

Below you will find a grading sheet, a peer assessment sheet, and a sample paper. Please use these to assist you in the successful completion of your Case History.

Thanks,

Weber State University Health Sciences Department

## *Grade Sheet*

### **Group Paper**

Patient History 10 pts \_\_\_\_\_

Symptoms 10 pts \_\_\_\_\_

Diagnostic Testing/Diagnosis 10 pts \_\_\_\_\_

Treatment 10 pts \_\_\_\_\_

Summary 10 pts \_\_\_\_\_

Paper is well organized with  
Introduction, body, and summary  
Paragraphs. 5 pts \_\_\_\_\_

Paper is correct length,  
Free of spelling and grammatical  
Errors and contains 3 references 5 pts \_\_\_\_\_

Correlation. Symptoms, testing results  
and diagnosis correlate with disease  
process. 10 pts \_\_\_\_\_

**Group Grade** 70 pts \_\_\_\_\_

### **Individual Grade**

Average of Peer Assessments 30 pts \_\_\_\_\_

**Final Grade** 100 pts \_\_\_\_\_

**Comments:**



## COPD Case Study

### Patient History:

Bob Jones is a 63-year-old male who presents to the emergency room with complaints of SOB. Pt was playing with grandchildren when he began having difficulty breathing and became dizzy and lightheaded. After nearly collapsing, Pt's daughter drove him to the ER. Pt had a forceful cough with production of yellow sputum. He stated he has had a chronic cough for many years. He has a history of smoking (at least 1 pack of cigarettes a day for the past 35 years). Pt states that it is easier to breath if he props himself up with 3 or 4 pillows. Pt appears to be using accessory muscles when breathing. Pt states he has had an extensive history of bronchitis and pneumonia over the years. Pt was diagnosed with emphysema at the age of 55.

### Signs and Symptoms:

- BP = 145/89 mmHg, Temp = 99.5° F, Resp = 28, HR = 116, SpO2 = 84% on room air.
- Pt appears older than his age.
- Auscultation to lungs reveals wheezing bilaterally in all fields.
- Strong cough producing yellow sputum
- Frequent clearing of the throat.
- 2+ pitting edema in bilateral lower extremities.
- Pt has a barrel chest

### Diagnostic Testing:

- Chest X-ray reveals the presence of thickening of tissue around the bronchi. Lungs appear larger than normal
- Pulmonary Function Test reveals airflow limitation. Forced vital capacity reduced 33%. Forced expiratory volume reduced 60%.
- Hematology
  - RBC = 5.7, High
  - Hemoglobin = 17.2, High
  - Hematocrit = 45.7, Normal
- Arterial Blood Gas analysis.
  - PaO2 = 61 mmHg, Low
  - PaCO2 = 56mmHg, High
  - pH = 7.36, Normal
  - HCO3 = 37mEq/L

**Diagnosis:**

Pt is suffering from Chronic Obstructive Pulmonary Disease (COPD). Wheezing in lungs indicates a narrowing of bronchioles. Cough and sputum production related to overactive goblet cells which in return results in frequent clearing of the throat. Barrel chest is consistent with difficulty expelling air. Chest X-ray confirms constriction of bronchioles. Spirometry test show decreased ability to inhale and exhale normal volumes of air. Increased RBC's and hemoglobin indicated decreased levels of oxygen. Low PaO<sub>2</sub> indicates decreased oxygen levels or decreased ability to absorb oxygen. Increased PaCO<sub>2</sub> indicates a deficiency expelling carbon dioxide. Increased HCO<sub>3</sub> and a pH at the low end of the normal values indicate compensated respiratory acidosis.

**Treatment:**

- Highly Recommending cessation of smoking.
- Bronchodilators
  - relax bronchiole tissue opening airways
  - Enhances cilia movement in pseudostratified epithelium to facilitate in mucus clearing
  - Reduce wheezing
- Corticosteroids
  - Reduce bronchiole inflammation
  - Reduce mucus production
  - Decrease inflammatory response to irritants and allergens
- Nonsteroidal Anti-inflammatory Medications (NSAID's)
  - Reduce or prevent inflammation caused by allergens.
  - Reduce wheezing
- Expectorants
  - Assist in liquefying and removing mucus from airways
- Oxygen
- Chest percussion
  - Loosen mucus in airway

**Summary:**

COPD is a pulmonary disease characterized by nonreversible decreased air flow through bronchioles. It is usually caused by emphysema and chronic bronchitis. Decreased air flow is caused by a decreased diameter of bronchioles and pathologic changes to the alveoli. Decreasing diameter within the bronchioles increased the resistance of the passing air which results in a decreased amount of air that can be inhaled and exhaled. The alveoli lose their elasticity and the walls become thick and inflamed.

