Vitamin D supplementation in the COVID-19 pandemic

Siuka D, Pfeifer M, Pinter B

Mayo Clin Proc. 2020;95(8):1804-1805

DOI:10.1016/j.mayocp.2020.05.036

Title: Vitamin D supplementation in the COVID-19 pandemic

Assist. Darko Siuka, MD, UMC Ljubljana, Division of Internal Medicine, Japljeva 2, Ljubljana, Slovenia

Prof. Marija Pfeifer, MD, PhD, University of Ljubljana, Faculty of Medicine, Vrazov trg 2, Ljubljana, Slovenia

Assoc. Prof. Bojana Pinter, MD, PhD, Ms (Econ), University of Ljubljana, Faculty of Medicine, Vrazov trg 2, Ljubljana, Slovenia; UMC Ljubljana, Division of Ob/Gyn, Slajmerjeva 3, Ljubljana, Slovenia

Conflict of interest: We authors declare no conflict of interest.

Corresponding author: Assoc. Prof. Bojana Pinter, MD, PhD, Ms (Econ), University of Ljubljana, Faculty of Medicine, Vrazov trg 2, Ljubljana, Slovenia; UMC Ljubljana, Division of Ob/Gyn, Slajmerjeva 3, Ljubljana, Slovenia; phone: +386-41-718-923, fax: +386-1-522-6130;
e-mail: bojana.pinter@guest.arnes.si

Manuscript word count: 470

LETTER TO THE EDITOR: Vitamin D supplementation in the COVID-19 pandemic

The COVID-19 pandemic has severe short-term and long-term consequences on individuals, health systems, and economies. Considering the studies on the role of vitamin D in the prevention of acute respiratory infections, supplementation of vitamin D may be reasonable also for the prevention of SARS-CoV-2 infections and reducing morbidity and mortality in COVID-19 high-risk patients.

Vitamin D deficiency is more common in older age groups, smokers, obese, and patients with chronic diseases such as diabetes, hypertension, various gastroenterological diseases, and also in African Americans.[1] The high-risk groups that have more complications and higher mortality in COVID-19 coincide with groups that have a high incidence of vitamin D deficiency. We believe that vitamin D deficiency might be one of the important risk factors for COVID-19 complications and higher mortality.

Studies of vitamin D replacement have demonstrated that vitamin D ameliorates innate immunity (the immediate response of macrophages to invading viruses and bacteria in the mucous membranes),[2] thereby reducing the incidence and severity of acute respiratory infections.[3] This effect requires a sufficient serum level of 25(OH)D3 being crucial for macrophages to activate it into hormone D (calcitriol), which activates genes for the synthesis of antimicrobial factors destroying viruses (such as SARS-CoV-2), fungi, and bacteria.[2] Also, vitamin D modulates the cellular immune response and, as expected, attenuates the cytokine storm,[4] the event so fatal in SARS-CoV2-induced pneumonia. Therefore, we suggest it would be reasonable to supplement vitamin D in subpopulations at risk of vitamin D deficiency and unfavorable COVID-19 outcomes, as well as in individuals already infected with SARS-CoV-2 to achieve optimal 25(OH)D3 concentrations as quickly as possible.

It is challenging to conduct evidence-based medicine in cases such as the COVID-19 pandemic. To the best of our knowledge, there are no data on the effects of vitamin D in SARS-CoV-2 infection, then again, there are reliable data on the beneficial effects of cholecalciferol in attenuating viral respiratory infections in people with low levels of vitamin D. The European Centre for Disease Prevention and Control makes this argument and encourages healthcare professionals to take actions that are logical in their own right, based on previously known findings in related fields: “Public health authorities should recognize that extra-scientific factors (e.g. feasibility of implementing scientific advice, time pressure, socio-political factors, institutional factors, economic interests, pressure from neighboring countries etc.) are inherent to the decision-making process. These factors will also influence the implementation of any proposed response measures. Decisions should therefore always be evidence informed, but they will very rarely be purely evidence based.”[5] In Slovenia, in the view of COVID-19 pandemic, medical doctors were urgently advised by leading experts to supplement vitamin D in high-risk and fragile individuals and in COVID-19 patients. With this letter to the editor we address the broader medical community to consider vitamin D supplementation in high-risk patients for adverse COVID-19 outcomes, urgently.

References:

1. Kennel KA, Drake MT, Hurley DL. Vitamin D deficiency in adults: when to test and how to treat. *Mayo Clin Proc.* 2010;85(8):752-757.

2. Zdrenghea MT, Makrinioti H, Bagacean C, Bush A, Johnston SL, Stanciu LA. Vitamin D modulation of innate immune responses to respiratory viral infections. *Rev Med Virol.* 2017;27(1). doi: 10.1002/rmv.1909. Epub 2016 Oct 7.

3. Martineau AR, Jolliffe DA, Hooper RL, et al. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ.* 2017:15;356:i6583.

4. Khoo AL, Chai LY, Koenen HJ, et al. Regulation of cytokine responses by seasonality of vitamin D status in healthy individuals. *Clin Exp Immunol.* 2011;164(1):72-79.

5. European Centre for Disease Prevention and Control. Considerations relating to social distancing measures in response to COVID-19 – second update. Stockholm: ECDC; 2020. Available at https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-social-distancing-measuresg-guide-second-update.pdf. Accessed April 17, 2020.