

Cardiac and Respiratory Emergencies

Objectives

- Recognize signs and symptoms of shortness of breath
- List common causes of shortness of breath
- Recognize danger signs of respiratory distress
- Describe the emergency medical care of the patient with breathing difficulty

Objectives (cont.)

- Define risk factors for the development of cardiac disease
- List the different causes of chest pain
- List the warning signs of a heart attack
- Describe the emergency care plan for assessing and treating the patient with chest pain

Components of the Respiratory System

- Central Nervous System - respiratory centers
- Nerves and muscles - work of breathing
- Airways - passages
- Circulation - blood flow for O₂ transport and CO₂ removal

Shortness of Breath

A leading symptom in Medical Emergencies

Normal Breathing

- Quiet and effortless
- Patient appears relaxed
- Chest expands normally
- Breath sounds are full and clear with no whistling (wheezing) or bubbly sounds

Abnormal Breathing

- How does abnormal breathing appear?

Abnormal Breathing

- Air hunger
- Labored breathing
- Noisy breathing
- Unusually slow, fast or irregular breathing
 - What is normal rate for adult?

Abnormal Breathing (cont.)

- Abnormal heart rate
- Pale, cyanotic (bluish) or mottled skin
- Use of accessory muscles to breathe
- Retractions, nasal flaring

Abnormal Breathing (cont.)

- Tripod position
- Fatigue
- Restlessness
- Confusion



Watch out for . . .

- Gasping for air
- Very slow breathing (less than 8-10 breaths per minute)
- Inability to speak in full sentences
- Severe cyanosis
- Inability to sit upright or unresponsiveness

BE PREPARED !

Left **untreated**, the patient will likely have a respiratory arrest

Causes of Shortness of Breath

- Infection
- Lung disease
- Trauma
- Foreign body obstruction
- Circulatory abnormalities
- Stress and anxiety

Treatment of Choice

Regardless of cause, treatment is **always**:

OXYGEN (The GAS of LIFE)

*In our line of work . . .
It's okay to pass a little gas!*

Specific Conditions: Asthma

- Lower airway disease
- Narrowing of small airways
- Able to draw air into chest but unable to exhale effectively
- Causes "air trapping"
- Triggers: inhaled irritants, cold, allergic reaction, exercise

Signs and Symptoms: Asthma

- Difficulty breathing
- Seated upright
- Fast shallow breathing
- Wheezing (early) & silent (late)
- Fatigue
- Decreasing LOC
- Fast heart rate (possibly from inhaler use)

Treatment: Asthma

- O₂ at 10L/minute
- Position of comfort
- If **PPV** is required, rate should be no faster than 8-10 breaths per minute (6-8 seconds)
- Manual exhalations
- Is the patient currently taking steroids? E.g. prednisone?
- Has the patient ever been intubated and placed on a ventilator?

Specific Conditions: COPD

Chronic Obstructive Pulmonary Disease

- Disease of lower airways; loss of elasticity of lung tissue, obstruction of air flow
- Disease of middle aged or elderly patients
- Cigarette smoking
- Chronic bronchitis, emphysema, "black lung"

Signs and symptoms: COPD

- Seated upright
- Pursed lip breathing
- Rapid respirations and pulse
- Possible wheezing
- One word sentences
- Decreased Level Of Consciousness (LOC)

Specific Conditions: COPD

- Have chronic low levels of oxygen and high levels of CO₂ (carbon dioxide)
- "Hypoxic " drive

Treatment: COPD

- Upright position
- **GIVE OXYGEN**
- Mild distress: O₂ by NC at 2-4 L/minute
- Moderate to severe distress: O₂ by non-rebreather mask at 10-15 L/minute
- Prepare to provide **PPV**

Specific Conditions: Hyperventilation

- Abnormally increased rate and depth of breathing
- Anxiety, stress, medical conditions

Signs and Symptoms: Hyperventilation

- Marked anxiety can escalate to panic
- Rapid deep breathing
- Dizziness or lightheadedness
- Numbness and tingling in fingers, toes and around mouth
- Carpopedal spasms – fingers & toes
- Tightness or lump in throat

Treatment: Hyperventilation

- Reassurance
- High flow O₂
- Vital signs
- More reassurance

Specific Conditions: Pulmonary Edema

- Definition: Built-up fluid in the lungs
- Causes:
 - Inhalation of smoke or toxic substances
 - Near drowning
 - Heart Attack
 - Congestive Heart Failure (CHF)

