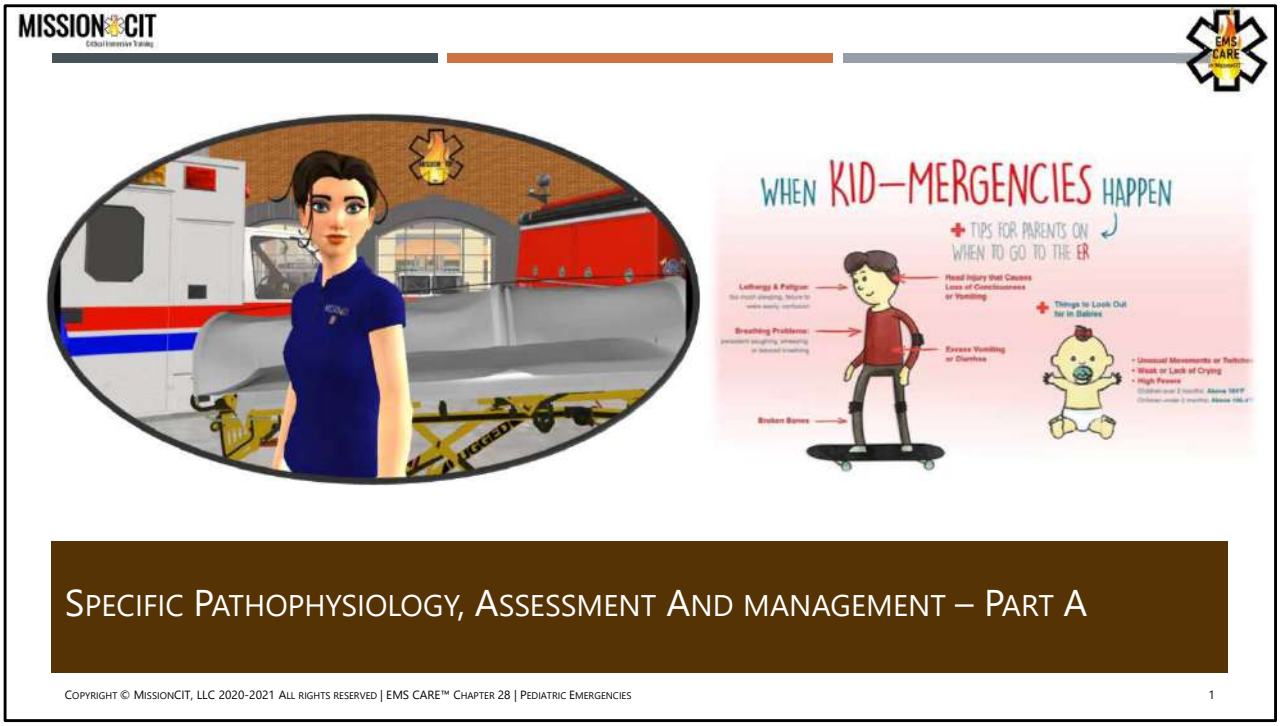


Thank you Justin!

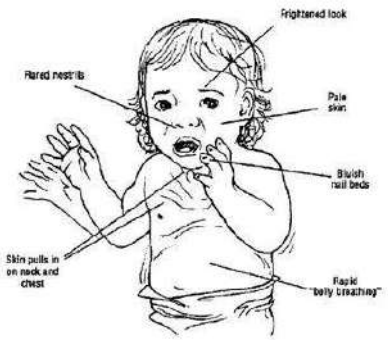
In this lesson, we speak about pediatric-specific pathophysiology. We discuss how to assess and manage these conditions.

So, let's get started.

MISSION CIT

RESPIRATORY DISTRESS | INTRODUCTION

- Includes all breathing problems faced by children due to
  - ✓ Infections
  - ✓ Chronic illness
  - ✓ Blocked airways
  - ✓ Premature birth
  - ✓ Dust and exposure to cigarette
- Can be mild to severe
- Complicated by underlying comorbidity, and multiorgan dysfunction.



Picture 1 Some signs of respiratory distress.

COPYRIGHT © MISSIONCIT, LLC 2020-2021 ALL RIGHTS RESERVED | EMS CARE™ CHAPTER 28 | PEDIATRIC EMERGENCIES

Respiratory distress includes all breathing problems faced by children. It is an umbrella of conditions, and the common underlying factor is that the child finds it hard to breathe or has to work harder to ensure that enough oxygen reaches their lungs.

