

American Heart Association

**Pediatric Advanced
Life Support**

**Core Case
Study Materials**

Respiratory Core Case 4

Disordered Control of Breathing

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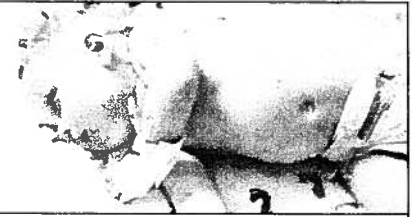
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General Management for All Patients

- Airway positioning
- Oxygen
- Pulse oximetry
- ECG monitor (as indicated)
- BLS as indicated



Upper Airway Obstruction

Specific Management for Selected Conditions

Croup	Anaphylaxis	Aspiration Foreign Body
<ul style="list-style-type: none"> • Nebulized epinephrine • Corticosteroids 	<ul style="list-style-type: none"> • IM epinephrine (or auto-injector) • Albuterol • Antihistamines • Corticosteroids 	<ul style="list-style-type: none"> • Allow position of comfort • Specialty consultation

Lower Airway Obstruction

Specific Management for Selected Conditions

Bronchiolitis	Asthma
<ul style="list-style-type: none"> • Nasal suctioning • Bronchodilator trial 	<ul style="list-style-type: none"> • Albuterol ± ipratropium • Corticosteroids • SQ epinephrine • Magnesium sulfate • Terbutaline

Lung Tissue (Parenchymal) Disease

Specific Management for Selected Conditions

Pneumonia/Pneumonitis <i>Infectious Chemical Aspiration</i>	Pulmonary Edema <i>Cardiogenic or Noncardiogenic (ARDS)</i>
<ul style="list-style-type: none"> • Albuterol • Antibiotics (as indicated) 	<ul style="list-style-type: none"> • Consider noninvasive or invasive ventilatory support with PEEP • Consider vasoactive support • Consider diuretic

Disordered Control of Breathing

Specific Management for Selected Conditions

Increased ICP	Poisoning/Overdose	Neuromuscular Disease
<ul style="list-style-type: none"> • Avoid hypoxemia • Avoid hypercarbia • Avoid hyperthermia 	<ul style="list-style-type: none"> • Antidote (if available) • Contact poison control 	<ul style="list-style-type: none"> • Consider noninvasive or invasive ventilatory support

Instructor points for discussion:

- Decision for assisted ventilations is based primarily on mental status and oxygenation.
- With supplemental oxygen, patients may maintain oxygenation while becoming significantly hypercarbic.
- The use of reversal agents for benzodiazepines in the setting of acute seizures is not recommended.
- Patients with respiratory depression following a prolonged seizure and use of benzodiazepines may be managed with a longer trial of BMV prior to endotracheal intubation because their respiratory depression may quickly resolve.

Lesson	Room set-up:	Equipment/activity
15	Students sit to view video	DVD player to show clip, discuss Respiratory Flowchart
16	Manikin with airway supplies	Airway resources to stimulate assess and treat infant/child in distress; Learning Station Competency Checklist

