The Effect of Vitamin D Supplementation on Severe COVID-19 Outcomes in Patients with Vitamin D Insufficiency

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Introduction: Coronavirus Disease 2019 (COVID-19) deaths have surpassed one million worldwide with limited treatment modalities, and physicians are relying on alternative methods, such as vitamin D supplementation, to prevent or halt disease progression without direct evidence. Research has proven that vitamin D supplementation can prevent inflammation based on its role in innate immune response; however, there have been limited studies regarding vitamin D supplementation in COVID-19. We aimed to determine whether vitamin D supplementation in vitamin D insufficient patients was associated with fewer severe COVID-19 outcomes, defined as mechanical ventilation or death.

Methods: Retrospective study that analyzed data from all adult patients admitted to our tertiary care center between March 2020 and July 2020 with a positive RT-PCR for SARS CoV-2 and a serum 25-hydroxyvitamin D (25[OH]D) level measured within 90 days prior to the index admission. Patients with 25(OH)D <30 ng/mL were considered vitamin D insufficient and patients ordered for least one weekly dose of ≥1,000 units of ergocalciferol or cholecalciferol were considered supplemented. Supplemented vitamin D insufficient patients were compared to non-supplemented vitamin D insufficient patients in terms of severe COVID-19 disease as defined by mechanical ventilation or death.

Results: 129 COVID-19 patients with a vitamin D level <30 ng/mL were identified, with a median vitamin D level of 21.4 ng/mL. A total of 43 patients (33.3%) had severe COVID-19 outcomes. 65 (50.4%) patients with vitamin D insufficiency were supplemented and 64 (49.6%) were not supplemented. Vitamin D supplementation with ≥1,000 units (OR 0.6, 95% CI 0.28 - 1.40; p=0.25), ≥5,000 units (OR 0.5, 95% CI 0.26 - 1.23; p=0.15), or ≥50,000 units (OR 1.0, 95% CI 0.42-2.20, p=0.92) weekly had no statistically significant effect on severe COVID-19 outcomes. The odds of severe COVID-19 outcomes in supplemented patients were non-significantly reduced at lower cutoff values for vitamin D insufficiency (<20 ng/mL and <12 ng/mL) for all supplementation amounts.

Conclusion: Vitamin D supplementation in patients with vitamin D insufficiency did not significantly reduce severe COVID-19 outcomes; however, vitamin D supplementation was associated with non-statistically significant reduced odds of severe COVID-19 outcomes at lower cutoff values of vitamin D level. These results demonstrate that vitamin D supplementation may have a protective effect against severe COVID-19 outcomes in patients with lower baseline levels of vitamin D.