Respiratory Emergencies for EMS Providers

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Lecture Agenda

• 1. Anatomy and Physiology Review
• 2. Primary and Secondary Assessment
• 3. Tools, pulse oximetry and capnography
• 4. COPD
• 5. Asthma
• 6. Pneumonia
• 7. Pulmonary Embolism
Respiratory System Anatomy

- Nasal cavity
- Nostrils
- Oral cavity
- Pharynx
- Epiglottis
- Larynx
- Paranasal sinuses
- Trachea (Windpipe)
- Right primary bronchus
- Superior lobe
- Middle lobe
- Right lung
- Left primary bronchus
- Left lung
- Alveoli
- Bronchi
- Superior lobe
- Bronchioles
- Inferior lobe
- Diaphragm
• Breathing is an involuntary process

• Which muscle group does the phrenic nerve innervate?

• Which muscle group does the intercostal nerve group innervate?

• Where is the dorsal respiratory group (DRG) and ventral respiratory group (VRG) located?

• Explain hypoxic drive
Primary Patient Assessment

• The primary survey is used to detect and manage any life-threatening conditions. A general impression will be formed.

• Signs of life-threatening respiratory distress in adult patients includes:
  • Altered mental status
  • Cyanosis
  • Stridor
  • Inability to speak one to two without dyspnea
  • Tachycardia > 130 bpm
Secondary Patient Assessment

• A focused history and chief complaint should be established

• The secondary assessment will be guided by the general impression and will note the patient’s mental status, ability to speak, respiratory effort, and skin color. A complete set of vital signs will be recorded. The head to toe exam will be completed here.
Assessment Tools-Pulse Oximetry

• Pulse oximetry

• Determines how well the patient is being oxygenated.

• This device measures the transmission of red and near-infrared light through arterial beds using a finger probe.

• Normal SaO2 > 93%

• A good wave form is paramount for measurement.
Assessment Tools - Capnography

- Capnography

Capnography is a numerical and graphical representation of carbon dioxide concentration exhaled through the breath.

Used to:
- confirm correct ET tube placement
- provide insight into ventilation
- indicate ROSC
- diagnose PE
COPD/Emphysema

- This disease progresses slowly and results in a decrease in the number of alveoli that are able to carry out gas exchange within the lung tissue.

- Predisposing factors include: smoking, environmental pollution, industrial exposures, and various pulmonary infections.

- The loss of elasticity in the alveoli results in air trapping driving up CO2 levels.

- Expiration becomes an active process requiring the use of accessory muscles.
Signs and Symptoms of COPD

- Thin barrel chest appearance
- Nonproductive cough
- Wheezing and rhonci
- Pink complexion
- Extreme dyspnea on exertion
- Prolonged inspiration (pursed lips)
Assessment and Treatment

• What has changed with the patient’s disease status?

• Assess the status of hypoxemia and treat

• Consider hypoxic drive but do not withhold oxygen. Titrate to oxygen saturation.

• Other treatments to consider: CPAP, supplemental oxygen, IV, monitor, medication administration.

• Which medications should be considered for COPD?
Asthma

- Asthma is characterized by chronic airway inflammation
- It is the most common chronic disease of childhood
- Childhood asthma and adult asthma differ. Children tend to grow out of asthma adults tend not to.
- Children: allergen driven
- Adult: Other drivers, infections, smoking, psychological, fumes.

Patho-physiology of Asthma
Signs and Symptoms of Severe Asthma

- Reduced level of consciousness
- Diaphoresis or pallor
- Retractions
- Lethargy/exhaustion
- Inability to speak after one to two words
- Pulse rate >130 bpm
- Respiratory rate > 30 breaths per min
- Severe agitation
- ETCO2 > 45 mm Hg
Treatment and Assessment of Asthma

• Assess the severity of the asthma attack. Consider status asthmaticus.

• Target oxygen therapy to SaO2 93 -95%.

• Consider IV, monitor, fluids, medications, CPAP

• Which medications would you consider for an asthma patient?

• Is RSI an option for impending respiratory failure?
Pneumonia

• Pneumonia

• A group of specific infections that cause an acute inflammatory process of the respiratory bronchioles and alveoli.

• Causes can be bacterial, viral, or fungal.

• Influenza viruses are the most common cause of pneumonia.

• These infections may spread via respiratory droplets through infected people.
Signs and Symptoms of Pneumonia

- Productive cough
- Pleuritic chest pain
- Tachypnea
- Wheezing, crackles, or rhonci
- DIB
- Fever
- Fatigue
- Headache
- Look for signs and symptoms of sepsis
Assessment and Treatment of Pneumonia

• Assess for hypoxia and airway compromise, treat accordingly
• Airway support
• Oxygen therapy
• IV, monitor
• IV fluids

• Which medications could we consider for pneumonia?
Pulmonary Embolism

- Pulmonary Embolism

- A blockage of the pulmonary artery by a clot or foreign material from another part of the body.

- This is a common disorder effecting roughly 900,000 people a year. Of this number, 60,000-100,000 die.

- Sudden death is the primary symptom.

- Thrombi migrate from the large veins of the lower extremities lodging in the pulmonary artery.

- Contributing factors: extended travel, bed rest, obesity, age, varicose veins, venous injury, hypercoagulability, polycythemia, sickle cell anemia, atrial fibrillation.
Signs and Symptoms of PE

• Due to the size and location of the blockage presentation may vary.

• DIB, cough, hemoptysis, pain, anxiety, syncope, hypotension, diaphoresis, tachypnea, tachycardia, fever, JVD, pleuritic chest pain, wheezes, crackles.

• Low SPO2 and low ETCO2 with normal wave form.

• A large embolism can cause sudden cardiac arrest.
Assessment and Treatment of PE

- Pre-hospital care is supportive
- IV, monitor, high flow oxygen therapy
- Treat symptoms as they arise
- Minimize movement
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Webinar Quiz and Evaluation Link

• Click the link below to take the Quiz/Evaluation.
• Allow 1-2 weeks for CE distribution.
• [https://msu.co1.qualtrics.com/jfe/form/SV_8Aq6r4xrvsE0lWB](https://msu.co1.qualtrics.com/jfe/form/SV_8Aq6r4xrvsE0lWB)