Vitamin D Deficiency in Long-Term Care Residents

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Should I give all of my nursing home residents a vitamin D supplement?

Vitamin D deficiency is common in residents of long-term care facilities. Sixty percent of female residents of a nursing home in Wisconsin were found to have levels of vitamin D low enough to cause secondary hyperparathyroidism, and only 4% of the 49 women studied had vitamin D levels above 30 ng/mL, a level considered optimal.1 Many of these female residents were taking a daily multivitamin. Skin exposure to the sun—something in short supply for most residents of long-term care facilities—is necessary for the endogenous production of vitamin D. While vitamin D is present in small amounts in some foods, in the absence of adequate sun exposure it is difficult to avoid vitamin D deficiency without nutritional supplementation.

Vitamin D deficiency causes osteomalacia and may result in osteoporosis.2 It can also cause muscle weakness and an associated propensity to fall.3,4 The symptoms of vitamin D deficiency are sufficiently nonspecific that either screening or routine supplementation is required. There are little data to support screening all nursing home residents for vitamin D deficiency. Serum 25-hydroxyvitamin D is the single best measure to assess whether a patient is vitamin D-deficient. Given the cost of the test, about $30, and the very high prevalence of vitamin D deficiency in this population, all nursing home residents should be considered for routine vitamin D supplementation. A serum 25-hydroxyvitamin D level, parathyroid hormone level, and calcium level should all be considered during the evaluation of residents newly diagnosed with osteoporosis. These tests are not required prior to the initiation of routine vitamin D supplementation.

Vitamin D supplementation is contraindicated in those with hypercalcemia and in those with evidence of vitamin D toxicity. Vitamin D supplementation is contraindicated in those with hypersensitivity to any component of a vitamin D-containing product. Phenobarbital and phenytoin may reduce plasma levels of 25-hydroxyvitamin D by inhibiting vitamin D 25-hydroxylase activity in the liver. The appropriate therapeutic response to this is not clear. A recent Cochrane review found insufficient evidence to support the routine use of vitamin supplements in patients with a seizure disorder, including vitamin D.5 Supplemental vitamin D is available as vitamin D\textsubscript{2} (ergocalciferol) or vitamin D\textsubscript{3} (cholecalciferol). Cholecalciferol is the naturally occurring form of vitamin D. A typical dosage is 200-400 IU (5 to 10 micrograms) daily. Vitamin D is often combined in one pill with calcium. There are varying recommendations for the amount of vitamin D, which should be provided as a nutritional supplement. At a minimum, 400 IU should be given daily, although 800-1000 IU is a more appropriate dose.

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for older nursing home residents. 400 IU of Vitamin D per day has been shown to be insufficient to prevent fractures in older persons.

A meta-analysis conducted to address this issue demonstrated a 26% relative risk reduction in hip fractures, which translated into needing to treat 45 patients for between 24 and 60 months to prevent one hip fracture. In this analysis, vitamin D supplementation between 700 and 800 IU per day appeared to reduce the risk of hip and any nonvertebral fractures, whereas a vitamin D dose of 400 IU per day was insufficient for fracture prevention. Given the significant mortality and disability associated with hip fractures in this population, and the low cost and side effects of supplementation, this is a worthwhile intervention. Not all multivitamins contain adequate amounts of vitamin D. The amount of vitamin D an individual is receiving in a multivitamin should be considered when calculating the dose of supplemental vitamin D. Excessive vitamin D ingestion can lead to nephrocalcinosis. Some long-term care residents receiving a combination of calcium and vitamin D may not be able to tolerate this treatment because of intractable constipation caused primarily by the calcium. The recommended daily intake of calcium for older patients is 1200 mg per day. If calcium supplementation needs to be discontinued, Vitamin D supplementation should continue.

References