Cardiovascular Emergencies I

EMC 420: Maternal & Child Emergency Care

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Objectives

- Differentiate shock from hypotension
- Distinguish compensated from decompensated shock
- Outline appropriate shock management
- Identify and manage selected pediatric dysrhythmias

Shock and Hypotension

- Shock is inadequate perfusion and oxygen delivery.
- Hypotension is decreased systolic blood pressure.
- Shock can occur with increased, decreased, or normal blood pressure.

Recognition of Shock

Management of Shock

Interventions:

- Open airway
- 100% O2
- Support ventilation
- Shock
  - Position
  - Fluid resuscitation
    - 20 mL/kg
  - Vasopressor support
    - dopamine 12-20 mic/kg/min

9-month-old Infant

- A 9-month-old presents with 3 days of vomiting, diarrhea and poor oral intake.

9-month-old Infant

PAT

Appearance
Agitated, makes eye contact

Work of Breathing
No retractions or abnormal airway sounds

Circulation to Skin
Pale skin color

Initial Assessment

ABCDE's

- Airway - Open and maintainable
- Breathing - RR 50 breaths/min, clear lungs, good chest rise
- Circulation - HR 180 beats/min; cool, dry, pale skin; CRT 3 seconds; BP 74 mm Hg/palp
- Disability - AVPU=A
- Exposure - No sign of trauma, weight 8 kg

Key Question

What is this child's physiologic state?

What are your treatment priorities?

Discussion

- Assessment: Compensated shock, likely due to hypovolemia with viral illness
- Treatment priorities:
  - Provide oxygen, as tolerated
  - Obtain IV access en route
    - Provide fluid resuscitation
      - 20 ml/kg of crystalloid, repeat as needed

Case Progression

- 160 ml normal saline was infused
- Reassess:
  - HR decreased to 140 beats/min
  - Patient alert and interactive

15-month-old Child

Case Study

- A previously healthy 15-month-old child presents with 12 hours of fever, 1 hour of lethargy and a "purple" rash.

15-month-old Child

Appearance
No eye contact, lies still with no spontaneous movement

Work of Breathing
No retractions or abnormal airway sounds

Circulation to Skin
Pale skin color

Initial Assessment

- Airway - Open
- Breathing - RR 60 breaths/min, poor chest rise
- Circulation - HR 70 beats/min; faint brachial pulse; warm skin; CRT 4 seconds; BP 50 mm Hg/palp
- Disability - AVPU=P
- Exposure - Purple rash, no sign of trauma, weight 10 kg

What is your assessment of this patient?

What is her physiologic state?

- This patient is in decompensated shock.

What are your treatment and transport priorities for this patient?

Treatment Priorities

- Begin BVM ventilation with 100% oxygen.
- Fluid resuscitation:
  - IV/IO access on scene
  - 20 ml/kg of crystalloid, repeat as needed en route
- Vasopressor therapy

Patient received 20 ml/kg (200 ml) with no change in level of consciousness, HR or BP.

What are your treatment priorities now?

- Consider endotracheal intubation
- Provide second 20 ml/kg fluid bolus
- Consider vasopressor support if prolonged transport time

3-year-old Toddler

- Toddler is found cyanotic and unresponsive
- Child last seen 1 hour prior to discovery
- Open bottle of clonidine found next to child

3-year-old Toddler

Appearance
No spontaneous activity; unresponsive

Work of Breathing
Gurgling breath sounds

Circulation to Skin
Cyanotic, mottled

Initial Assessment

- Airway - Partial obstruction by tongue
- Breathing - RR 15 breaths/min, poor air entry
- Circulation - HR 30 beats/min; faint femoral pulse; CRT 3 seconds; BP 50/30 mm Hg
- Disability – AVPU : P
- Exposure - No sign of trauma

- The monitor shows the following rhythm.

What are your treatment priorities for this patient?

Treatment Priorities

- Open airway
- BVM ventilation/consider intubation
- Chest compressions
- IV/IO access on scene
  - Medications
    - Epinephrine 1:10,000 0.1 mL/kg IV Q 5
    - Atropine 0.02mg/kg [0.1 mg – 0.5 mg]
  - Consider pacing
  - Possible antidote - naloxone
  - Fluid resuscitation
- Check glucose
- Rapid transport

- Patient's heart rate improved to 70 beats/min with assisted ventilation.
- Color, CRT and pulse quality improves.
- After BVM, patient's RR increases to 20 breaths/min, good chest rise
- Rapid glucose check 100 mg/dL

12-month-old Child

- You arrive at the house of a 12-month-old child.
- Mother states the child has a history of congenital heart disease and has been fussy for the last 3 hours.
- Mother states the child weighs 22 pounds.

12-month-old Child

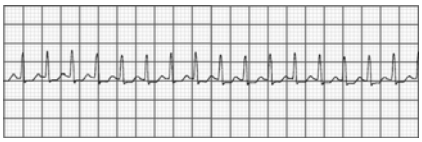
Appearance
Alert but agitated

Work of Breathing
mild retractions

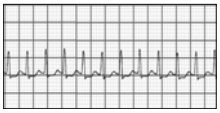
Circulation to Skin
Lips and nailbeds blue

- On initial assessment, you note clear breath sounds, a RR of 60 breaths/min and a heart rate that is too rapid to count.

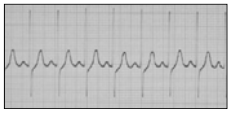
What rhythm does the monitor show?



How can you distinguish SVT from sinus tachycardia?



SVT



Sinus Tachycardia

SVT versus Sinus Tachycardia

Treatment Priorities

- Supplemental oxygen
- Obtain IV access
- Convert rhythm based on hemodynamic stability
  - Stable: vagal maneuvers or adenosine
  - Unstable:
    - IV /IO access obtained - adenosine
    - No IV/IO and unconscious - synchronized cardioversion (1 J / kg)

- Blow-by oxygen administered
- IV started
- Adenosine 0.1 mg/kg (1mg), given rapid IVP with 5 ml saline flush
- Five seconds of marked bradycardia/asystole, followed by conversion to NSR

Conclusion

- Cardiovascular compromise in children is often related to respiratory failure, hypovolemia, poisoning or sepsis. It is rarely due to a cardiac arrhythmia.
- Management priorities for shock include airway management, oxygen and fluid resuscitation.
- Treat rhythm disturbances emergently only if signs of respiratory failure or shock are present.