Human Biology ATAR – Task 3 Lung Disease

Griffin Flynn

**Lung Disease A: Emphysema**

“Emphysema is a lung condition that causes shortness of breath. In people with emphysema, the air sacs in the lungs (alveoli) are damaged. Over time, the inner walls of the air sacs weaken and rupture — creating larger air spaces instead of many small ones” (Emphysema - Symptoms and Causes, 2017).

**Cause:**

“Smoking is the number one factor. Because of this, emphysema is one of the most preventable types of respiratory diseases. Air pollutants in the home and workplace, genetic (inherited) factors (alpha-1 antitrypsin deficiency), and respiratory infections can also play a role in causing emphysema. Cigarette smoking not only destroys lung tissue, it also irritates the airways. This causes inflammation and damage to the cilia that line the bronchial tubes. This results in swollen airways, mucus production, and difficulty clearing the airways. All of these changes can lead to shortness of breath” (Emphysema: Causes, Symptoms, Diagnosis & Treatments, 2019).

**Symptoms:**

The symptoms of emphysema include breathlessness, susceptibility to chest infections, cough with phlegm production, fatigue, barrel-shaped chest (from an expansion of the ribcage in order to accommodate enlarged lungs), cyanosis (a blue tinge to the skin) due to lack of oxygen (Emphysema - Better Health Channel, n.d.).

**Diagnosis:**

Emphysema is diagnosed mainly using a lung function test called spirometry, which measures the amount of air that you can breath out of your lungs. It can also be diagnosed through the use of chest x-rays (Emphysema - Better Health Channel, n.d.).

**Treatments:**

“There are many treatments for emphysema including bronchodilator medications; inhaled as aerosol sprays or taken orally, bronchodilator medications may help to relieve symptoms of emphysema by relaxing and opening the air passages in the lungs. Antibiotics; may be used to help fight respiratory infections common in people with emphysema, such as acute bronchitis, pneumonia and the flu. Vaccines; patients with emphysema should receive a flu shot annually and a pneumonia shot every five to seven years to prevent infections. Oxygen therapy; as a patient's disease progresses, they may find it increasingly difficult to breathe on their own and may require supplemental oxygen. Oxygen comes in various forms and may be delivered with different devices, including those you can use at home. Surgery or lung transplant; lung transplantation may be an option for some patients with emphysema. For others, lung volume reduction surgery, during which small wedges of damaged lung tissue are removed, may be recommended” (Emphysema Treatment, n.d.).

**Prevention:**

“To prevent emphysema, don't smoke and avoid breathing secondhand smoke. Wear a mask to protect your lungs if you work with chemical fumes or dust” (Emphysema - Symptoms and Causes, 2017).

**Lung Disease B: Pneumonia**

Pneumonia is a lung infection that can range from mild to severe. It happens when an infection causes the air sacs in your lungs (alveoli) to fill with fluid or pus, which can make it hard for you to breathe in enough oxygen to reach your bloodstream (Crosta, 2022).

**Cause:**

“Pneumonia is typically due to infectious pathogens, such as bacteria and viruses. These pathogens can spread via coughing and sneezing or by contaminating surfaces that people touch. In most cases, a person contracts pneumonia-causing pathogens by breathing them into the small air sacs, or alveoli, within their lungs. The immune system responds by sending white blood cells to attack the infection, which triggers inflammation of the alveoli. The alveoli fill with fluid and pus, causing pneumonia” (Crosta, 2022).

**Symptoms:**

“The signs and symptoms of pneumonia vary from mild to severe, depending on factors such as the type of germ causing the infection, and your age and overall health. Mild signs and symptoms often are similar to those of a cold or flu, but they last longer.The symptoms of pneumonia may include chest pain, cough; which may produce phlegm, fatigue, fever, sweating and shaking chills, lower than normal body temperature (in adults older than age 65 and people with weak immune systems), nausea, vomiting or diarrhea, and shortness of breath” (Sandhya Pruthi, 2020).

**Diagnosis:**

“Diagnosis of pneumonia is usually made based on your recent health history (such as surgery, a cold, or travel exposures) and the extent of the illness. Based on these factors, your healthcare provider may diagnose pneumonia simply on a thorough history and physical exam. Pneumonia is usually diagnosed through the the use of a chest x-ray, blood tests, sputum culture; which is a test that is done on the material that is coughed up from the lungs and into the mouth, it’s often used to see if there’s an infection in the lungs, pulse oximetry; an oximeter is a small machine that measures the amount of oxygen in the blood, chest CT scan; this imaging procedure uses a combination of X-rays and computer technology to produce sharp, detailed horizontal, or axial, images (often called slices) of the body, bronchoscopy, is direct exam of the bronchi (the main airways of the lungs) using a flexible tube (called a bronchoscope), it helps to evaluate and diagnose lung problems, assess blockages, and take out samples of tissue and/or fluid for testing, and a pleural fluid culture; a sample of a fluid sample is taken from the pleural space. This is the space between the lungs and chest wall. Fluid is pulled into a syringe attached to the needle, it is sent to the lab where it’s tested to find out which bacteria is causing the pneumonia” (Pneumonia, n.d.).