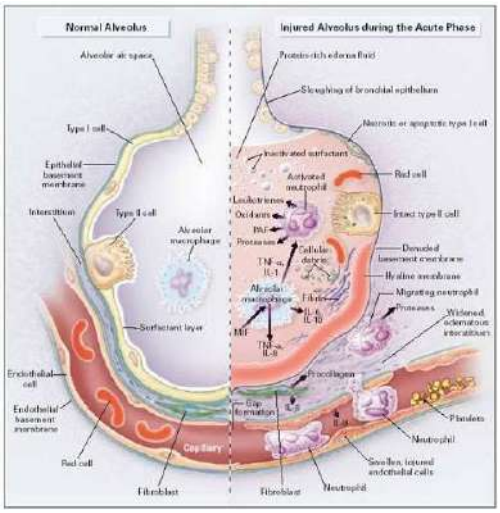
As you expected, the distress can be mild to severe, depending on the cause and the child's reaction. Some of the possible respiratory distress triggers include Infections, Chronic illness, Blocked airways, A premature baby whose lungs were not well-developed at the time of birth, or exposure to dust and cigarette smoke.

These causes are further complicated if the child has underlying comorbidity or multiorgan dysfunction.

MISSION CIT

RESPIRATORY DISTRESS | PATHOPHYSIOLOGY

- Characterized by vascular permeability, increased lung capacity, and loss of aerated tissue.
- Signs and symptoms
  - ✓ Pale or bluish skin color
  - ✓ Increased breathing rate
  - ✓ Chest retractions
  - ✓ Nasal flaring
  - ✓ Noisy sounds during breathing
  - ✓ Clammy and cold skin
  - ✓ Sleepiness and fussiness



COPYRIGHT © MISSIONCIT, LLC 2020-2021 ALL RIGHTS RESERVED | EMS CARE™ CHAPTER 28 | PEDIATRIC EMERGENCIES

3

The pathophysiology of respiratory distress is characterized by increased vascular permeability, increased lung capacity, loss of aerated tissue.

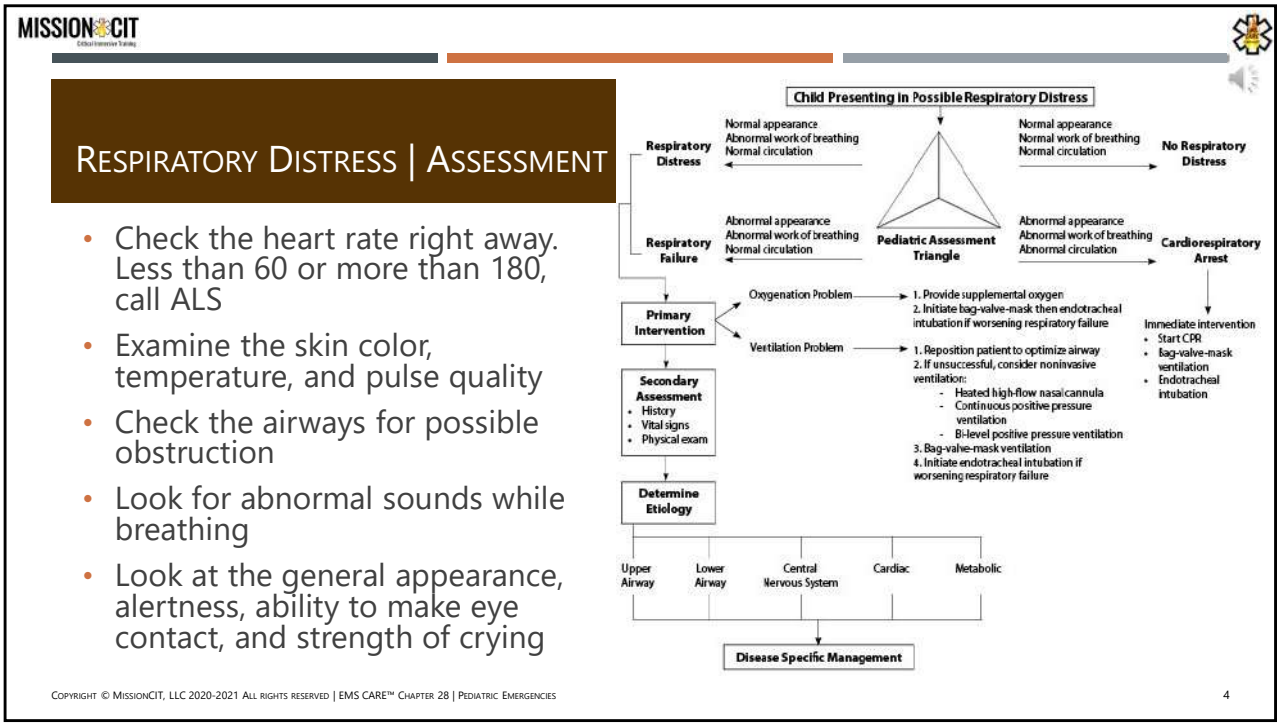
One of the telltale clinical signs of respiratory distress is the presence of hypoxia, typically within 7 days of a known insult.

