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Low Vitamin D in COVID-19 Predicts ICU Admission, Poor Survival

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There is a high prevalence of vitamin D deficiency in Italy, where mortality rates from COVID-19 have been particularly high.

To examine the relationship between vitamin D levels and COVID-19 severity/mortality, the researchers studied three groups:

- 103 symptomatic patients with COVID-19 with respiratory insufficiency who were admitted to a Milan hospital from March 9 to April 30.
- 52 patients with mild COVID-19, recruited from patients and staff from a nearby nursing home who had a positive test for COVID-19.
- 206 healthy controls, matched 2:1 with symptomatic patients of the same age, weight, and gender, from 3174 patients who had vitamin D measured during a routine check-up from January to March 2020.

Patients in the hospitalized group had lower mean vitamin D levels (18.2 ng/mL) than those with mild COVID-19 (30.3 ng/mL) or those in the control group (25.4 ng/mL).

Patients with symptomatic versus mild COVID-19 were slightly older and more likely to have at least one comorbidity and less likely to be taking a vitamin D supplement at baseline (30% vs 79%).

Among symptomatic patients, mean vitamin D levels were inversely associated with interleukin (IL)-6 and C-reactive protein, "both of which are a direct expression of the inflammatory status," Gennari noted.

About half of the hospitalized patients (49) were admitted to a ward and discharged after a mean stay of 16 days (none died).

The other 54 hospitalized patients were admitted to the intensive care unit (ICU) with severe acute respiratory distress; 38 patients received continuous positive airway pressure (CPAP) and 16 patients received endotracheal intubation.

Of the 54 patients admitted to ICU, 19 patients died from respiratory distress after a mean of 19 days, "consistent with the literature," and the other 35 patients were discharged after a mean of 21 days.

Patients with severe COVID-19 who were admitted to ICU, as opposed to a ward, were more likely to be male, have at least one comorbidity, have higher baseline IL-6 levels and neutrophil counts, and lower lymphocyte and platelet counts.

They also had lower mean vitamin D levels (14.4 vs 22.4 ng/mL) and were more likely to have vitamin D deficiency (vitamin D < 20 ng/mL; 80% vs 45%).

Patients admitted to ICU who died had lower baseline vitamin D levels than those who survived (13.2 vs 19.3 ng/mL).

Vitamin D levels were inversely associated with respiratory distress requiring ICU admission [odds ratio, 1.06; *P* = .038] and with mortality (odds ratio, 1.18, *P* = 0.29), independent of IL-6 levels and other comorbidities.

"That vitamin D levels are associated with improved outcomes independent of IL-6 could reflect that IL-6 is an imperfect measure of the inflammatory process or that vitamin D is related to outcomes for other reasons, such as enhancement of innate or adaptive immunity," said Meltzer.

He added that "this is not to exclude the possibility that vitamin D has important immunomodulatory effects."

Gennari, Meltzer, and Manson have reported no relevant financial relationships.

ASBMR 2020 annual meeting. Presented September 11, 2020.

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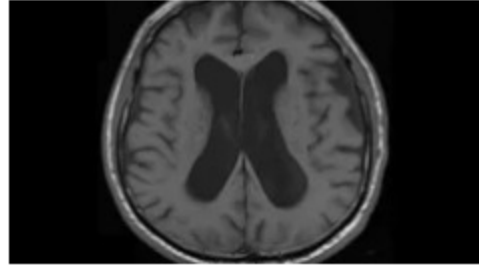
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