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ORIGINAL RESEARCH COMMUNICATION

Vitamin D insufficiency in children, adolescents, and young adults with cystic fibrosis despite routine oral supplementation[1,2,3]

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Background: Cystic fibrosis (CF) with pancreatic insufficiency is associated with poor absorption of fat and fat-soluble vitamins, including vitamin D. Pancreatic enzyme supplementation does not completely correct fat malabsorption in CF patients.

Objective: The objective of the study was to compare the vitamin D status of children, adolescents, and young adults with CF who were treated with routine vitamin D and pancreatic enzyme supplements with the vitamin D status of a healthy reference group from a similar geographic area.

Design: Growth, dietary intake, and serum concentrations of 25-hydroxyvitamin D [25(OH)D], 1,25-dihydroxyvitamin D [1,25$(OH)_2$D], and parathyroid hormone (PTH) were measured in 101 white subjects with CF and a reference group of 177 white subjects.

Results: The median daily vitamin D supplementation in the CF group was 800 IU. The mean ± SD serum concentrations of 25(OH)D were 20.7 ± 6.5 ng/mL in the CF group and 26.2 ± 8.6 ng/mL in the reference group ($P < 0.001$). Vitamin D deficiency and insufficiency were defined as 25(OH)D concentrations < 11 ng/mL and < 30 ng/mL, respectively. Seven percent of the CF group and 2% of the healthy reference group were vitamin D deficient ($P < 0.03$). Ninety percent of the CF group and 74% of the healthy reference group were vitamin D insufficient ($P < 0.01$). Twenty-five percent of the CF group and 9% of the healthy reference group had elevated PTH ($P < 0.006$). The odds of vitamin D insufficiency in the CF group, compared with the healthy reference group, were 1.2 (95% CI: 1.1, 1.3) after adjustment for season and age.

Conclusion: Despite daily vitamin D supplementation, serum 25(OH)D concentrations remain low in children, adolescents, and young adults with CF.

Key Words: Cystic fibrosis • vitamin D • fat-soluble vitamins • children • adolescents • young adults