Some of the signs and symptoms that tell you that a child is in acute respiratory distress are:

- Pale or bluish skin color, especially around the lips, eyes, hands, and nail beds.

- Increased breathing rate which is a sign that the child is working extra to get oxygen to its lungs
- Retractions of the chest, especially around the collarbone and ribs
- Nasal flaring where the child's nostrils widen visibly while taking a breath
- Noisy breathing signs like grunting or wheezing
- Clammy and cold skin. The head will feel sweaty as well
- If the child is fussy, sleepy, finding it difficult to keep awake, or just acting different, it could be a sign of respiratory distress
- When the child leans forward or tilts the head backwards, it could mean that the child is finding the right position to get sufficient oxygen to the lungs

If you see one or more of these signs, start treatment immediately, as any delays can lead to respiratory failure, and possibly even death.



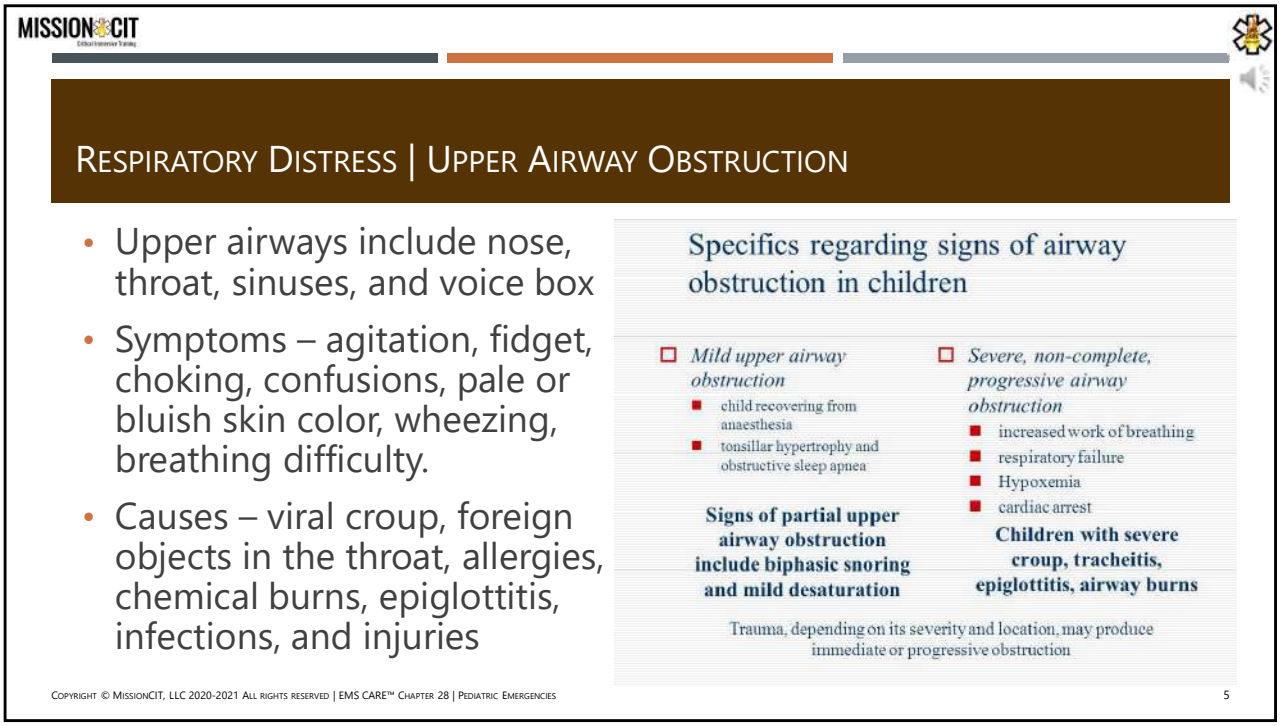
As soon as you walk in, look for the symptoms mentioned earlier, and if you suspect a possibility of respiratory distress, check the heart rate right away. If the rate is below 60 or more than 180, call Advanced Life Support immediately.

But if the symptoms are not evident, do a routine CAB checkup. Start with the circulation and examine the child's skin color, temperature, and pulse quality. Next, check the airways for any possible obstruction. Lastly, look at the breathing and in particular, look for sounds such as grunting, wheezing, or any other abnormal lung

sounds.

In addition, check the child's general appearance including its alertness to the environment, ability to make eye contact, motor activity, and the strength of crying.

Based on the results of these assessments, decide if the child needs emergency transport. Also, start CPR if required.



