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LETTER TO THE EDITOR

Potential role of vitamin D in patients with diabetes, dyslipidaemia, and COVID-19

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Abstract

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus-2 has become a worldwide public health crisis. Studies have demonstrated that diabetes and dyslipidaemia are common comorbidities and could be high-risk factors for severe COVID-19. Vitamin D, a group of fat-soluble compounds responsible for intestinal absorption of calcium, magnesium, and phosphate, has been widely used as a dietary supplement for the prevention and treatment of numerous diseases, including infectious and non-infectious diseases, due to its high cost-effectiveness; safety; tolerability; and anti-thrombotic, anti-inflammatory, antiviral, and immunomodulatory properties. In this letter to the editor, we mainly discuss the potential role of vitamin D in patients with diabetes, dyslipidaemia, and COVID-19.

Key Words: Coronavirus disease 2019; Severe acute respiratory syndrome coronavirus-2; Vitamin D; Diabetes; Dyslipidaemia

Core Tip: Diabetes and dyslipidaemia are common comorbidities in patients with coronavirus disease 2019 (COVID-19), and these comorbidities are often associated with worse clinical outcome. In this letter to the editor, we hypothesize that vitamin D may be a prognostic factor and could be a promising preventive measure and treatment for patients with diabetes, dyslipidaemia, and COVID-19.

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TO THE EDITOR

We read with great interest the recent article by Iglesias *et al*[1] entitled "Retrospective analysis of anti-inflammatory therapies during the first wave of coronavirus disease 2019 (COVID-19) at a community hospital", which demonstrated the survival benefit associated with anti-inflammatory therapy with glucocorticoids and revealed that combination treatment with tocilizumab and glucocorticoids could provide the most benefit in critically ill patients with COVID-19 caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). However, monotherapy with tocilizumab as an interleukin 6 (IL-6) antagonist was not associated with an increase in survival among critically ill patients with COVID-19, which could be explained by the fact that tocilizumab non-selectively blocks both anti-inflammatory and pro-inflammatory actions of IL-6[2]. Meanwhile, vitamin D, a group of fat-soluble compounds, may have advantages over tocilizumab as an IL-6 immunomodulator by potentially reducing the pro-inflammatory effects, but avoiding the deleterious effects on the anti-inflammatory actions of IL-6 in patients with COVID-19[2]. Additionally, vitamin D could modulate the innate and adaptive immune responses, and its deficiency is associated with increased morbidity and mortality in SARS-CoV-2 infection[3]. Vitamin D status may be a potential predictor of COVID-19 outcomes, and vitamin D supplementation could be a promising therapeutic and preventive method against COVID-19, due to its high cost-effectiveness; safety; tolerability; and anti-thrombotic, anti-inflammatory, antiviral, and immunomodulatory properties[3,4].

Another published article in your journal by Gkoufa *et al*[5] entitled "Elderly adults with COVID-19 admitted to intensive care unit: A narrative review" found that diabetes and hypercholesterolemia were common comorbidities in older patients with COVID-19 and these comorbidities were often associated with worse clinical outcome. Previous studies also showed that vitamin D deficiency was associated with diabetes and dyslipidaemia[6,7]. Unfortunately, about 30%-50% of people in the world have vitamin D deficiency or insufficiency, and vitamin D deficiency has been a global health problem[8]. Singh *et al*[3] reviewed the evidence of vitamin D deficiency in patients with diabetes and COVID-19, and they proposed that diabetes increased the tendency for infection and COVID-19, vitamin D deficiency was linked to both diabetes and an increased risk of infections, including COVID-19, and vitamin D supplementation may be a safe, cheap, and simple adjuvant therapy in patients with diabetes and COVID-19. Verdoia *et al*[4] reviewed the mechanisms of action of vitamin D and its potential interaction with SARS-CoV-2 infection, and they reported that vitamin D plays an important protective role in the cardiovascular system, immune system, respiratory system, and glucose-lipid metabolism. Therefore, we hypothesize that vitamin D status has prognostic significance in diabetes and dyslipidaemia, and vitamin D supplementation could exert a triple preventive and therapeutic effect in patients with diabetes, dyslipidaemia, and COVID-19.

In summary, diabetes and dyslipidaemia are common comorbidities in patients with COVID-19. Patients with diabetes and dyslipidaemia are more prone to SARS-CoV-2 infection, and they have poor clinical outcomes. Vitamin D may be a potential prognostic factor and could be a promising preventive measure and treatment for patients with diabetes, dyslipidaemia, and COVID-19. Notably, hypervitaminosis D is a rare but potentially serious condition, and it should be avoided when recommending fat-soluble vitamin D supplementation in the era of COVID-19[9]. Certainly, more robust studies are still required to ascertain the prognostic significance and one-arrow three-vulture effect of vitamin D in patients with diabetes, dyslipidaemia, and COVID-19.

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FOOTNOTES

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