**Treatments:**

“Treatments that are often use for pneumonia are antibiotics; these medicines are used to treat bacterial pneumonia. It may take time to identify the type of bacteria causing your pneumonia and to choose the best antibiotic to treat it, cough medicine; coughing helps loosen and move fluid from your lungs, it's a good idea not to eliminate your cough completely, fever reducers/pain relievers. You may take these as needed for fever and discomfort. These include drugs such as aspirin, ibuprofen (Advil, Motrin IB, others) and acetaminophen (Tylenol, others)” (Sandhya Pruthi, 2020).

**Prevention:**

“Get a flu shot every year to prevent seasonal influenza. The flu is a common cause of pneumonia, so preventing the flu is a good way to prevent pneumonia. Additional pneumococcal vaccinations may be recommended for children and adults who are at increased risk of pneumococcal disease depending on their health condition(s). There are several other vaccines that can prevent infections by bacteria and viruses that may lead to pneumonia, including pertussis (whooping cough), COVID-19, chicken pox and measles. Wash your hands frequently, especially after coughing or blowing your nose, going to the bathroom, diapering, and before eating or preparing foods. Don't Smoke; tobacco damages your lung's ability to fight off infection, and people who smoke have been found to be at higher risk of getting pneumonia. Tobacco users are considered one of the high-risk groups that are encouraged to get the pneumococcal vaccine” (Preventing Pneumonia, 2022).

**Comparison:**

“People with emphysema are more likely to have pneumonia, and having the two conditions can negatively affect a person’s outlook. Emphysema weakens the respiratory system, increasing vulnerability to pneumonia. Because people with emphysema already have weakened airways and immune systems, they are more likely than people without emphysema to die of pneumonia. One study found that 36.1% of first-time hospitalizations for emphysema exacerbations were related to pneumonia. This rate was lower upon subsequent visits. People with emphysema who develop pneumonia have worsening breathing and usually require hospitalization. It typically takes them longer to recover from the infection than otherwise healthy people without emphysema, and they are more likely to develop serious complications.

Emphysema is a chronic, lifelong condition that a person can only manage, not cure. In contrast, pneumonia is an acute infection, which doctors can treat in many cases. Both conditions can cause breathing difficulties and feelings of tightness in the chest. Because emphysema often flares up, improves, then flares up again, it may be difficult to tell the difference between a emphysema flare-up and pneumonia. Sudden difficulty breathing always warrants medical treatment.

Emphysema is a lifelong condition that affects a person’s ability to breathe. In contrast, pneumonia is an often short-term inflammation of the lungs resulting from infection. Having emphysema can increase a person’s risk of developing pneumonia but is not a cause itself. Both conditions carry severe health risks, and having a combination of emphysema can find support and advice to help with managing emphysema symptoms, avoiding flare-ups, and reducing the risk of infection” (Villines, 2022).

**References:**

* Crosta, P. (2022, January 6). What you should know about pneumonia. MedicalNewsToday. Retrieved April 25, 2022, from <https://www.medicalnewstoday.com/articles/151632>
* Emphysema - Better Health Channel. (n.d.). Better Health Channel. Retrieved April 25, 2022, from <https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/emphysema#symptoms-of-emphysema>
* Emphysema - Symptoms and causes. (2017, April 28). Mayo Clinic. Retrieved April 21, 2022, from <https://www.mayoclinic.org/diseases-conditions/emphysema/symptoms-causes/syc-20355555#:%7E:text=Emphysema%20is%20a%20lung%20condition,instead%20of%20many%20small%20ones>
* Emphysema: Causes, Symptoms, Diagnosis & Treatments. (2019, August 7). Cleveland Clinic. Retrieved April 21, 2022, from <https://my.clevelandclinic.org/health/diseases/9370-emphysema>
* Emphysema Treatment. (n.d.). Ucsfhealth. Retrieved April 25, 2022, from <https://www.ucsfhealth.org/conditions/emphysema/treatment>
* Pneumonia. (n.d.). Johns Hopkins Medicine. Retrieved April 27, 2022, from <https://www.hopkinsmedicine.org/health/conditions-and-diseases/pneumonia>
* Preventing Pneumonia. (2022, February 18). American Lung Association. Retrieved April 27, 2022, from <https://www.lung.org/lung-health-diseases/lung-disease-lookup/pneumonia/preventing-pneumonia#:%7E:text=Get%20a%20flu%20shot%20every,Children%20younger%20than%202>
* Sandhya Pruthi, M. D. (2020, June 13). Pneumonia - Symptoms and causes. Mayo Clinic. Retrieved April 27, 2022, from <https://www.mayoclinic.org/diseases-conditions/pneumonia/symptoms-causes/syc-20354204>
* Villines, Z. (2022, February 18). What is the link between COPD and pneumonia? Medical News Today. Retrieved April 27, 2022, from <https://www.medicalnewstoday.com/articles/315713#pneumonia-or-copd>