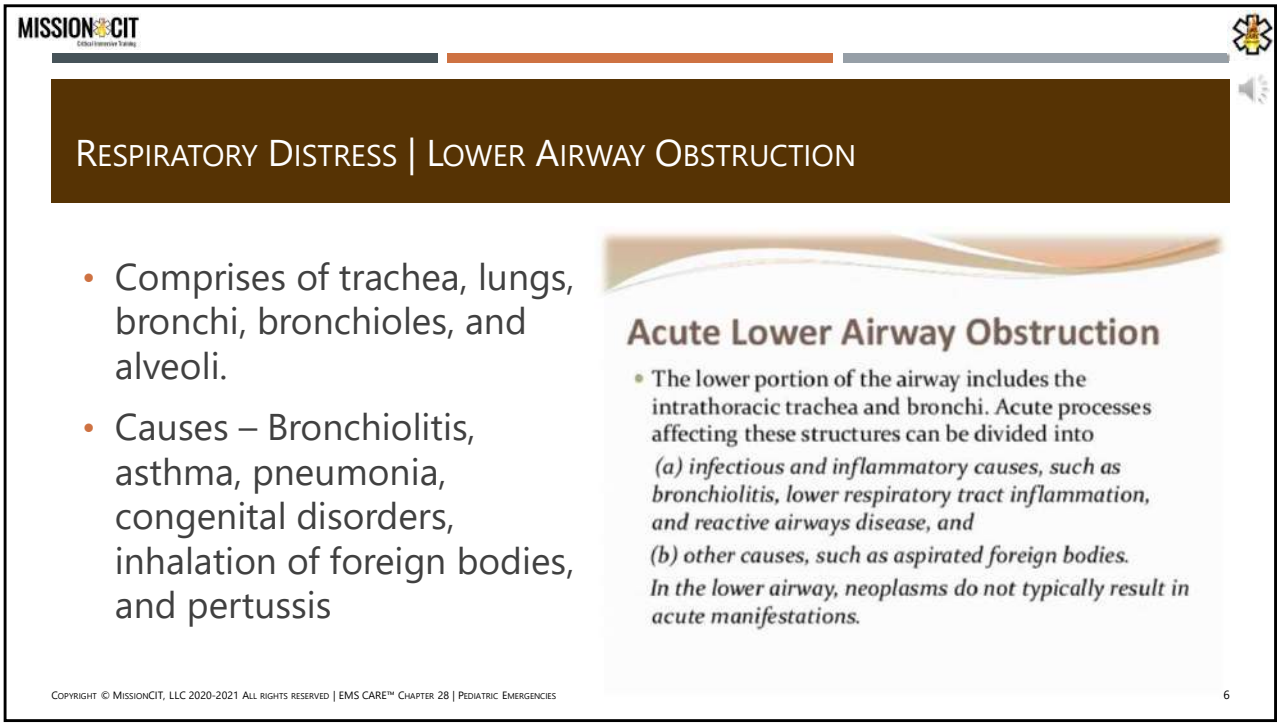
The upper airways include the nose, throat, sinuses, and voice box. When one or more of these airways are obstructed, it can lead to respiratory distress, and possibly even failure.

You can identify that the upper airways are blocked if the child is agitated or fidgeting, choking, experiencing confusions or panic, has a pale or blue skin color, or when there are any other breathing noises like wheezing that indicate breathing difficulty.

Besides these symptoms, the following conditions

increase the possibility of upper airway obstruction.

- Viral croup, where the child's cough resembles a barking sound,
- The presence of a foreign object in the child's throat,
- Allergic reactions that cause the trachea or windpipe to swell,
- Chemical burns,
- Epiglottitis, typically caused by an infection,
- Fire burns due to smoke inhalation, and
- Any other infections or injuries.



The lower airway comprises the trachea, lungs, bronchi, bronchioles, and alveoli.

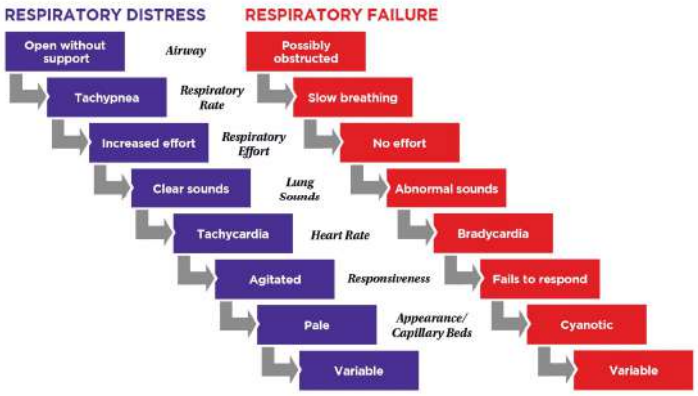
Common causes of lower respiratory distress include,

- Bronchiolitis
- Asthma
- Pneumonia
- Laryngotracheal bronchitis
- Congenital disorders
- Inhalation of foreign bodies, and
- Pertussis.

