tube
 - C. Confirmation of appropriate oxygen and carbon dioxide tensions on arterial blood gas analysis
 - D. Clinical assessment of adequate bilateral breath sounds and chest expansion plus presence of exhaled CO₂ in a colorimetric detection device after delivery of 6 positive-pressure ventilations

For further information: see the PALS Provider Manual Chapter 3: Recognition of Respiratory Distress and Failure, and Chapter 4: Management of Respiratory Distress and Failure.

15. A 4-year-old male is in pulseless arrest in the pediatric intensive care unit. A code is in progress. As the on-call physician you quickly review his chart and find that his baseline corrected QT interval on a 12-lead ECG is prolonged. A glance at the monitor shows recurrent episodes of the following rhythm:



The boy has received one dose of epinephrine 0.01 mg/kg (0.1 mL/kg of 1:10,000 dilution) but continues to demonstrate the rhythm illustrated above. If this rhythm persists at the next rhythm check, which medication would be *most* appropriate to administer at this time?

- A. Adenosine 0.1 mg/kg IV
- B. Epinephrine 0.1 mg/kg (0.1 mL/kg of 1:1,000 dilution) IV
- C. Lidocaine 1 mg/kg IV
- D. Magnesium sulfate 50 mg/kg IV

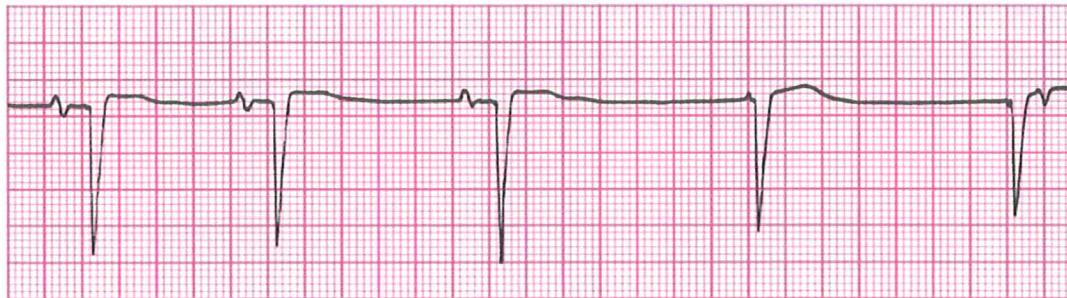
For further information: see the PALS Provider Manual Chapter 7: Recognition and Management of Cardiac Arrest, Chapter 9: Pharmacology, the PALS Course Guide Part 6: Cardiac Arrest, and Part 10: Pharmacology.

16. You are participating in the elective intubation of a 4-year-old child with respiratory failure. You must select the appropriate sized uncuffed endotracheal tube. You do not have a color-coded, length-based tape to use to estimate correct endotracheal tube size. Which of the following is the most appropriate estimated size uncuffed endotracheal tube for an average 4-year-old?
- A. 3-mm tube
 - B. 4-mm tube
 - C. 5-mm tube
 - D. 6-mm tube

For further information: see the PALS Provider Manual Chapter 3: Recognition of Respiratory Distress and Failure, and Chapter 4: Management of Respiratory Distress and Failure.

17. You are caring for a 3-year-old with vomiting and diarrhea. You have established IV access. When you place an orogastric tube, the child begins gagging and continues to gag after the tube is placed. The child's color has deteriorated; pulses are palpable but faint and the child is now lethargic. The heart rate is variable (range 44/min to 62/min). You begin bag-mask ventilation with 100% oxygen. When the heart rate does not improve, you begin chest compressions.

The cardiac monitor shows



Which of the following would be the *most appropriate* therapy to consider next?

- A. Epinephrine 0.1 mg/kg (0.1 mL/kg of 1:1,000 dilution) IV
- B. Atropine 0.02 mg/kg IV
- C. Attempt synchronized cardioversion at 0.5 J/kg
- D. Cardiology consult for transcutaneous pacing

For further information: see the PALS Provider Manual Chapter 6: Recognition and Management of Bradyarrhythmias and Tachyarrhythmias, Chapter 9: Pharmacology, the PALS Course Guide Part 7: Bradyarrhythmias and Tachyarrhythmias and Part 10: Pharmacology.

