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Asthma

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Introduction to Asthma

A chronic inflammatory airway disorder, asthma is marked by airway hyper-responsiveness with recurrent episodes of wheezing, coughing, tightness of the chest, and shortness of breath. Typically, these episodes are associated with airflow obstruction that may be reversed spontaneously or with treatment” (Lynn & Kushto-Reese, 2015). Asthma is an extremely common diagnosis seen in the Pediatric Intensive Care Unit at Nationwide Children’s Hospital. While most asthmatic patients can be well controlled with proper management, exacerbations in the intensive care setting can be life threatening. Some of these exacerbations can be attributed to exposure to antigens, non-compliance to treatment, or respiratory infections (bacterial or viral) just to name a few. I chose this topic due to my familiarity with the asthmatic patient population, as well as the vast spectrum of illness asthmatic patients can experience. It is not uncommon on our unit to have an asthmatic patient intubated, with multiple bronchodilators/vasoactive medications infusing, yet down the hall to have an asthmatic eating lunch while on continuous albuterol. I hope to break down the pathophysiology of an asthma diagnosis, treatment, and management as well as show the progression of how truly ill the asthmatic population can become in the acute intensive setting.

Signs and Symptoms

“The most common signs of asthma are coughing, especially at night, during exercise or when laughing, difficulty breathing, chest tightness, shortness of breath, and wheezing (a whistling or squeaky sound in your chest when breathing, especially when exhaling)”(American College of Allergy, Asthma, & Immunology).

“Asthma is an obstructive pulmonary disorder with exacerbations characterized by symptoms of shortness of breath, cough, chest tightness, and/or wheezing. Symptoms are caused by chronic airway inflammation” (Maslan & Mims 2014).

Asthma signs and symptoms include:

- Shortness of breath
 - Chest tightness
 - Trouble sleeping throughout the night
 - A whistling or wheezing sound when exhaling (wheezing).
 - Coughing that is worsened by a respiratory viruses, or flu-like illnesses.
- Signs that your asthma is probably worsening include:
- Any of the above symptoms becoming more frequent and bothersome
 - The need to use a quick-relief inhaler more often
- One should recognize when appropriate to seek the aid of advanced medical professionals.



The Pathophysiology of Asthma and its Significance

“Asthma is an obstructive pulmonary disorder with exacerbations characterized by symptoms of shortness of breath, cough, chest tightness, and/or wheezing. Symptoms are caused by chronic airway inflammation. There are multiple cell types and inflammatory mediators involved in its pathophysiology. The airway inflammation is frequently mediated by Th2 lymphocytes, whose cytokine secretion leads to mast cell stimulation, eosinophilia, leukocytosis, and enhanced B-cell IgE production. Although various genes have been identified as likely contributors to asthma development, asthma is largely environmentally triggered and has a multifactorial cause. Asthma is extremely common, especially in poor, urban environments. Asthma is the third most common reason for pediatric hospitalizations” (Maslan & Mims 2014). As mentioned above, the pathophysiology of asthma is multifaceted. “Asthma can affect the trachea, the bronchi and the bronchioles, which form part of the lower respiratory tract. The disease causes bronchoconstriction or abnormal narrowing of the airways as a result of epithelial damage, over-production of mucus, edema, bronchospasm and muscle damage” (Barnes 1996, Rees 2010). “In asthma, the epithelium (the layer of cells that line the airways) can become damaged and peel away. Epithelial shedding can contribute to airway hyper-responsiveness in several ways; these include loss of barrier function, which may allow penetration of allergens; loss of enzymes that break down inflammatory mediators; and exposure of sensory nerves, which may lead to reflex neural effects on the airway” (Barnes 1996). “Asthma causes the mucus-secreting cells in the airways to multiply and the mucous glands to expand. Increased mucus secretion contributes to the formation of viscid mucous plugs that can occlude the airways” (Ward et al 2010). “The capillaries in the airway walls can dilate and may leak. The consequences of microvascular leakage include increased airway secretions, impaired mucociliary clearance and edema, which may contribute to airway narrowing and hyper-responsiveness” (Barnes 1996). Bronchospasm, or a bronchial spasm is a sudden constriction of the muscles in the walls of the bronchioles. It is caused by the release (degranulation) of substances from mast cells or basophils under the influence of anaphylatoxins. It causes difficulty in breathing which can be very mild to severe. “With poorly controlled or undertreated asthma, changes in structural cells and tissues can occur in the lower respiratory tract that lead to remodeling of the airway, resulting in permanent fibrotic damage” (Rees 2010).

Implications for Nursing Care

Nursing implications in regards to asthma include medication management, a well-controlled regimen, and eliminating triggers that cause asthma symptoms. Controller medications should be taken daily, and include inhaled corticosteroids (Qvar/ Flovent). “Leukotriene receptor antagonists, such as montelukast and zafirlukast, affect the production and/or activity of leukotrienes, which are responsible for airway inflammation and hyper-responsiveness, mucus production, edema and bronchoconstriction” (Kaufman 2011). These medications should also be taken every day. Short acting beta-agonists provide quick relief during an asthma exacerbation and are used to quickly relax the airways, and open up the patient’s airways. One should not be using their rescue inhaler more than twice a week, if that is the case one should see their allergist, or pulmonologist. Oral Steroids can be used in the acute phase of an illness or exacerbation as well but should not be utilized long term due to the side effects of prolonged oral steroid usage. Avoiding environmental triggers, as well as known allergy causing agents is important in the management of one’s asthma. As long as the patient as well as the patient’s family are aware of such triggers, hopefully the road of management that lies ahead is one with promise.

Conclusion

“A thorough clinical history and objective measurement of lung function are important in establishing a reasonably certain diagnosis of asthma. A range of drugs is used in the management of the disease, and clinical guidelines advocate a stepwise approach to drug therapy, where treatment is stepped up when required and stepped down when control is good. Alongside pharmacological management of the disease, partnership working between patients and healthcare professionals, personalized written asthma action plans, information and education are central to improving the quality of life of patients with asthma” (Kaufman 2011).

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