Pathophysiology Of Chronic Asthma And Acute Asthma Exacerbation

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Introduction

Asthma is an airway condition that is most prevalent in children between two and six years. The disease is marked by difficulty in breathing that is caused by an inflammatory process of the airway. The symptoms of the disease are more severe at night or early morning. The symptoms, which are mostly transient, include chest tightness, cough, and wheezing. Asthma can affect adults as well. The signs and symptoms of the disease are caused by exposure to allergens, mainly environmental substances like pollen grains and dust. Patient behavior like smoking might also lead to exacerbation of the clinical symptoms (Janssens, 2013).

Pathophysiology Of Chronic Asthma

Chronic asthma is marked by the persistence of the recurrent symptoms of the disease for a long duration of time. Persistence of the inflammatory process in the bronchioles and bronchi leads to an increase in the smooth muscle layer of the airway and increased sensitivity to allergens. The presence of chronic asthma may also be marked by increased inflammatory cells in the blood. These cells include immune cells like eosinophils and macrophages. An increase in eosinophil levels in the lamina propria causes increased sensitivity of the airway. The changes associated with chronic asthma may also lead to an increase in the number of mucous glands in the airway. Increased mucus production causes further blockage of the airway during an asthmatic attack. The changes associated with the airways during an asthmatic attack are easily reversed by drugs that reduce inflammation. In chronic asthma, there is a decreased response to treatment options (Bonsignore, 2015).

Pathophysiology Of Acute Asthma Exacerbation

Asthma exacerbations include episodes of asthmatic attacks that are marked by worsening asthmatic signs, including chest tightness, shortness of breath, and wheezing. The exacerbations are mostly caused by exposure to an allergen. Inhaling substances that are known to cause inflammation in the airway, like dust or smoke, causes the release of inflammatory mediators from the walls of the airway, leading to the worsening of the asthmatic attack. Recurrence of acute asthma attacks should be avoided since it could lead to the persistence of the condition and the possible development of chronic asthmatic conditions. Acute attacks can also aggravate chronic asthma. Immediate treatment of the resultant symptoms can help avoid the chances of developing complications or sustaining

further damage to the airways (Golden, 2015).

The most common arterial blood gas finding during an asthmatic exacerbation is hypoxemia. A decrease in the oxygen levels in the arterial blood is due to the impaired oxygenation of blood in the lungs. The arterial carbon dioxide levels might be normal or increased on assessment. Normal levels of the gas are due to the counter mechanism in which the carbon dioxide in the blood forms carbonic acid, leading to increased blood acidity. Prolonged attacks lead to further accumulation of carbon dioxide gas, increasing its partial pressure in the arterial blood. Evaluation of the partial pressures of both oxygen and carbon dioxide gases before and after treatment can be a good marker of progress. Restoration of normal breathing restores the integrity of the blood gases, with high partial pressure of oxygen and low partial pressure of carbon dioxide in the arterial blood. Oxygen therapy should be conducted carefully to avoid respiratory alkalosis, which is primarily caused by hyperventilation of the alveolar (Singh, 2013).

Effect Of Patient Behavior On The Pathophysiology Of Asthma

Patient behavior is an important determinant of the frequency of asthmatic attacks and exacerbations. The predisposition of the patient to allergens determines how often the manifestations occur. The exposure can be determined by several aspects of the individual's behavior, including smoking and exposure to industrial dust and farm allergens like pollen grains. When there is frequent exposure to a certain allergen, the most crucial management procedure is the elimination of the allergen, followed by the treatment of symptoms.

Diagnosis of asthma is done using a series of tests. These tests include spirometry exams, measurement of blood gases, skin tests for allergenicity to common environmental compounds, and provocation tests. The inclusion of an immunologist can also be helpful in the identification of immune markers of allergic hypersensitivity. Isolation of the individual allergens associated with the asthmatic attack is done by obtaining a comprehensive history.

The treatment options aim at controlling the symptoms, restoring lung function, and preventing damage to the airway and future exacerbations. The clinician has to also ensure that there is minimum use of drugs in the management of the condition. When necessary, the drugs with the least side effects should be used. Isolation of the possible causes of asthmatic exacerbations forms an important part of the management process. Drugs that can be useful in managing the condition include short-acting and long-acting bronchodilators, inhaled steroids, anticholinergic agents, and immune cell modifiers like mast cell stabilizers.

References

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