

THE NUTRITIONAL ROLE OF VITAMIN D DURING THE SARS COVID-19 PANDEMIC

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Abstract

The supplementary intake of vitamin D is one of the most debated topics in the medical field, a source of controversy and convictions that are also strongly antithetical. Both the judgment of clinicians and public opinion consider this vitamin necessary for the maintenance of bone health, but also for the prevention and treatment of a number of diseases, including diabetes mellitus, autoimmune diseases, neoplasms, multiple sclerosis, heart disease, stroke, depression and more association between low levels of serum 25-hydroxyvitamin D. In fact, Vitamin D is responsible for regulation of calcium and phosphate metabolism and maintaining a healthy mineralized skeleton.

It is also known as an immunomodulatory hormone. Experimental studies have shown that 1,25-dihydroxyvitamin D, the active form of vitamin D, exerts immunologic activities on multiple components of the innate and adaptive immune system as well as endothelial membrane stability. Association between low levels of serum 25-hydroxyvitamin D. Vitamin D plays a fundamental role in nutrition, especially for the new evidence related to the SARS pandemic Covid-19 and for this reason it is important to maintain optimal levels of the vitamin, controlled through food.

Keywords: 25-hydroxyvitamin D, 1,25-dihydroxyvitamin D, immunomodulation, nutrition, pandemic Sars Covid-19

Introduction

In the early twentieth century, the curative properties of vitamin D on rickets were identified and its role then became confined to the prevention of disorders associated with bone health. Today, the role of vitamin D and in particular of its receptor the vitamin D receptor (VDR) has been re-evaluated and this has been identified in numerous cell types not involved in calcium and phosphorus homeostasis, suggesting involvement in other body functions, and studies report many cellular processes affected by the active form of vitamin D, 1- α -25 dihydroxyvitamin D ($1,25(\text{OH})_2\text{D}$) (2). With the term vitamin D, a group of fat-soluble secosteroids, we mean all the compounds that have the biological activity of calciferol and are characterized by being derivatives of cyclopentanoperhydrophenanthrene. Calciferol (vitamin D₃) is the form naturally present in mammals, while ergocalciferol (vitamin D₂) is formed following exposure to ultraviolet light of ergosterol (provitamin form of plant origin). Calciferol is 50-100 times more active than ergocalciferol (D₃ is more active than D₂). Both ergocalciferol and calciferol are inactive forms of vitamin D, therefore activation is required in the liver and kidney. Man is able to synthesize cholecalciferol starting from a precursor, with the function of provitamin: dehydrocholesterol (derived from cholesterol by reduction). This provitamin is found on the skin, in order to absorb the solar radiant energy that causes isomerization to cholecalciferol (3).

In fact, many studies report that this vitamin is necessary for the maintenance of bone health, but also for the prevention and treatment of a number of diseases, including diabetes mellitus, autoimmune diseases, neoplasms, multiple sclerosis, heart disease, stroke, depression and more association between low levels of serum 25-hydroxyvitamin D. The purpose of the present review is to provide an explanation of the importance of this vitamin especially for nutritional management, for maintaining a healthy body, especially for the new evidence related to the SARS pandemic Covid-19 (4).

Methods

Many studies have suggested that vitamin D supplementation can lower the odds of developing respiratory infections, particularly in vitamin D-

deficient groups, but randomised trials have yielded mixed results. In *The Lancet Diabetes & Endocrinology*, a study in which they were used is reported data from the D-Health Trial, a randomised, double-blind, placebo-controlled trial of monthly vitamin D supplementation, for which acute respiratory infection was a pre-specified trial outcome. Participants were supplemented and followed for up to 5 years. The trial was set within the Australian general population, using the Commonwealth Electoral Roll (5).

Results

This scientific evidence has strengthened the need to favor a just supplementation, not only through extreme integration but also through nutrition. These studies also reported how important it is to fight the nutritional deficiency of vitamin D. Nutritional deficiencies are usually the result of food inadequacy, decreased absorption and/or an increase in need or excretion. A vitamin D deficiency can occur when the usual dietary intake is low, exposure to sunlight is limited, the kidneys cannot convert 25-hydroxyvitamin D to its active form, or the absorption of vitamin D by the tract digestive is insufficient. Diets deficient in vitamin D are associated with milk allergy, lactose intolerance, egg-vegetarianism and veganism. Some groups of the adult population are particularly at risk of an inadequate intake of vitamin D. It should be borne in mind that in our latitudes about 80% of the vitamin D requirement is guaranteed by solar radiation and the remaining 20% is insured from the power supply (6). In another study, in fact it is shown that that 25(OH)D concentrations above 50 ng/ml (125 nmol/l) vs. <20 ng/ml were associated with a 27% reduction in influenza-like illnesses. From the available evidence, we hypothesize that raising serum 25(OH)D concentrations through vitamin D supplementation could reduce the incidence, severity, and risk of death from influenza, pneumonia, and the current COVID-19 epidemic (7).

Discussion

The scientific research, however, has concluded that sufficient evidence to support vitamin D

supplementation with the aim of preventing or treating COVID-19 was still lacking and that the topic should be further investigated. vitamin D after supplementation is generally safe and that any potential low toxicity.

Experts studying vitamin D welcomed the call for more research, but the lack of specific recommendations in the context of COVID-19 was also met with disappointment by many in the scientific community who have argued that vitamin D supplementation is generally safe and that any potential low toxicity would likely be strongly outweighed by any potential benefits in relation to protection from COVID-19.

National and international programs should be instituted to educate the public about the health benefits of vitamin D and policies to fortify commonly consumed foods with vitamin D to reduce the risk of vitamin D deficiency during pregnancy, childhood, and in young and middle-aged adults when autoimmune disorders are most prevalent. In addition, improvement in vitamin D status from birth until death may help reduce the risk of infectious diseases such as influenza and COVID-19 that can have devastating consequences especially for the elderly. However, more investigation is needed to determine who would most benefit from vitamin D, and how much vitamin D is required for its maximum health benefit based on their individual vitamin D responsive profile. It is also unknown whether giving 1,25(OH)₂D₃ or one of its analogs is a reasonable approach for treating autoimmune disorders and infectious diseases. Blood levels of 1,25(OH)₂D₃ are tightly controlled and for good reason, any significant increase in circulating levels of 1,25(OH)₂D will result in an increase in intestinal calcium absorption and, when uncontrolled, this causes hypercalciuria and ultimately hypercalcemia. It is more likely that the endogenous production of 1,25(OH)₂D in the immune cells including monocytes and macrophages is what is required for vitamin D to have its immunomodulatory functions. There are still open questions that need to be further investigated in order to take full advantage of the effect of vitamin D on the immune system for clinical practice (8).

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