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THE EFFECT OF VITAMIN D LEVELS ON THE DEVELOPMENT OF ALLERGIC DISEASES IN CHILDREN

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ANNOTATION: 58 children with a diagnosis of atopic dermatitis were examined to study, determine vitamin D biochemical analysis in the blood as a factor in the development of atopic reactions. Low levels of vitamin D have been found in various allergic diseases such as asthma, eczema, allergic rhinitis, food allergies, anaphylaxis, and urticaria . Key words: allergy, vitamin D, biochemistry, hormone.

Relevance . Vitamin D is a " hormone " that has immunomodulatory And immunoregulatory properties . In the setting of vitamin D deficiency, disruption of the integrity of the skin/mucosal complex and occasional infections may act synergistically with allergen exposure to enhance the risk of sensitization during critical periods of immune development before tolerance develops [1,3,6]. Furthermore, recent research on vitamin D suggests that higher serum vitamin D levels may improve outcomes of some disorders, such as asthma/eczema severity and urticaria symptoms; these data are somewhat equivocal and contradictory [2,4,5]. There is a combination of different factors which determine 25(OH)D serum levels and vitamin D deficiency like skin pigmentation, low sun exposure, more time spent indoors, obesity, higher latitudes, and winter season [3, 4]. Other secondary causes that could affect vitamin D serum levels are diseases including rheumatoid arthritis, cystic fibrosis, ulcerative colitis, Crohn's disease, celiac disease, rickets, and medications [5].

In this review, we outline the basic metabolism of vitamin D and its effects on the immune system. In addition, we discuss recent findings regarding vitamin D status and its relation to allergy, specifically throughout Europe and Mediterranean countries. We also considered the effects of vitamin D supplementation in allergic disease, highlighting the recent recommendations.

Vitamin D deficiency has been blamed as a cause of increased incidence of asthma and allergy symptoms. In a study conducted by Hollams et al. in Australia, 689 subjects were seen longitudinally at both ages of 6 and 14 years [2,10]. This study showed that vitamin D levels at ages 6 and 14 years were predictive of allergy/asthma outcomes at both ages, but more importantly, vitamin D levels at age 6 years were predictive of subsequent atopy and asthma-associated phenotypes at age 14 years. This is the first study which demonstrates the association between vitamin D and asthma in older children, comparing with the early-life birth cohort studies. In addition to the relationship between vitamin D status and asthma, there is considerable interest in assessing whether this vitamin protects against or reduces asthma morbidity. It is now well known that there is a significant association between vitamin D deficiency and infections. This association becomes particularly significant in children with respiratory disease such as asthma. The most common causes of acute asthma exacerbations are viral upper respiratory tract infections. The human rhinovirus (HRV) is the commonest trigger for acute asthma. Up to 80% of asthma exacerbations are triggered by a "cold." A recent clinical trial showed that vitamin D supplementation (500 IU/day) given as adjuvant therapy to inhaled corticosteroids in children with asthma reduced the risk of asthma exacerbation triggered by respiratory tract infections [3,5].

Other researchers in Costa Rica studied vitamin D levels in children with asthma and demonstrated that lower vitamin D levels were associated with increased airway responsiveness, higher eosinophilic counts and total IgE levels, and increased risk of severe asthma exacerbations [4,5,6]. This finding suggests that sufficient vitamin D responses, resulting in viral infections causing less severe symptoms. The same authors conducted a longitudinal study based on Childhood Asthma Management Program and showed that the group with the lower risk of exacerbations was the group with 25(OH)D ≥ 30 ng/mL and who were receiving inhaled corticosteroids [4,6,8]. The hypothesis that vitamin D supplementation might potentiate the anti-inflammatory function of corticosteroids is intriguing because glucocorticoid resistance is an important obstacle to effective treatment in some patients with asthma. Searing et al. in their study of asthmatic children demonstrated a significant association between lower vitamin D levels and greater use of inhaled or oral corticosteroids and total steroid dose . Similar results were obtained in studies conducted on asthmatic adults [3,6]. Xystrakis et al. demonstrated the same association in vitro by using cell cultures obtained from steroid sensitive and steroid-resistant asthmatic subjects. Adding vitamin D to CD4+ T-cell cultures from steroid-resistant patients enhances the response to dexamethasone by inducing the production of IL-10 [2,7]. Furthermore, they showed that oral administration of vitamin D in severe asthmatics inverted steroid resistance through induction of IL-10-secreting Tregs (regulatory T-cells). These observations, together with clinical and experimental studies, justify the use of vitamin D in the treatment of severe asthma, particularly to enhance action of steroids.