Signs and Symptoms: Pulmonary Edema

- Shortness of breath (SOB)
- Cyanosis, cool clammy skin
- Tachycardia (rapid heart rate)
- Confusion, agitation, decreased LOC
- Weakness
- Swelling legs and ankles
- Cough with pink, frothy sputum

Treatment: Pulmonary Edema

- Upright position
- Oxygen!
- PPV if tolerated
- Monitor Responsiveness & ABCs

Cardiovascular System

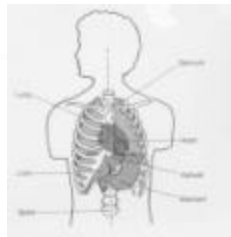
- Also known as the circulatory system
- Structures: Heart
Blood Vessels
Blood
- Dynamic and constantly changing

Cardiovascular System

- Transport blood which contains oxygen, nutrients, and waste products through the heart and vessels to and from all parts of the body

Anatomy of the Heart

- Hollow muscular organ "fist" size
- Center of chest
- Pumps blood
- Four Chambers; 2 atria, 2 ventricles
- Receives blood supply from coronary arteries



Characteristics of Heart Muscle

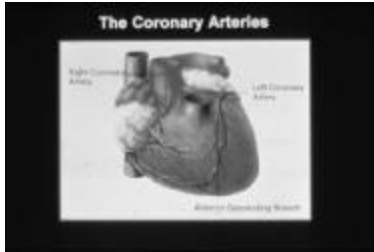
- Require continuous supply of O₂ and nutrients
- Capability of increasing supply on demand
- Capability of constricting or dilating coronary arteries to change flow on demand

Conditions Affecting Heart function

- Coronary artery disease (CAD)
- Bad Valves
- Electrical Impulse Malfunction
- Weakened or damaged heart muscle

Coronary Artery Disease (CAD)

- Most common cause of cardiac impairment
- Buildup of fatty deposits on walls of arteries
- Stiffening or hardening of the arterial wall
- Commons conditions include:
 - Angina Pectoris
 - Acute Myocardial Infarction (AMI)



Causes of Chest Pain

- Injuries to the ribs and intercostal muscles
- Lung infections, heart infections
- Blood clots in the lungs
- Partial or total collapse of the lung
- Heartburn
- Gall bladder disease
- Coronary Artery Disease



Angina Pectoris

- "A pain in the chest"
- Insufficient oxygen supply to the heart muscle
- Diseased coronary artery can no longer supply increased blood flow on demand
- No permanent damage to heart muscle

Characteristics of Anginal Pain

- Location: substernal or across chest
- Radiation: neck, jaw or arms
- Duration: 3-8 minutes, rarely longer
- Other s/s: SOB, nausea, sweating
- Mental State: anxiety
- Causes: exertion, stress, meals, weather extremes

Characteristics of Anginal Pain

- Symptoms relieved when Oxygen supply meets demand
- Pain relieved by :
 - Stopping physical activity
 - Reducing Stress
 - Nitroglycerin

Acute Myocardial Infarction (AMI)

- Death of heart muscle due to lack of oxygen
- Caused by narrowing or occlusion of the coronary artery that supplies the region with blood

Characteristics of Chest Pain with Acute Myocardial Infarction

- Similar to angina *plus*
- More intense
- Usually longer than 15 minutes
- May occur at rest
- Not relieved by rest or Nitro

Signs and Symptoms: AMI

- Tachycardia, bradycardia, irregular pulse
- Hypotension (low blood pressure)
- Shortness of breath
- Sudden onset of weakness, nausea, or sweating
- Pulmonary Edema
- Feeling of impending doom
- Signs of shock

Signs and Symptoms: AMI

- True or False?

An MI always causes chest pain or pressure, shortness of breath and sweating?

FALSE

While some people will describe the typical complaints, others may describe something as subtle as general malaise and syncope

Delay in Seeking Help

- Patients with chest pain tend to present to the emergency department within an average of **4** hours following the start of their symptoms;
- Patients with atypical symptoms present an average of **12** hours later

“Time is Muscle”

- Treatment options and patient outcomes depend on early entry into the health care system.
- The majority of AMI's occur as a result of thrombus formation
- Thrombolytic therapy is most effective when initiated within **4** hours after the start of symptoms.

Consequences of Acute Myocardial Infarction

- Death of heart muscle
- Arrhythmias
- Cardiac Arrest “sudden death”
- Congestive heart failure
- Cardiac rupture

Treatment of Chest Pain

- Treat all patients with chest pain as though they are having an AMI!
- Calm, confident manner put the patient at ease
- Position of comfort - usually upright
- **Oxygen therapy!**
- All chest pain patients **High Priority!**