COPD: EMPHYSEMA

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Pathophysiology

There are two types of emphysema, primary and secondary emphysema. Primary emphysema has a genetic component. Primary emphysema is an autonomic recessive trait of alpha-1 antitrypsin deficiency. Alpha-1 antitrypsin is a proteinase inhibitor and is made in the liver. This gene is a mutation in the SERPINA1 gene located in the 14th chromosome. This protein helps protect the lungs from damage by cigarette smoke. If not enough alpha-1 antitrypsin is present, lung damage can occur and lead to emphysema (Izaguirre Anariba, 2017). Secondary emphysema usually occurs by environmental factors, mainly from cigarette smoke, occupational and air pollutants (Boka, 2016). Below discusses the pathophysiology behind emphysema.

The main sign of emphysema is dyspnea (shortness of breath). Many people who have emphysema may experience fatigue, increased mucous production, and wheezing in the early stages. By the time these symptoms appear, often much of the lung tissue has already been destroyed. These symptoms can often be misdiagnosed for other diseases or illnesses (Cleveland Clinic Foundation, 2017). The disease usually progresses where individuals will experience increasing shortness of breath that affects their daily activities, and eventually individuals will experience fatigue, shortness of breath and cyanosis. When the airway is narrowed or obstructed, expiratory flow is decreased causing dyspnea occurs because the lungs are being overworked. (Burt & Madell, 2013).

Significance of Pathophysiology

Understanding the importance of the pathophysiology and how it affects the individual will help providers to understand the disease of emphysema. Below is the significance of the pathophysiology of emphysema.

Inflammation decreases the elastic recoil of the lung tissue and destroys alveolar attachments to small airways (Burt & Corbridge, 2013). Repeated reduction in alveoli with septal wall destruction reduces gas exchange and causes the “barrier’s” capillary collapse during exercise, thus limiting airflow (Birg, Joanne, & Wright, 2016). Bronchial inflammation increases pulmonary secretions, muscle contraction, loss of alveolar structure and airway edema causes airway narrowing or obstruction (Burt & Corbridge, 2013). When the airway is narrowed or obstructed, expiratory flow is decreased causing hyperventilation of lung from small shallow breaths. (Burt & Corbridge, 2013). Dyspnea occurs because the lungs are being overworked. (Burt & Corbridge, 2013). Individuals will have the appearance of “barrel-chested” due to too much air being trapped in the lungs (The Cleveland Clinic Foundation, 2017). Further parenchymal destruction impairs gas exchange and leads to hypoxia. (Burt & Corbridge, 2013).

Signs & Symptoms

The main sign of emphysema is dyspnea (shortness of breath). Many people who have emphysema may experience fatigue, increased mucous production, and wheezing in the early stages. By the time these symptoms appear, often much of the lung tissue has already been destroyed. These symptoms can often be misdiagnosed for other diseases or illnesses (Cleveland Clinic Foundation, 2017). The disease usually progresses where individuals will experience increasing shortness of breath that affects their daily activities, and eventually individuals will experience fatigue, shortness of breath and cyanosis. When the airway is narrowed or obstructed, expiratory flow is decreased causing dyspnea occurs because the lungs are being overworked. (Burt & Madell, 2013).

Implications for Nursing

- Education: The biggest risk factor is smoking. Smoking cessation is the only intervention shown to reduce the rate of the disease progression and related to mortality (Bian, 2016). Providing patient education about smoking cessation is crucial to in advancing the stages of emphysema and preventing further damage. Also, it is important to educate patients about proper nutrition, exercise, correct ways to use inhalers, and signs of exacerbations (Rennard & Drummond, 2015).
- Providing annual influenza vaccinations to prevent infections (Mosenifar, 2013).
- Providing smoking cessation counseling (Corbridge, 2013).
- Providing patient education about risk factors (Simpson et al., 2013).
- Providing proper identification of exacerbations (Mosenifar et al., 2013).
- Providing patient teaching about disease progression (Paape, 2016).
- Providing patient teaching about exacerbations (Simpson et al., 2013).
- Providing patient education about the importance of self-management (Kho, 2016).

References


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Introduction

Working in the Critical Care Unit at Grant Medical Center, many of our patients admitted to the unit have a history of Chronic Obstructive Pulmonary Disease (COPD), and the disease can complicate their course of treatment. Working with this patient population, it is common for these patients to experience prolonged time on the ventilator and increased stress on staff. Many patients have multiple admissions throughout the year with COPD exacerbation, thus decreasing lung function and increasing risk for mortality.

Chronic Obstructive Pulmonary Disease is the third leading cause of death in the United States and is affecting more than 32 million Americans (Mosenifar, 2013). The progression of the disease continues to rise and many people are unaware they even have the disease. Prevention is essential in decreasing the incidence of the disease and Advanced Practice Nurses (APN) play a vital role. Chronic Obstructive Pulmonary Disease (COPD) is a lung disease characterized by progressive airway inflammation resulting from small- vessel disease and parenchymal destruction (Burt & Corbridge, 2013). The inflammation further weakens and destroys the airways, thus decreasing gas exchange. This collapse of lungs leads to an trapping and further damage to the alveoli and narrowing of the airways (Burt & Corbridge, 2013). There are two types of COPD, chronic bronchitis and emphysema. Emphysema is abnormal enlargement of airspaces distal to the terminal bronchioles, accompanied by destruction of the alveolar walls and without obvious foci (Boka, 2016). Being able to understand the pathophysiology of emphysema will allow for providers to accurately assess patients and diagnose the disease. Educating patients and family members about the disease and providing preventative education such as risk factors to the disease will help prevent escalation of disease.