Talk to the parents and caregivers to understand the onset of any of these conditions and the child's medical history to decide the appropriate course of action.

Respiratory Distress | Management

- Provide ventilation if local protocols allow
- Provide CPR if necessary
- Call ALS if it is an emergency
- Arrange for emergency transport
- Gather information about the history of respiratory illnesses and other pertinent aspects
- Document



Copyright © MissionCIT, LLC 2020-2021 All rights reserved | EMS CARE™ Chapter 28 | Pediatric Emergencies

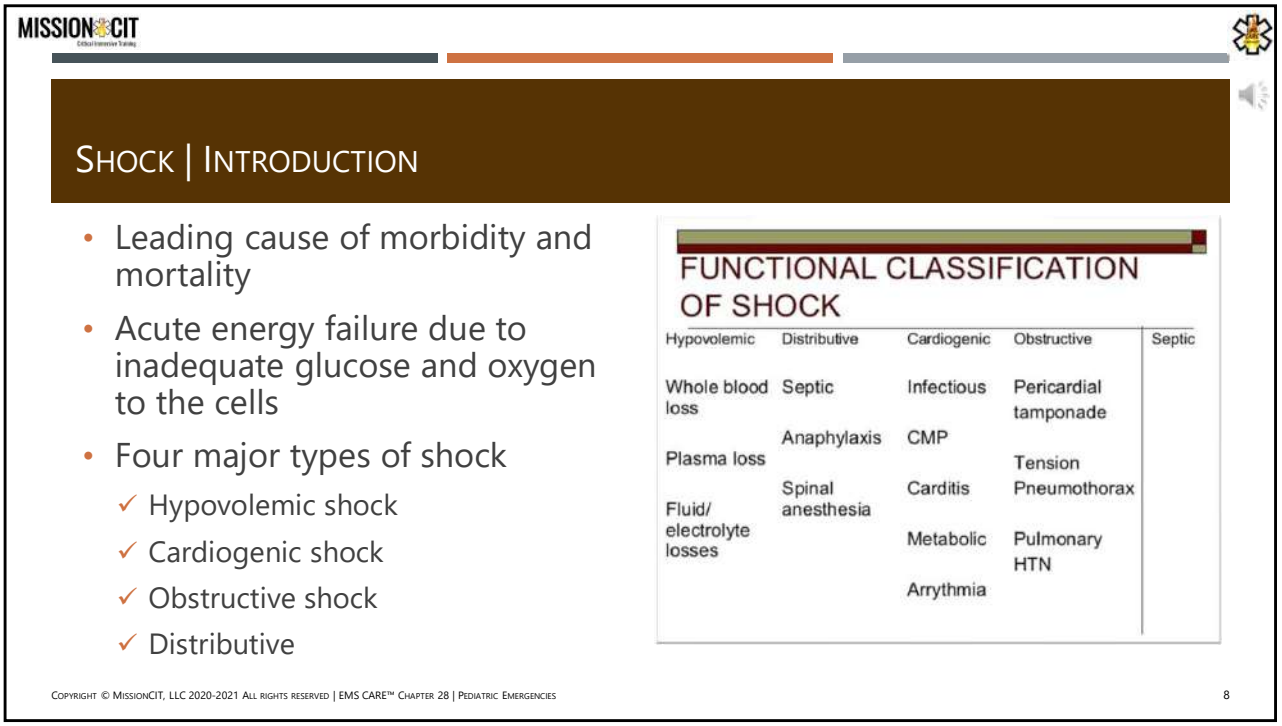
When indicated, provide ventilation per your local protocol. Check ABCs and, if necessary, provide CPR. Also, if protocol allows, use a pulse oximeter to determine oxygen levels present in the body.

Call A L S if the child requires advanced treatment. In moderate distress, arrange for emergency transport.

Make a note of the surroundings to help ascertain the cause. Do one or both the parents smoke? Has the child been exposed to carbon monoxide? Has the child been suffering from lung-related infections? Is there a history

of respiratory distress?

Gather all this information and include them in your report to assist the hospital clinicians.



