Vitamin and Mineral Treatment in Asthma

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Introduction

Asthma is one of the world's most common chronic diseases, which affect the lives of more than 235 million people worldwide.[1] In America alone, 20 million are affected, 4.8 million of them children. Approximately 5500 asthmatics die each year, and most deaths are preventable but represent inadequate treatment.[2] The current understanding of asthma is that it is a chronic inflammatory disease of the lungs that appears to result from complex interactions among genetic, immunologic, and environmental factors.[3] It is associated with bronchial hyper-responsiveness to a variety of stimuli and airway inflammation that leads to airway obstruction.[4] Continued inadequate management can lead to persistent asthma symptoms, including a chronic cough or wheeze, chest tightness, shortness of breath and frequent recurrence of asthma exacerbations, characterized by the life-threatening situation known as "status asthmaticus."[5] Asthmatic symptoms are often aggravated by "triggers" such as allergen exposure, including foods or food additives and botanicals; respiratory infections, secondhand smoke, perfumes and various chemical agents.[4] Asthma has no set pattern in terms of the presentation of its symptoms; in fact, symptoms can be mild, moderate, or severe; vary from person to person; flare up from time to time and then not appear for long periods; and vary from one episode to the next, making this condition quite unpredictable. To add, the cause of asthma remains unknown, and currently there is no identified cure.[5] Long-term control of persistent asthma symptoms is accomplished by the use of daily anti-inflammatory agents and avoidance of irritants. Anti-inflammatory medications have been shown to reduce symptoms and may help to prevent progression of the disease.[2] Often doctors cannot determine why someone gets asthma, yet the condition remains a significant cause of morbidity and mortality. Given the high prevalence of asthma and its effect on individuals, there is a need to identify interventions that can be used to complement conventional asthma therapy and, more importantly, relieve and prevent the reoccurrence of asthmatic symptoms.

Current Influences

As Allan and Devereux (2011) explain, the increase in asthma prevalence is most likely to be a consequence of changing environmental/lifestyle factors rather than of genetic influence.[6] The primary nonpharmacological intervention for people with asthma should be to focus on identifying the individual's triggers and the means of eliminating or avoiding them.[2] Viral infections are the major trigger for the younger asthmatics; therefore, immunization for influenza is highly recommended for these patients and their families.[7] Decreasing or eliminating irritant or allergen exposure is also a significant means of reducing the risk of triggers. Smoking cessation should be a major concern for discussion if the patient or any member of the patient's family smokes.[2] Reducing exposure to known triggers should not be underestimated as a significant treatment plan for individuals with asthma.

Significant advances have been made in the treatment of asthma, largely involving improvements in existing therapies such as the commonly known corticosteroids and β-agonists.[8] However, relatively recent research suggests that a changing diet has emerged as a promising contributory factor to the decrease in asthma. With that, there have been investigations in regard to the association between diet and asthma, with the potential for dietary interventions to complement conventional asthma treatments.[6] Specifically, the antioxidants vitamin C, magnesium, and polyunsaturated fatty acids have been a significant focus.

Key Findings

Nutritional Supplementation

It has been suggested that dietary antioxidants can modify the manifestation of symptoms in adults susceptible to asthma.[9] Inflammation is the main culprit behind asthma symptoms and the target of commonly prescribed asthma medications. Inflammation in the airways increases the risk of oxidative damage, predominately due to the activity of immune cells such as macrophages, neturophils, and lymphocytes which can release reactive oxygen species (ROS). This in turn further enhances inflammatory responses through the production of pro-inflammatory cytokines.[10] Some studies have found that patients who have received antioxidants as a treatment have been shown to have a reduction in certain asthma symptoms as a result of lower inflammatory responses. For example, Guo et al. (2012) supplemented asthma patients with a multinutrient antioxidant formula for two months, after which it was demonstrated that nutritional supplementation significantly improved micronutrient and oxidative stress status, inflammatory responses, and immune function, as well as better asthma control.[10] Complementary evidence has shown that dietary fruit intake (high in antioxidants) is significantly associated with a reduced risk of diagnosed asthma. More specifically, when subcategorized, citrus fruits were far more associated with a reduced risk of asthma, primarily due to the exceptionally high levels of vitamin C.[9] The protective effect of fruit appeared to be related to the potent antioxidant capacity of vitamin C, and was independent of all other nutrients investigated. Murray (2001) confirms that vitamin C is a major antioxidant substance in the airway surface area of the lungs, where it plays an important role in protecting against both endogenous and exogenous-induced oxidative damage.[11] Further, high-dose vitamin C (as ascorbic acid) therapy of 1 to 2g/day appears extremely effective based on the