Asthma Disease

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Asthma is a disease that affects lungs and is associated with episodes of chest tightness, wheezing, early and nighttime coughing, and breathlessness. Asthma is characterized by functional and structural abnormalities of the bronchial epithelium, inflammatory cell accumulation in the bronchial mucosa, and airway tissue structure remodeling (MacDowell & Bacharier, 2005)

This virus causes almost half of the upper respiratory tract infections. Rhinovirus also causes lower airway infection but the exact mechanism through which it provokes asthma is not known. It is believed that mechanism may involve effects on airway responsiveness that is independent of the inflammation associated with lower respiratory tract infection and epithelial damage. Rhinovirus increases the immediate and late-phase allergen responses and exacerbates the allergic inflammation in the airway. It is also associated with the decline in lung function in asthmatic patients. Coronavirus is associated with asthma in adults and children. It is the second most common virus that is associated with asthma episodes. It is stated that coronavirus infection is associated with a large burden of disease as compared to respiratory syncytial and influenza virus. The influenza virus is also associated with exacerbation of asthma in all age groups. Adenovirus infection has also been demonstrated during the acute episode of asthma but the adenovirus frequency is low as compare to coronavirus and rhinovirus. The adenoviral infection has a role in the asthma genesis. Respiratory syncytial virus serves as a trigger for asthma exacerbation and other chronic lung diseases. Those infants who are infected with respiratory syncytial virus bronchiolitis demonstrated an increased frequency of asthma and wheeze later in their life. M pneumonia and C pneumonia are associated with the chronicity of asthma. Many case studies have demonstrated the onset of asthma symptoms in individuals with this infection.

**Epidemiology**

Currently, more than 334 million people suffer from asthma and each year prevalence continues to grow particularly in middle and low-income countries. The asthma prevalence differs greatly in different parts of the world due to occupational, genetic and environmental factors. In high-income countries, prevalence of asthma is reaching a plateau. Worldwide, it is estimated that almost 250,000 cases are attributed to asthma each year. It is estimated that by 2025, the overall prevalence will increase to 100 million. Asthma affects more than 25 million including 6 million children under 18 years of age. Asthma has a significant economic and health burden on individuals, their families, and communities. In 2016, approximately 1.9 million individuals visited the emergency department for asthma-related care and 190,000 were hospitalized due to asthma. In 2001, 53.8% of adults and 61.7% of children with asthma had one asthma attack in the last 12 months as compared to 43.6% and 51.6% in 2017 respectively. In the United States, the financial burden associated with asthma is almost $ 3300 per patient including absences from school, or work and medical facilities (Loftus & Wise, 2016).

**Risk Factors**

Asthma consists of a wide range of heterogeneous phenotypes that varies in pathophysiology, etiology, and presentation. The risk factors for each of the asthma phenotypes include environmental, host, and genetic factors. Family history also plays a role in the development of asthma. Over the last few decades, the increase in asthma incidence and geographical variation in both the magnitude and prevalence rate support that environmental factors play an important role in the epidemic of asthma. Environmental triggers also affect asthma differently at different times of personal life. Studies have shown that genetics play an important role in the allergy and asthma development. Studies have shown that more than 100 genes are associated with asthma and allergy in 11 different populations. It is found that prenatal maternal smoking is associated with wheezing in early childhood. Prenatal maternal stress is associated with decreased cortisol level which causes the development of allergic phenotype. Asthma which occurs in adulthood can have environmental causes. Adult-onset asthma can be caused by NSAIDs and β-blockers. In women it can be caused by occupational exposure to irritants and sensitizing agents or because of hormone replacement therapy. Occupational asthma can be caused by commercial and domestic cleaning (cleaning solution), car painting (isocyanates), and baking (flour dust). Bacteria such as Chlamydia pneumonia and Mycoplasma pneumonia are also associated with the exacerbation of asthma. These bacteria cause acute wheezing episodes in preschool children with the same frequency as seen with the virus (Darveaux & Lemanske Jr, 2014).

Asthma can be persistent and intermittent. When symptoms of asthma arise occasionally then a person has intermittent asthma. Persistent asthma symptoms occur more often. The four main stages of asthma include intermittent asthma, mild persistent asthma, moderate persistent asthma and severe persistent asthma. The asthma symptoms are same at each stage but their severity and frequency differ. The main symptoms include wheezing, breathing difficulties, coughing, and tightening of the chest.

**Intermittent Asthma**

This type of asthma is not severe. These symptoms may occur 2 days a week or even less often. Symptoms make a person awake for two or fewer times every month. Symptoms do not interfere with regular activities. A person may need to use a short-acting beta inhaler to control the asthma symptoms two or fewer days every week.

**Mild Persistent Asthma:**

These asthma symptoms usually occur more than twice a week but not every day. Symptoms usually have a minor impact on regular activities.

**Moderate Persistent Asthma**

This is the second-most severe form of asthma. Symptoms occur daily. Symptoms awake individuals more than once in a week. Symptoms can limit the daily routine activities

**Severe Persistent Asthma**

This type of asthma is the most sever. The symptoms arise throughout the day. Symptoms usually limit the individual’s daily routine. A person needs to use inhaler several times a day to control his symptoms.

**Treatment**

Prevention of asthma symptoms are key in controlling asthma attacks. Treatment involves recognizing the asthma triggers, steps to avoid them and medicines. Quick-relief inhalers are used to open swollen airways. Long term asthma control medicines are usually taken daily and are the main cornerstone of asthma treatment. Long term asthma medicines include inhaled corticosteroids such as mometasone, fluticasone furoate, etc. Unlike oral corticosteroids, inhaled corticosteroids have fewer side effects. Leukotriene modifiers are effective in relieving symptoms up to 24 hours. Short and Long-acting beta-blockers are also effective in reducing asthma symptoms. Immunotherapy is also used to treat asthma symptoms. Theophylline is also used in treating asthma (Chung, 2015).

References

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