Shock Core Case 2

Obstructive Shock

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<h3>Management of Shock Emergencies</h3> <ul style="list-style-type: none"> • Oxygen • Pulse oximetry • ECG monitor • IV/IO access • BLS as indicated • Bedside glucose 			
<h3>Hypovolemic Shock</h3> <p>Specific Management for Selected Conditions</p>			
<h4>Nonhemorrhagic</h4>		<h4>Hemorrhagic</h4>	
<ul style="list-style-type: none"> • 20 mL/kg NS/LR bolus, repeat as needed • Consider colloid after 3rd NS/LR bolus 		<ul style="list-style-type: none"> • Control external bleeding • 20 mL/kg NS/LR bolus repeat 2 or 3x as needed • Transfuse PRBCs as indicated 	
<h3>Distributive Shock</h3> <p>Specific Management for Selected Conditions</p>			
<h4>Septic</h4>	<h4>Anaphylactic</h4>	<h4>Neurogenic</h4>	
<p>Management Algorithm:</p> <ul style="list-style-type: none"> • Septic Shock 	<ul style="list-style-type: none"> • IM epinephrine (or auto-injector) • Antihistamines • Corticosteroids • Epinephrine infusion • Albuterol 	<ul style="list-style-type: none"> • 20 mL/kg NS/LR bolus, repeat PRN • Vasopressor 	
<h3>Cardiogenic Shock</h3> <p>Specific Management for Selected Conditions</p>			
<h4>Bradycardia/Tachycardia</h4>		<h4>Other (eg, CHD, Myocarditis, Cardiomyopathy, Poisoning)</h4>	
<p>Management Algorithms:</p> <ul style="list-style-type: none"> • Bradycardia • Tachycardia with poor perfusion 		<ul style="list-style-type: none"> • 5 to 10 mL/kg NS/LR bolus, repeat PRN • Vasoactive infusion • Consider expert consultation 	
<h3>Obstructive Shock</h3> <p>Specific Management for Selected Conditions</p>			
<h4>Ductal-Dependent (LV Outflow Obstruction)</h4>	<h4>Tension Pneumothorax</h4>	<h4>Cardiac Tamponade</h4>	<h4>Pulmonary Embolism</h4>
<ul style="list-style-type: none"> • Prostaglandin E₁ • Expert consultation 	<ul style="list-style-type: none"> • Needle decompression • Tube thoracostomy 	<ul style="list-style-type: none"> • Pericardiocentesis • 20 mL/kg NS/LR bolus 	<ul style="list-style-type: none"> • 20 mL/kg NS/LR bolus, repeat PRN • Consider thrombolytics, anticoagulants • Expert consultation

Instructor points for discussion:

- The DOPE mnemonic can be used to identify causes of deterioration in the intubated patient.

Lesson	Room set-up:	Equipment/activity
17	Students view and discuss	DVD player, video clips. Shock Management Flowchart
18	Manikin with O ₂ , IV/IO, monitor	Mega supplies to simulate treating pediatric shock patient Learning Station Competency Checklist

Shock Core Case 3

Distributive (Septic) Shock

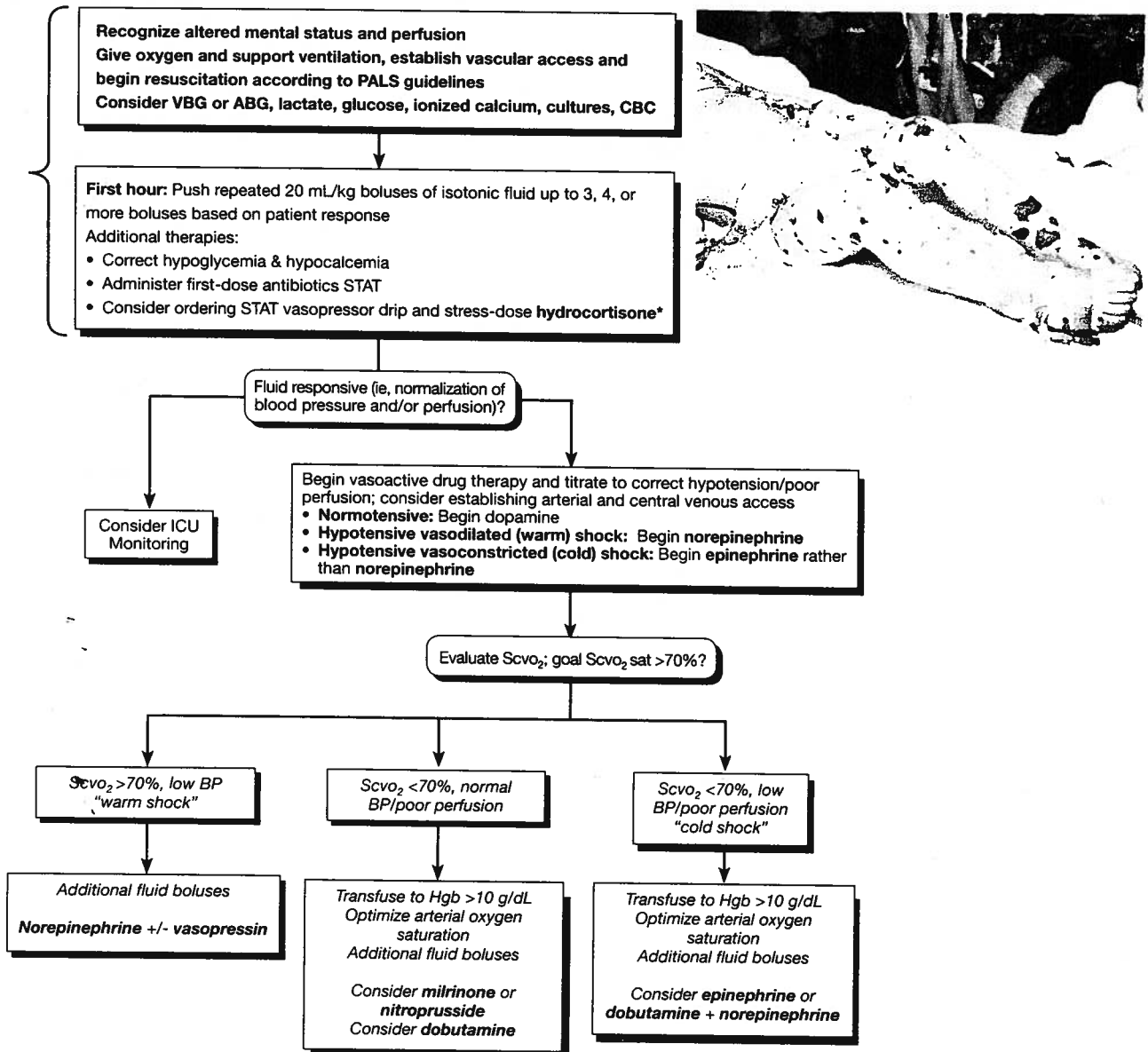
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*Note: Fluid refractory and dopamine- or norepinephrine-dependent shock defines patient at risk for adrenal insufficiency.

