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Research Article

Statistical Data from Real-life Observation of Vitamin D Level in Patients in Greece with SARS-CoV-2 Infection

Mouchsiadis Ntemis* and Chatzigeorgiou Charalampos

Department of Reumatology, First General Hospital of Thessaloniki <Ayios Pavlos>, Greece

***Corresponding Author:** Mouchsiadis Ntemis, Department of Reumatology, First General Hospital of Thessaloniki <Ayios Pavlos>, Greece.

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Abstract

WHO declared SARS-CoV-2 in 2019 a global pandemic. The present aim was to show the prevalence of vitamin D in patients in Greece via real-life data and observation and to compare it with mean levels of vitamin D of general population of same age group.

Methodology: We studied 368 patients with Sars-CoV-2 infection who had been treated in GHT<Ayios Pavlos> during periods (November 2020-February 2021 and November 2021). The mean age was 55 years old (±5). The study ensured the patients' anonymity and was performed in accordance with the national legislation on the use of clinical data for research purposes. In our study, serum 25-(OH) D was measured using the Elecsys® Vitamin D Assay, an electrochemiluminescence binding assay (ECLIA) for the in-vitro determination of total 25-(OH)D (Roche).

Result: Despite Greece is the one of the sunniest countries in Europe there is a paradox, so called Mediterranean, with low mean levels of vitamin D (= 25.08 ng/ml or 62.4 nmol/L) [1].

Keywords: COVID-19; SARS-CoV2; Vitamin D; Calcitriol

Introduction

Previous observational studies report independent associations between low serum concentration of vitamin D3 and susceptibility to acute respiratory tract infections [2]. Martineau., *et al*. has described that vitamin D protected against acute respiratory tract infection in a systematic review and meta-analysis of 25 randomised controlled studies [3]. Regarding the role of vitamin D in the prevention of viral infection, Gruber-Bzura noticed that the data generate controversies [4].

Calcitriol exerts pronounced impacts on ACE2/Ang(1-7)/MasR axis with enhanced expression of ACE2 [5]. ACE-2 is recognized as the host cell receptor responsible for mediating infection by SARS-CoV-2 and it might suggest a higher risk of infection. However previous studies identified associations between higher levels of ACE2 and better coronavirus disease health outcomes. ACE2 was shown to protect against lung injury [6]. The prevalence of vitamin D deficiency is increasing, and assay of serum vitaminD3 is one of the most frequently ordered blood investigation. The percentage of the population with vit D insufficiency is high in most European countries. Studies on the vitD status in Europe show that vitD deficiency is more common in southern than in northern Europe, because population prefers shadow over strong sun and applies sun-cream [7].

The primary aim of this observational study is to contribute in information about mean level of vitamin D in patients with SARS -CoV-2 infection from real-life data.

Methods and Materials

We studied 368 patients with Sars-CoV-2 infection who had been treated in GHT<Ayios Pavlos> during periods (November 2020-February 2021 and November 2021 - until today) without

any predisposing factors for low vitamin D concentration. The mean age was 55 years old (±5). The study ensured the patients' anonymity and was performed in accordance to the national legislation on the use of clinical data for research purposes. In our study, serum 25-(OH) D was measured using the Elecsys® Vitamin D Assay, an electrochemiluminescence binding assay (ECLIA) for the in-vitro determination of total 25-(OH)D (Roche).

Results

The mean level of vitamin D was significantly low for a population living in sunny country such as Greece. The mean total serum 25-(OH)D concentration in patients with SARS-CoV-2 infection was 14.5 ± 4.5 (ng/mL) or 36.19 ± 11.23 nmol/L (which was severely lower than above mentioned mean levels of vitamin D (= 25.08 ng/ml or 62.4 nmol/L) in general population of the same age group. The lowest observed level of vitamin D was 4.4 (ng/mL) or 10.98 nmol/L and the highest observed level was 26.6 ng/ml or 66.39 nmol/L.

Discussion

Our findings revealed statistically significant decrease of vitamin D in patients with Covid-19 infection compared with mean level of vitamin D in general population of same age group in Greece, which is by the way also low compared with Northern European countries. Our results are almost the same with previous studies carried out in Europe and especially in Greece. The SENECA study carried out among elderly Europeans 50 years or older, showed that hypovitaminosis D was much more common among people living in sunny European countries such as Italy, Spain and Greece, than among those living in Northern European countries [8]. After exposure to sun, skin is synthesizing vitamin D. Factors which can affect production of vitamin D in people residing in Greece are:

- Higher melanin content of the skin
- Avoidance of exposure to direct sunlight and use of sunscreens because of skin cancer concerns
- Limited outdoor activity in an urban environment
- Aging
- Food sources rich in vitamin D are not routinely consumed in Greece and fortified products are absent (with the exception of infants' and children's milk).

Also it is frequently observed that patients with infectious or inflammatory diseases have low levels of vitamin D.

Multifactorial models of linear regression have shown that age and month are significantly associated with vitamin D levels. The lowest levels of vitamin D are usually observed from November until March (the period that we carried the study) with values significantly increasing until August and linearly decreasing in autumn and winter. The vitamin D levels would be higher if the study was carried out during summer.

Conclusion

Although Greece is one of the sunniest countries in Europe, most patients with SARS-CoV-2 infection suffer from severe hypovitaminosis D much over general population of same age group (which also suffers from mild hypovitaminosis D). These data provide information that hypovitaminosis D plays some role predisposing for infection with Sars-CoV-2. More observational studies are needed from real-life data to make more evident this observation to give guideline for correlation of levels of vitamin D via any treatment or food supplementation.

Acknowledgments

None.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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