Another aspect involved in the relationship between vitamin D deficiency and asthma relates to lung function impairment. Consistent with the role of vitamin D on enhancing steroid responsiveness, several studies of children and adults have shown that a low vitamin D level is associated with impaired lung function. Children with insufficient vitamin D levels were found to have a slightly lower mean FEV1 than children with sufficient vitamin levels [2,5]. Other studies in adults show a strong relationship between serum concentrations of vitamin D, forced expiratory volume in 1 second (FEV1), and forced vital capacity, where decreasing pulmonary function is associated with vitamin D deficiency [6, 8].

It has been found that different gene polymorphisms of the vitamin D receptor (VDR) and vitamin D binding protein (VDBP) have variable associations with asthma. Together with different serum levels of vitamin D, also VDR and VDBP variants seem to represent a risk factor for asthma [9]. The vitamin D receptor is present in bronchial smooth muscle cells which are associated with active protein synthesis. It has been demonstrated that vitamin D inhibits bronchial smooth muscle proliferation induced by platelet-derived growth factor and it also influences the microarray gene expression signature in bronchial smooth muscle cells [7,5,9,10]. This finding suggests a role of vitamin D in cell growth and survival and morphogenesis and airway remodeling, which may be important in asthma pathophysiology and treatment [3, 2].

The aim of the study: to determine the effect of vitamin D on the severity and course of atopic reactions in children.

Materials and methods of the study. 58 sick children from 6 months to 7 years old with diagnoses of eczema, urticaria , bronchial asthma and atopic dermatitis admitted to the allergology and pulmonology department of the Samarkand Children's Multidisciplinary Hospital were examined.

and the intensive care unit, emergency pediatrics #1 and #2 of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care. The examinations studied the vitamin

D levels in the biochemical blood test. Discussion of the results. More boys (55% (32)) than girls (45% (26)) participated in the studies. Of the total number, the number of children aged 6 months to 1 year was 18% (11), from 1 year to 3 years 29% (18) and from 3 to 7 years 50% (29). Of the observed children, 12% (7) were registered with a diagnosis of eczema, 8% (5) with urticaria, 25% (15) with bronchial asthma and 53% (31) with atopic dermatitis. All children were divided into 3 groups according to the severity of atopic reactions: Group I - 15 (25%) children with a mild degree of the atopic process; Group II included 15 (25%) children with moderate allergic reactions; Group III included 28 (50%) children with severe allergic reactions. The following symptoms were observed: skin itching in 17 (29%) cases, swelling in 11 (18%) cases, respiratory failure of grades I and II in 7 (12%) cases, suffocation in 2 (3%) cases, and loss of appetite in 12 (20%) cases. According to laboratory tests, the mean arithmetic value (calculated using the formula: [ ]) was 28.56 ng / ml in Group I, while the mean arithmetic value (calculated using the formula: [ ]) was 24.93 ng / ml in Group II, and 21.2 ng / ml in Group III . The data obtained show that low serum vitamin D levels are inversely correlated with atopic dermatitis. In addition, low vitamin D levels at birth are a risk factor for developing atopic dermatitis later in life.

Conclusions: Thus, according to the conducted research on the influence of vitamin D and its role in allergic conditions. In addition, the studies attempted to determine the effect of vitamin D on the immune system in particular, on allergic diseases.

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