If adrenal insufficiency is suspected give hydrocortisone ≈ 2 mg/kg bolus IV; maximum 100 mg

Draw baseline cortisol; consider ACTH stimulation test if unsure of need for steroids

Modified from Parker MM, Hazelzet JA, Carcillo JA. Pediatric considerations. *Crit Care Med.* 2004;32:S591-S594.

Instructor points for discussion:

- Appropriate infection control measures should be taken if there is a potentially transmissible disease. Gloves and mask are typically adequate.
- Aggressive fluid resuscitation is indicated for septic shock.
- In general, vasoactive infusions should not be initiated until after several fluid boluses have been administered (up to 60 mL/kg).

Lesson	Room set-up:	Equipment/activity
19	Students view and discuss	DVD player, video clips, Septic Shock Algorithm
20	Manikin with O ₂ , IV/IO, monitor	Mega supplies to simulate treating pediatric shock patient Learning Station Competency Checklist

Shock Core Case 4

Cardiogenic Shock

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Management of Shock Emergencies

- Oxygen
- Pulse oximetry
- ECG monitor
- IV/IO access
- BLS as indicated
- Bedside glucose



Hypovolemic Shock

Specific Management for Selected Conditions

Nonhemorrhagic

- 20 mL/kg NS/LR bolus, repeat as needed
- Consider colloid after 3rd NS/LR bolus

Hemorrhagic

- Control external bleeding
- 20 mL/kg NS/LR bolus repeat 2 or 3x as needed
- Transfuse PRBCs as indicated

Distributive Shock

Specific Management for Selected Conditions

Septic

- Management Algorithm:
- Septic Shock

Anaphylactic

- IM epinephrine (or auto-injector)
- Antihistamines
- Corticosteroids
- Epinephrine infusion
- Albuterol

Neurogenic

- 20 mL/kg NS/LR bolus, repeat PRN
- Vasopressor

Cardiogenic Shock

Specific Management for Selected Conditions

Bradyarrhythmia/Tachyarrhythmia

- Management Algorithms:
- Bradycardia
 - Tachycardia with poor perfusion

Other (eg, CHD, Myocarditis, Cardiomyopathy, Poisoning)

- 5 to 10 mL/kg NS/LR bolus, repeat PRN
- Vasoactive infusion
- Consider expert consultation

Obstructive Shock

Specific Management for Selected Conditions

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

Instructor points for discussion:

- In general, vasoactive infusions should not be initiated until after several fluid boluses have been administered (up to 60 mL/kg).
- Give smaller fluid boluses (5 to 10 mL/kg) over a longer period of time (10 to 20 minutes) in suspected cardiogenic shock.
- Vasoactive drugs that cause peripheral vasodilation (dobutamine, milrinone) are frequently used in cardiogenic shock due to compensatory mechanisms that impair cardiac output.