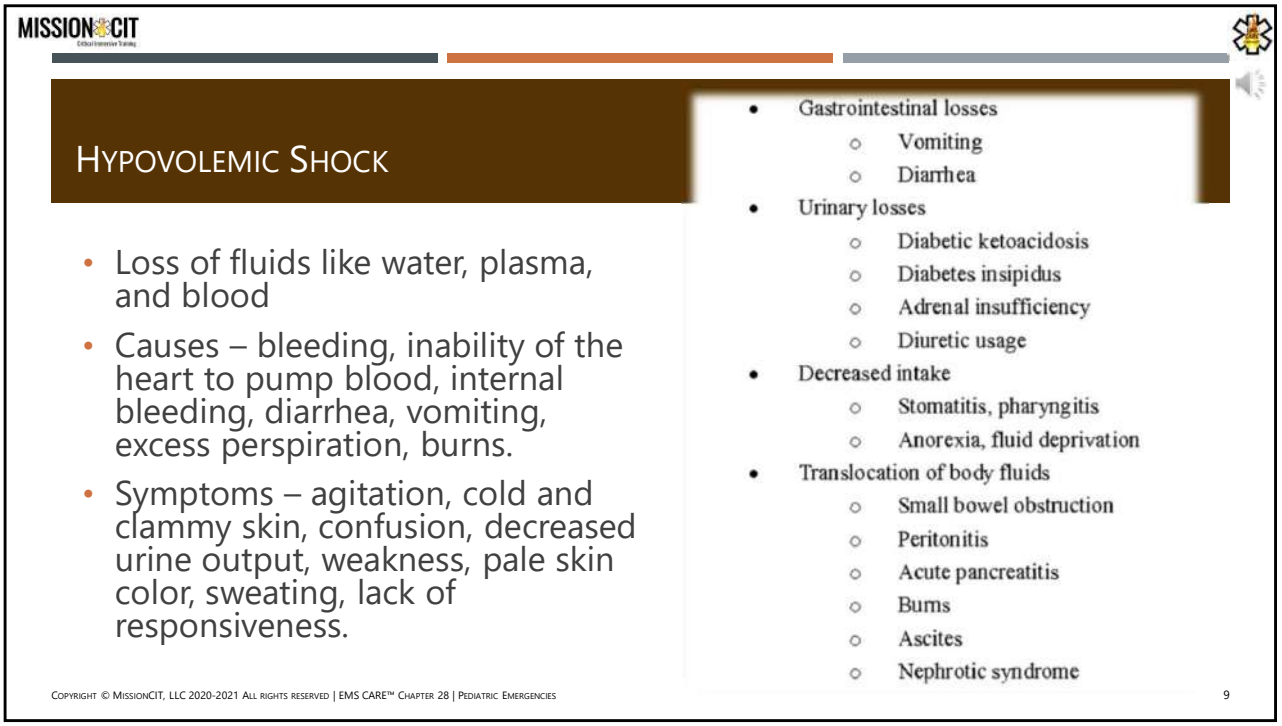
Do you know that shock is one of the leading causes of morbidity and mortality among children?

So, what is shock? Medscape defines it as a state of acute energy failure due to inadequate glucose substrate delivery, oxygen delivery, or mitochondrial failure at the cellular level. In other words, when the cardiopulmonary system cannot deliver enough glucose and oxygen to the mitochondria present in the body's cells, it leads to shock.

There are four significant types: Hypovolemic,

Cardiogenic, Obstructive, and Distributive Shock.

Let’s take a detailed look at each of these.



Hypovolemic shock is characterized by a loss of fluids, both internal and external. So, it includes the loss of water, plasma, and blood.

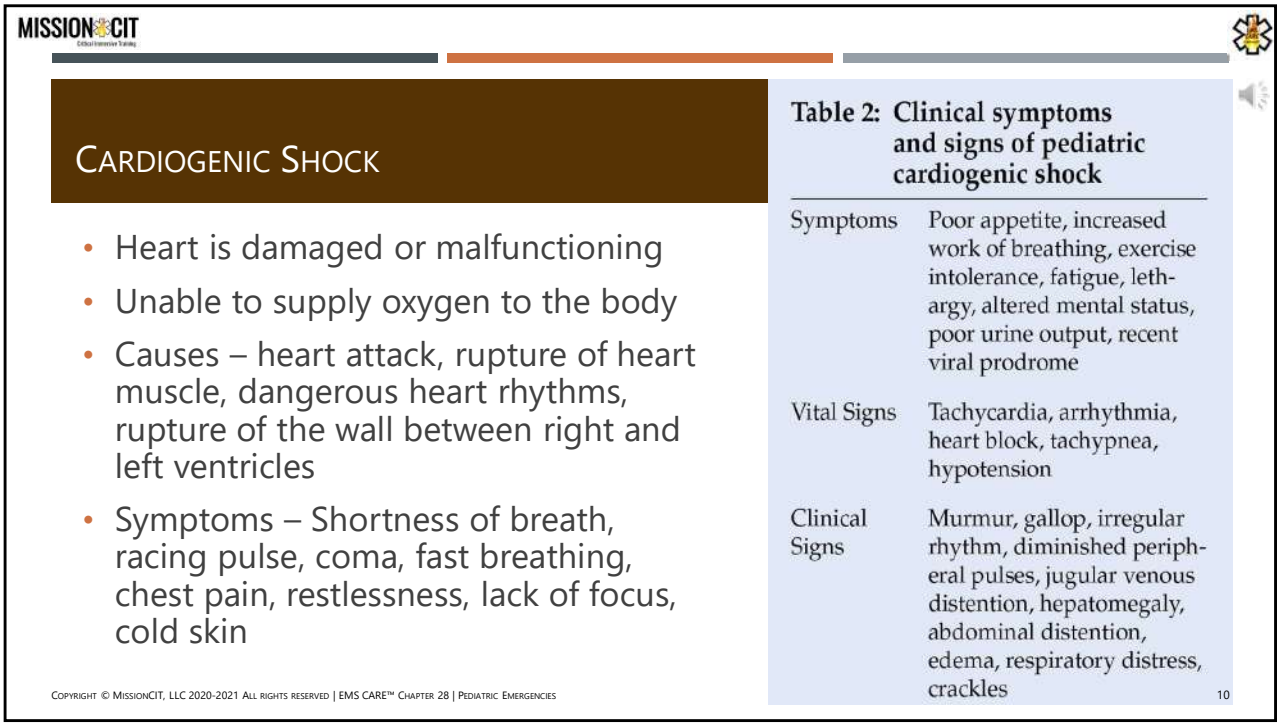
This is an emergency condition where the heart is unable to pump enough blood to the body. Within minutes, it can lead to multi-organ failure.