Loss of elasticity decreases the amount of surface area available for gas exchange. Thickening results in a greater distance that oxygen and carbon dioxide must travel through alveolar tissue, which results in decreased gas exchange. Narrowing of the airway passages causes wheezing that can be heard upon auscultation. Corticosteroids, bronchodilators, and NSAID's can be used to decrease inflammation and relax smooth muscle within the bronchioles to increase airway passage diameter.

Irritation and inflammation cause goblet cells within pseudostratified epithelium to produce more mucus. This additional mucus can clog or decrease airway passages. Pt's with COPD can have a chronic cough and frequently try to clear their throat in efforts to expel the mucus. Expectorants can be used to liquefy mucus secretions making it easier for pt's to cough it up. Percussion can also be used to loosen secretions, aiding in its removal.

Pt's with COPD often present with a barrel chest. This is caused by the inability to expel air which then results in over inflated lungs which increases the thoracic cavity. Because airway passages are decreased, pt's have a harder time inhaling and exhaling proper volumes of air. They must therefore increase their rate of respirations to compensate for the decreased volume. Pulmonary Function Test will show decreased ability to forcefully inhale and exhale air due to these narrowed passages.

COPD pt's often have an increased RBC and hemoglobin count. As the result of decreased gas exchange, the tissues are not receiving adequate oxygen perfusion. To compensate for hypoxic conditions in tissue, the adrenal glands release erythropoietin. Erythropoietin is a hormone that stimulates the production of RBC's within the bone marrow. The bone marrow then increased the rate of production. Problems can result from the over production of RBC's. The increased number cells can increase blood volume which in turn can increase blood pressure. It also can increase the viscosity of the blood which slows the circulation within the vessels.

Arterial blood gases will also be abnormal in COPD patients. The carotid and aortic bodies are special chemoreceptors that monitor the oxygen, carbon dioxide, and pH level in the blood. They relay information to respiratory neurons in the brain stem which can increase the rate of respiration. COPD patients have a difficult time regulating blood gas levels. PaO<sub>2</sub> will be low because oxygen is not being absorbed properly in the lungs. PaCO<sub>2</sub> will be high because carbon dioxide is not being exchanged in the lungs efficiently. Due to the increase in CO<sub>2</sub>, the body's pH will decrease. This causes respiratory acidosis. In order to compensate for the acidic conditions, the kidneys retain bicarbonate. When the body's pH is brought back to within normal ranges, the condition is called compensated respiratory acidosis.

There is no cure for COPD. Medical care is more palliative and focuses on treating symptoms. Most patients who suffer form COPD have an extensive history of smoking. The first line of treatment is the cessation of smoking. Oxygen therapy is sometimes used but can be dangerous if not used properly. The medulla oblongata will eventually adapt to the elevated CO<sub>2</sub> levels. Normally the body is much more sensitive to

changes in CO<sub>2</sub> levels than oxygen levels. Small changes in CO<sub>2</sub> normally affect respiration rate dramatically. However, in COPD patients they do not have the same sensitivity to CO<sub>2</sub>. Their respiration rate is dependant more on O<sub>2</sub> levels. If a COPD patient is administered too much oxygen it can knock out their drive to breathe and they will go into respiratory arrest.

COPD is a dangerous disease that is easy to avoid. There is not a strong genetic correlation and appears to be an environmental influenced disease. The best way to prevent this disease is not smoking. With as many complications that result from smoking it is hard to understand why people still insist on doing it. But regardless of people choices, it is important that we educate people on the consequences of smoking and treat them in our best abilities.

### **References:**

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Jenkins, B. (2003). COPD Cigarettes and Alcohol, a Common Link? Retrieved Nov. 14, 2005, from <http://www.racc.edu>

McCance, K., & Huether, S. (2002). Pathophysiology: Biologic Basis for Disease in Adult & Children. St. Louis: Mosby Inc.

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