Lesson	Room set-up:	Equipment/activity
19	Students view and discuss	DVD player, video clips, Shock Management Flowchart
20	Manikin with O ₂ , IV/IO, monitor	Mega supplies to simulate treating pediatric shock patient Learning Station Competency Checklist

Cardiac Core Case 1

VF/Pulseless VT

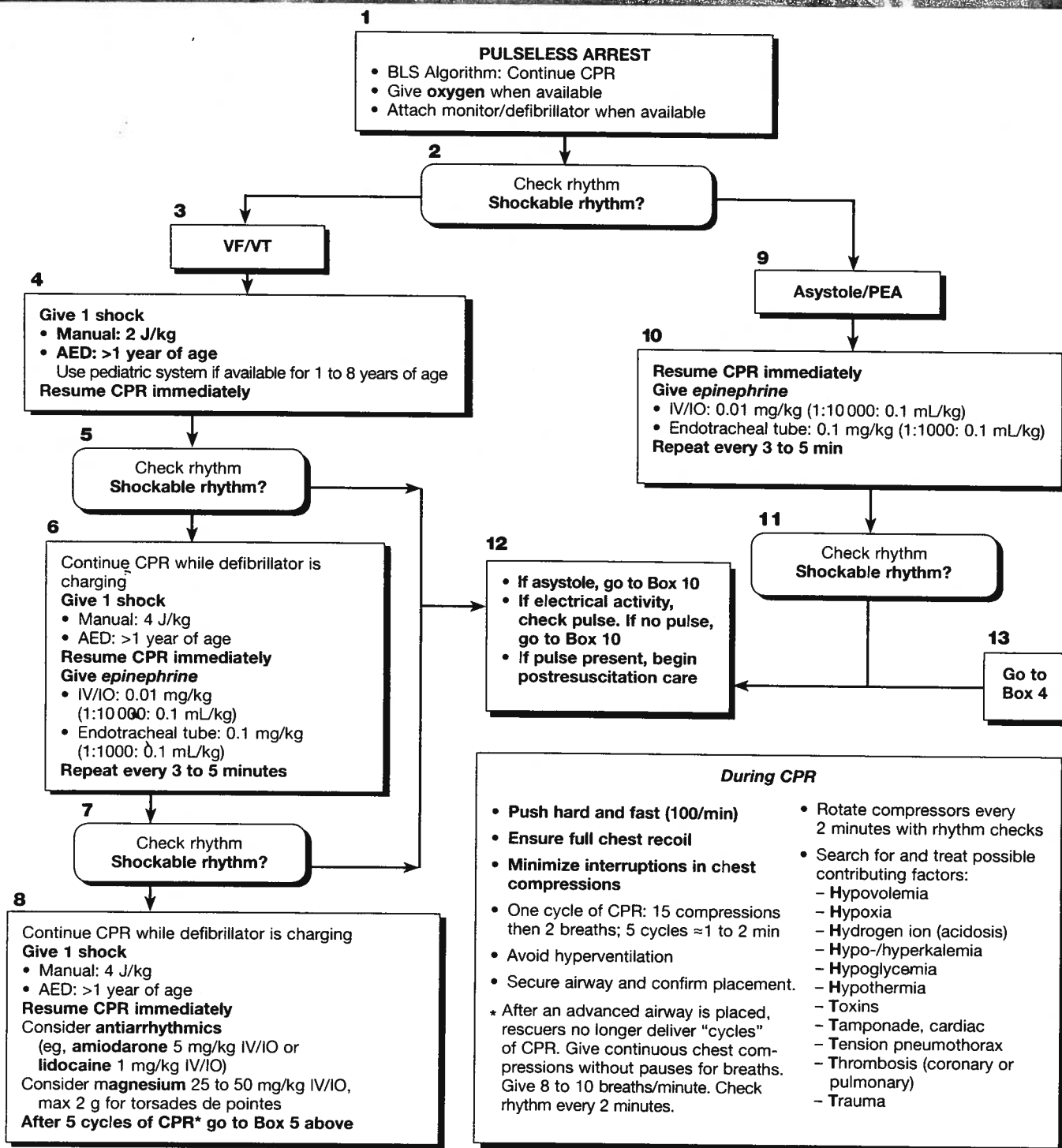
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Instructor points for discussion:

- Minimize interruptions in chest compressions; pause only for ventilations, rhythm checks, and shock delivery. Once advanced airway is in place (LMA or ETT), compressors can provide continuous compressions (rate of 100/min), and rescuer providing ventilations can deliver 8 to 10 breaths/min (1 breath every 6 to 8 seconds).
- Consider potentially reversible causes.

Lesson	Room set-up:	Equipment/activity
7	Students observe team video	Manikin and mega supplies/instructor leads a team using algorithm
8	Manikin with mega supplies	Team role labels, mega supplies, simulate team managing an arrest; learning station competency checklist

Cardiac Core Case 3

Supraventricular Tachycardia

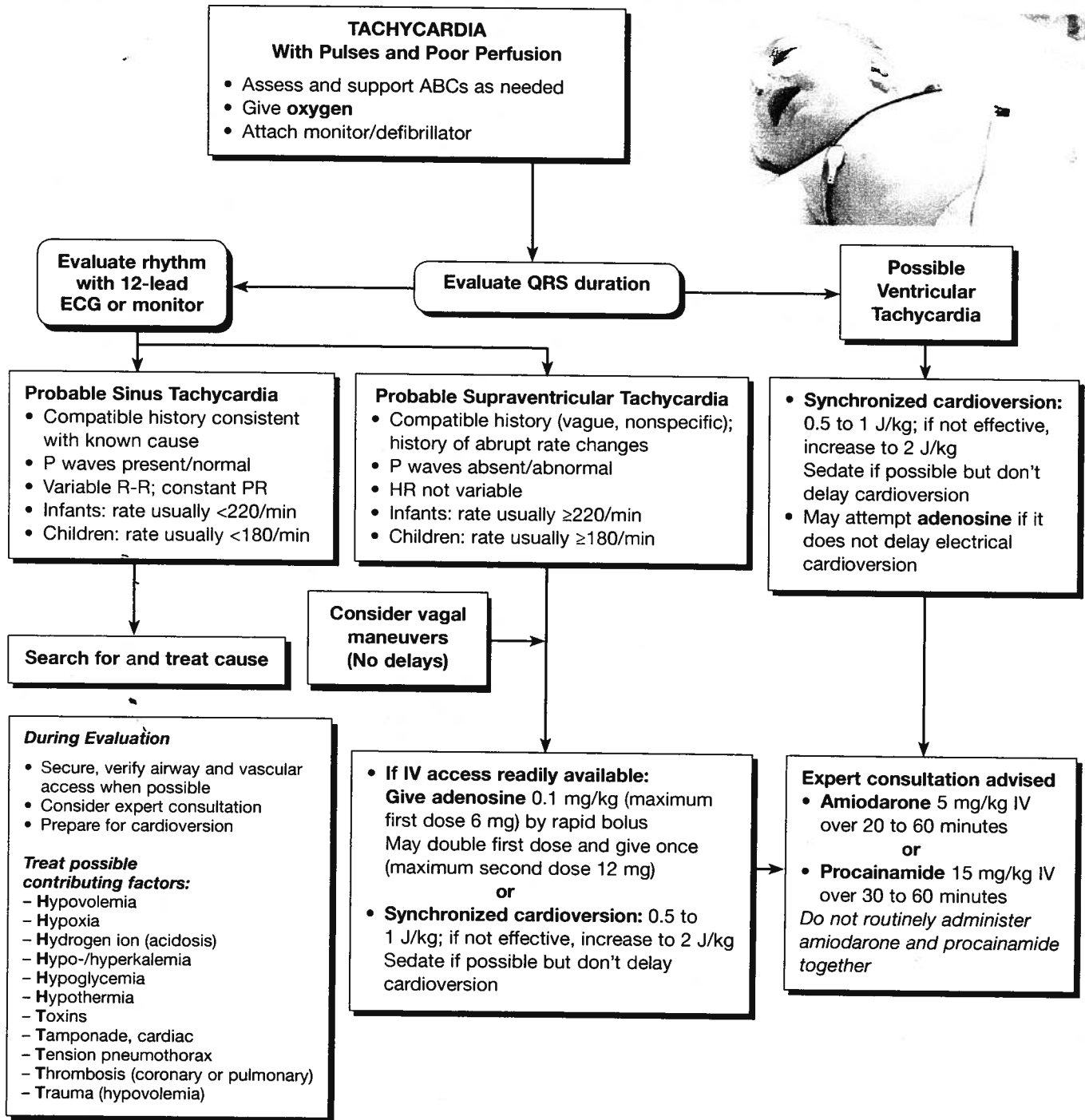
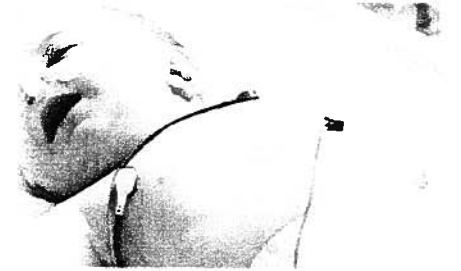
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Instructor points for discussion:

