Short Communication

Vitamin D produce antibodies in pandemic response to gripal viruses? A critical analysis

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Abstract

In the evolutionary journey of humanity, it is possible to verify an analysis of pandemics with high occurrences. This study aims to conduct a critical analysis of the role of Vitamin D as an endogenous vaccine in the main viruses present in humanity over the decades. To construct this text, we used the short review methodology through a critical analysis. This study demonstrated the importance of using Vitamin D as an endogenous vaccine when used frequently in both healthcare professionals and patients. Therefore, it is concluded that Vitamin acts protectively in the innate immune system.

Introduction

When carrying out an analysis over time in the history of pandemics such as the “Spanish Flu” it is possible to verify the high occurrence in the period from 1918 to 1920 [1]. For example, in the northern hemisphere, recent documents related to records of pandemic waves in the United States of America and Norway in the spring of 1918 in the months referring to February to April were mild and had low mortality, started in military populations and did not spread to civilian populations [1,2].

However, it was in the period of 1918 [1], specifically in the months of May to September, at that time morbidity occurred in a characteristically urban area in countries well connected with transport, in relation to rural areas it is possible to verify that isolated areas managed to have little pandemic incidence. But it was in the year 1919 [2], specifically in the months of January to March, that several isolated regions that had not previously had contagions were affected with devastating consequences [1,2].

Specifically in the year of the 1918 the H1N1 virus was responsible for pandemics during the winter and autumn wave periods in the United States [1]. What is observed in this period in relation to viral development is the presence of information regarding geographic factors and the host responsible with specific patterns related to age and sex with morbidity, mortality and fatality per wave [1,2].

However, viruses have continued to emerge and bring challenges to the global public health system with emerging viruses with respiratory contagion, for example, in 2002 the coronavirus (CoV) of a viral family, known since the 1960s which is the cause of infection breathing in humans and animals has brought problems to human health [1]. Coronavirus causes mild to moderate respiratory illness and the symptoms are equivalent to a common cold. Generally the coronaviruses that infect humans are the alpha coronavirus 229E, NL63 and beta coronavirus OC43 and HKU1 types [3-7].

In addition, the coronavirus can develop as the disease worsens due to a genetic environmental depression of the
Vitamin D plays a role in innate and adaptive immunity [8] as it is essentials for the regulation of human genes and stimulates the production of catelicidin which increases the production of HCAP-18 and thus improves the function of cells such as macrophages and immunity innate. This relationship is associated between Vitamin D levels [12,13], for example, the expression of increased catelicidins and the intracellular death of Mycobacteria Tuberculosis and yet [2], there is an inverse association between low Vitamin D levels and increased infections in the upper respiratory tract [2,14,15] by flu viruses. Let’s remember that Vitamin D also influences the development of adaptive immunity by inhibiting the proliferation of B cells with differentiation and secretion of immunoglobulins that will supply the proliferation of T cells and thus results in a more pro-inflammatory response change from TH1 to anti-inflammatory TH2 cells [4,12]. In previous studies, it was observed that inadequate vitamin D nutrition is endemic among children [13], the elderly and populations with a history of pre-existing autoimmune diseases, especially in winter [8]. During the development of studies in the systematic review and meta-analysis model it was possible to high light that the deficit in serum levels of Vitamin D [25 (OH) D] are below the limit of 20 ng/ml in blood serum [4,5] and this risk factor increases in people of all ages who live in temperate latitudes [9], especially in the north in long winter regions [4,5]. We have observed in previous published studies that the human being tends to acquire Vitamin D mostly by exposure to occasional sunlight to a degree that is a function of the exposed surface area of the skin [6,9]. For example, older people have less than 25% vitamin D production when compared to a 21-year-old youth after the same amount of exposure to sunlight [4,13]. It is possible to observe that in the world there is a seasonal variation in relation to the deficit
of Vitamin D which is related to subtropical and a tropical latitudes. Generally, this elderly person can supplement 10 mcg/day [16,17] of vitamin D by sun exposure, and yet [4,9,13] it does not prevent vitamin D insufficiency in winter, with oral supplementation being necessary and when we talk about influenza or coronavirus pathology [1] we emphasize that it involves a complex interaction between the virus and innate and acquired immunity [4,5] the defense action of the organism occurs by macrophages that rapidly release cytokines in the infected respiratory tissue and virucidal antimicrobial peptides try to prevent viral replication and thus it prevents the organism from being infected [7]. Studies have shown that the release of pro-inflammatory cytokines as well as the virulence of the virus is possible to determine the clinical phenotype of viral infection, for example, flu [6,15]. This is because clinical flu phenotypes can positively correlate with the amount of cytokines released [15]. During years of studies it was possible to observe that the severity of the illness induced by influenza viruses, for example, influenza is correlated with the virus’s ability to induce the production of cytokines by macrophages. Let us remember that in avian influenza, for example, the innate immune response in relation to the release of cytokines can be dominant, since the levels of this cytokine are high and with lethal results. A study recently [4,5] reported that Vitamin D has a modulating role in the release of macrophages and thus prevents the release of many inflammatory cytokines and chemokines [5,9]. It was also found that the vitamin D deficit also shows negative changes in the macrophages’ ability to mature and thus produce surface antigens specific for macrophages and thus produces the acid phosphatase of the lysosomal enzyme and secrete H2O2 through an integral function of their abilities [4,10,13] functional antimicrobial [8]. It is possible to report with studies published in the last five years that Vitamin D supplementation increases the expression of specific surface antigens, for example, macrophages and the acid phosphatase of the lysosomal enzyme by stimulating its oxidative burst function [2,13]. This is due to the stimulation of gene expression of antimicrobial peptides (AMP) in human monocytes, neutrophils and other human cell lines [4,15]. It is possible to report that this endogenous antibiotic, such as defensin and cathelicidins, is able to directly destroy the invasive viral microorganism [1,6], since the broad-spectrum antimicrobial peptide can include antiviral activities and inactivate the flu virus, for example, influenza [6]. Neutrophils, macrophages are considered natural killer cells which secrete antimicrobial peptides, however, the epithelial cells that line the upper and lower respiratory tract can also secrete this immune cell origin as a lung defense [8,14]. If Vitamin D has the capacity to stimulate the production of viral antimicrobial peptides with a primary function in the defense against infectious agents, and this defense occurs through the stimulation of antimicrobial peptides which can intensify the reduction of cathelicidins [4,8], it is concluded that the vitamin deficit is able to cause imbalance of the immune system and the supplementation of pharmacological doses of 250-500 mcg/day [16,17] of vitamin D can be useful in the treatment of viral infections by influenza or coronavirus. Thus, it is reinforced that vitamin D should be used by health professionals through pharmacological doses to prevent vitamin D deficiency and avoid viral infectious risks [6,8], therefore, it is possible to conclude that daily pharmacological doses have the benefit of improving symptoms of viral respiratory infections [9,14].

However, the nutritional potential of vitamin D remains untapped by scientific evidence [4,9,18].

References

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