The amount of fluid circulation can drop due to bleeding from injuries, internal bleeding, diarrhea, vomiting, excessive perspiration, and even burns.

The symptoms associated with this shock are agitation,

cold and clammy skin, confusion, decreased urine output, weakness, pale skin color, sweating, and lack of responsiveness.

To assess this shock, check the child’s blood pressure, body temperature, and pulse. If the first two are low and falling rapidly, arrange for emergency transportation right away. As for the pulse, if you think it is weak and thready, the child needs to be hospitalized immediately.

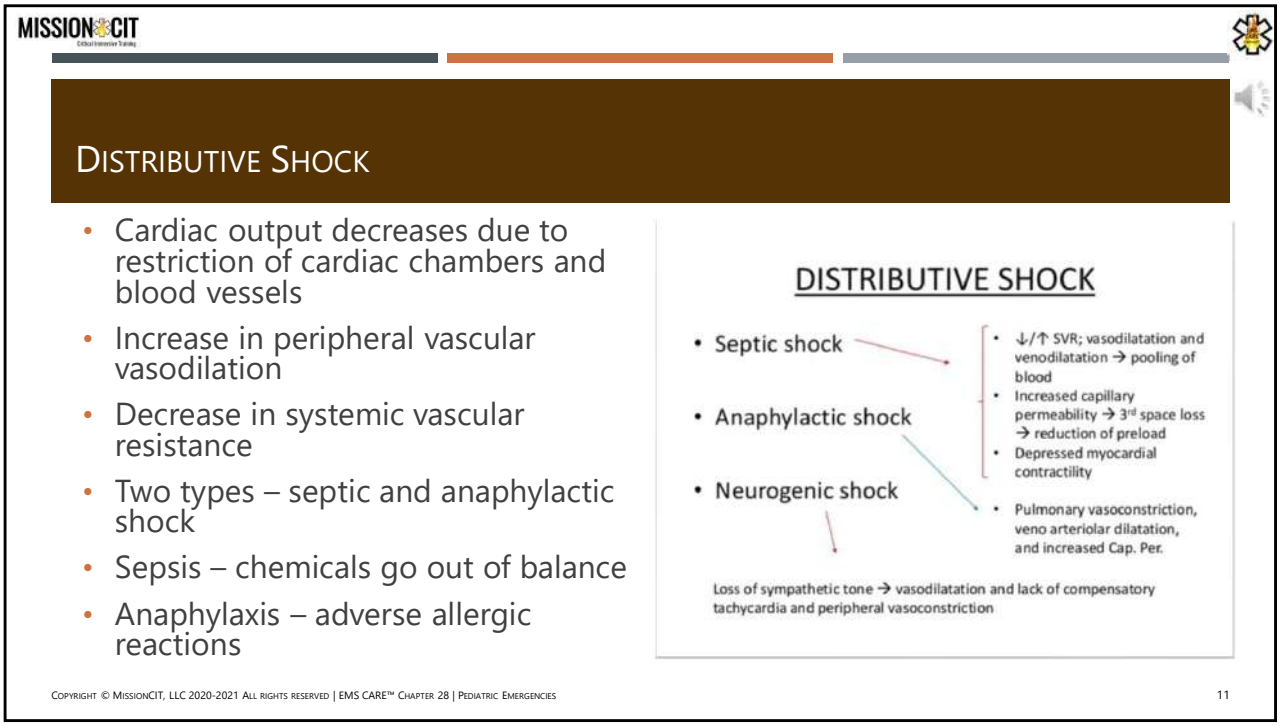


Cardiogenic shock happens when the heart is damaged or malfunctioning and is unable to supply enough oxygen to the body. Most times, it happens during a heart attack or any other serious heart condition such as the rupture of a heart muscle, dangerous heart rhythms, rupture of the muscles that support the heart valves, rupture of the wall between the right and the left ventricles, and slow heart rhythm.