- Discuss how to distinguish between sinus tachycardia (ST) and supraventricular tachycardia (SVT).
- Point out to the students that although the patient has respiratory distress, there may be secondary respiratory effects of systemic illness, including shock and metabolic acidosis.
- Discuss indications for synchronized cardioversion.

Lesson	Room set-up:	Equipment/activity
11	Students observe video	DVD player, video clip, infant/child with tachycardia, algorithm
12	Manikin, monitor, simulator Or ECG rhythm cards, mega supplies	Team role tags, mega set up, simulate team leader managing a child with a fast rhythm

Cardiac Core Case 4

Bradycardia

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BRADYCARDIA
With a Pulse
Causing
cardiorespiratory compromise

- Support ABCs as needed
- Give **oxygen**
- Attach monitor/defibrillator

Bradycardia still causing
cardiorespiratory compromise?

- Support ABCs; give oxygen if needed
- Observe
- Consider expert consultation

Perform CPR if despite
oxygenation and ventilation
HR <60/min with poor perfusion

Persistent symptomatic bradycardia?

- **Give epinephrine**
 - IV/IO: 0.01 mg/kg (1:10 000: 0.1 mL/kg)
 - Endotracheal tube: 0.1 mg/kg (1:1000: 0.1 mL/kg)
- Repeat every 3 to 5 minutes**
- **If increased vagal tone or primary AV block:**
Give **atropine**, first dose: 0.02 mg/kg, may repeat. (Minimum dose: 0.1 mg; maximum total dose for child: 1 mg.)
- Consider cardiac pacing

If pulseless arrest develops, go to Pulseless Arrest Algorithm



Reminders

- **During CPR, push hard and fast (100/min)**
- **Ensure full chest recoil**
- **Minimize interruptions in chest compressions**
- Support ABCs
- Secure airway if needed; confirm placement
- Search for and treat possible contributing factors:
 - Hypovolemia
 - Hypoxia or ventilation problems
 - Hydrogen ion (acidosis)
 - Hypo-/hyperkalemia
 - Hypoglycemia
 - Hypothermia
 - Toxins
 - Tamponade, cardiac
 - Tension pneumothorax
 - Thrombosis (coronary or pulmonary)
 - Trauma (hypovolemia, increased ICP)

Instructor points for discussion:

- Chest compressions should be initiated if there is not rapid improvement in HR to >60 after beginning assisted ventilations with 100% oxygen. It is also acceptable to initiate chest compressions when the slow pulse is identified and to discontinue after reassessment of the heart rate.
- Potentially reversible causes include hypothermia, heart block, increased intracranial pressure, toxins, hypoxia, and heart transplant.
- Epinephrine is preferred over atropine for bradycardia secondary to hypoxia.

Lesson	Room set-up:	Equipment/activity
11	Students observe video	DVD player, video clip, infant/child with bradycardia, algorithm
12	Manikin, monitor, simulator Or ECG rhythm cards, mega supplies	Team role tags, mega set up, simulate team leader managing a child with a slow rhythm