18. You are transporting a 6-year-old endotracheally intubated patient who is receiving positive-pressure mechanical ventilation. The child begins to move his head and suddenly becomes cyanotic and bradycardic. SpO₂ is 65% with good pulse signal. You remove the child from the mechanical ventilator circuit and provide manual ventilation with a bag via the endotracheal tube. During manual ventilation with 100% oxygen, the child's color and heart rate improve slightly and his blood pressure remains adequate. Breath sounds and chest expansion are present and adequate on the right side, but they are consistently diminished on the left side. The trachea is not deviated, and the neck veins are not distended. A suction catheter passes easily beyond the tip of the endotracheal tube. Which of the following is the most likely cause of this child's acute deterioration?
- A. Tracheal tube displacement into the right main bronchus
 - B. Tracheal tube obstruction
 - C. Tension pneumothorax on the right side
 - D. Equipment failure

For further information: see the PALS Provider Manual Chapter 3: Recognition of Respiratory Distress and Failure, and Chapter 4: Management of Respiratory Distress and Failure.

19. A 3-year-old boy presents with multiple system trauma. The child was an unrestrained passenger in a motor vehicle crash. On primary assessment he is unresponsive to voice or painful stimulation. His respiratory rate is <6/min, heart rate is 170/min, systolic blood pressure is 60 mm Hg, capillary refill is 5 seconds, and SpO₂ is 75% in room air. Which of the following most accurately summarizes the first actions you should take to support this child?
- A. Provide 100% oxygen by simple mask, stabilize the cervical spine, establish vascular access, and provide maintenance IV fluids
 - B. Provide 100% oxygen by simple mask and perform a head-to-toe survey to identify the extent of all injuries; begin an epinephrine infusion and titrate to maintain a systolic blood pressure of at least 76 mm Hg
 - C. Establish immediate vascular access, administer 20 mL/kg isotonic crystalloid, and reassess the patient; if the child's systemic perfusion does not improve, administer 10 to 20 mL/kg packed red blood cells
 - D. Open the airway (jaw-thrust technique) while stabilizing the cervical spine, administer positive-pressure ventilation with 100% oxygen, and establish immediate IV/IO access

For further information: see the PALS Provider Manual Chapter 3: Recognition of Respiratory Distress and Failure, and Chapter 4: Management of Respiratory Distress and Failure,

**PALS Written 2006 Precourse Self-Assessment
Answer Key**

EKG Rhythm Identification

1. The correct answer is E, Wide-Complex Tachycardia, presumed Ventricular Tachycardia
2. The correct answer is H, Pulseless Electrical Activity (PEA)
3. The correct answer is C, Sinus Bradycardia
4. The correct answer is G, Asystole
5. The correct answer is F, Ventricular Fibrillation
6. The correct answer is B, Sinus Tachycardia
7. The correct answer is D, Supraventricular Tachycardia (SVT)
8. The correct answer is A, Normal Sinus Rhythm
9. The correct answer is M, V-Fib converted into an organized rhythm after successful shock delivery
10. The correct answer is C & K, Sinus Bradycardia with First Degree AV Block
11. The correct answer is L, Torsades de Pointes (Polymorphic Ventricular Tachycardia)
12. The correct answer is J, Wide Complex Tachycardia (in a child with known aberrant intraventricular conduction; this is SVT with aberrant conduction)
13. The correct answer is I, SVT converting to Sinus Rhythm with Adenosine administration

Pharmacology

1. The correct answer is D
2. The correct answer is B
3. The correct answer is D
4. The correct answer is C
5. The correct answer is D
6. The correct answer is C
7. The correct answer is C
8. The correct answer is B
9. The correct answer is A
10. The correct answer is D
11. The correct answer is C

Practical Application

1. The correct answer is B
2. The correct answer is C
3. The correct answer is C
4. The correct answer is C
5. The correct answer is B
6. The correct answer is A
7. The correct answer is C

Practical Application (con't)

8. **The correct answer is A**
9. **The correct answer is D**
10. **The correct answer is D**
11. **The correct answer is B**
12. **The correct answer is B**
13. **The correct answer is C**
14. **The correct answer is D**
15. **The correct answer is D**
16. **The correct answer is C**
17. **The correct answer is B**
18. **The correct answer is A**
19. **The correct answer is D**