This shock's symptoms include shortness of breath, racing pulse, coma, fast breathing, decreased urination, chest pain, pale or blotchy skin, restlessness, inability to

focus, cold skin, and heavy sweating.

Arrange for emergency transport if the child’s blood pressure is extremely low, the skin is cold and clammy, and the pulse is weak and thready.



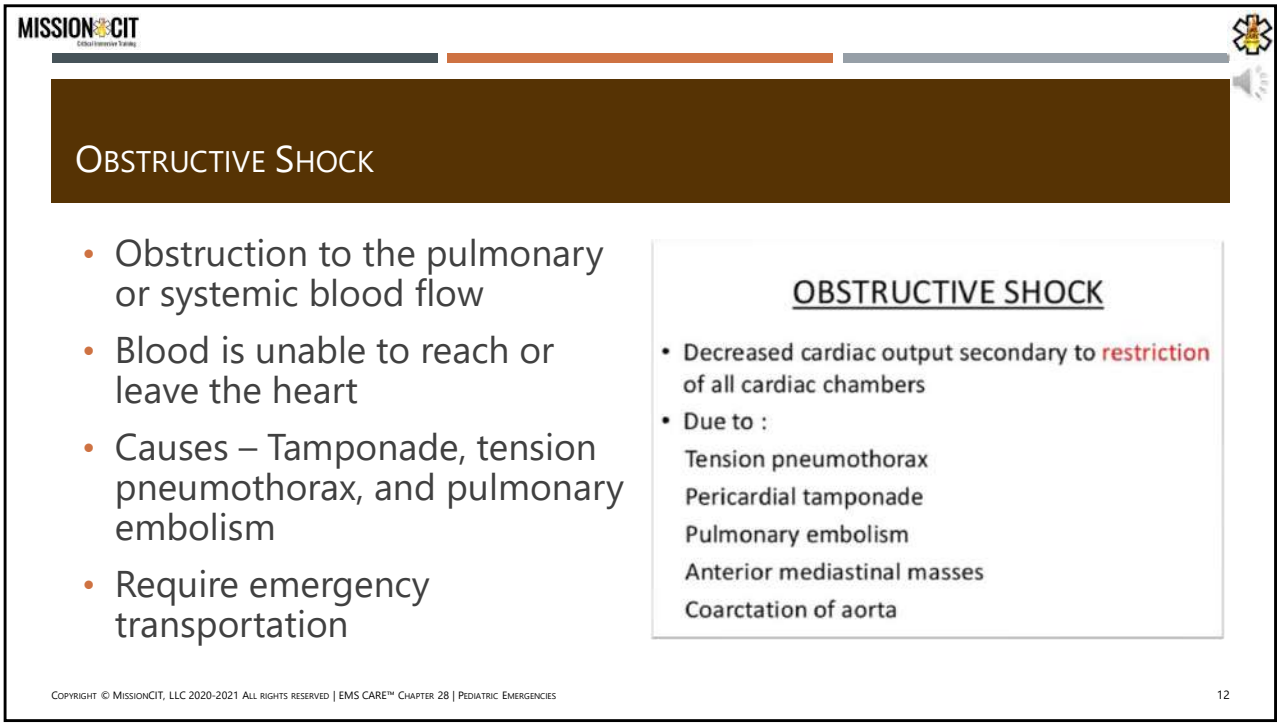
In this type of shock, the cardiac output is decreased due to the restriction of cardiac chambers and blood vessels. It typically happens when there is an increase in the peripheral vascular vasodilation and a decrease in systemic vascular resistance that can lead to a maldistribution of intravascular volume.

The two most common kinds of distributive shocks in children are septic shock and anaphylactic shock.

Sepsis is a condition that causes the body's chemicals to go out of balance, and in the process, trigger changes

that can lead to multi-organ failures.

Anaphylaxis, on the other hand, is an allergic reaction that causes the child to go into a state of shock.



Obstructive shock is the least likely type of shock and it is caused by the obstruction to the pulmonary or systemic blood flow. In this condition, the blood is unable to reach or leave the heart, though there are no changes to the cardiac function or the intravascular volume.

The common causes of this shock are cardiac tamponade, tension pneumothorax, and pulmonary embolism.

All these conditions require emergency transportation.

With this, we come to the end of this lesson. Justin will

take you through the second part of specific pathophysiology where he will talk about a few other conditions.