Vitamin D Supplementation Overuse in Adults

Between 1999 and 2014, the number of US adults taking vitamin D supplements increased, with 3% exceeding the upper limit of 4,000 units daily and 18% exceeding 1,000 units daily.[1] Similarly, vitamin D testing has also been on the rise, evidenced by an 83-fold increase in reimbursement volume for Medicare Part B vitamin D tests from 2000 to 2010.[2]

Previous early evidence suggested that vitamin D supplements had benefits in increasing bone mineral density, preventing falls and fractures, reducing cancer risk, and preventing cardiovascular disease. However, recent studies provide stronger evidence that vitamin D supplementation does not provide these benefits:

- A 2019 randomized, double-blind, placebo-controlled trial concluded vitamin D supplementation at doses of 2,000 units or higher did not lead to a significantly lower incidence of invasive cancer of any type or decrease in major cardiovascular events, such as myocardial infarction or stroke.[3]
- The 2018 United States Preventative Services Task Force (USPSTF) evidence report and systematic review concluded that vitamin D supplementation was not associated with reduced fracture incidence in community-dwelling adults.[4]
- A randomized controlled trial that compared vitamin D 100,000 units monthly versus placebo for a treatment duration of 2.5 to 4 years in patients age 50 to 84 years demonstrated no effect on corrected serum calcium concentrations, cumulative fractures, or falls.[5]
- A 2018 systematic review and meta-analysis of 81 randomized control trials concluded that vitamin D supplementation did not reduce the risk of total fracture, hip fracture, or falls, and did not have clinically meaningful benefits in improving bone mineral density scores. The study noted that vitamin D supplements may be appropriate in treating rickets and osteomalacia, which can occur with vitamin D concentrations lower than 25 nmol/L.[6]

Testing for vitamin D deficiency is not recommended in most patients but may be advised for those who are home bound or in a long-term care facility, for conditions that increase the risk of vitamin D deficiency or insufficiency, and for patients with osteoporosis or a history of a low-trauma fracture, hypocalcemia, or hypophosphatemia.[7]

Given the recent information from several randomized controlled trials and systematic reviews, there is little justification for the use of vitamin D supplements except in documented vitamin D deficiency, for the prevention or treatment of rickets in children and treatment of osteomalacia in adults.

Due to the lack of evidence for vitamin D preventing falls, fractures, cardiovascular events, or invasive cancer, consider discontinuing vitamin D prescriptions in adults when used as supplements.

References:

1. Rooney MR, Harnack L, Michos ED, et al. Trends in Use of High-Dose Vitamin D Supplements Exceeding 1000 or 4000 International Units Daily, 1999-2014. JAMA. 2017;317(23):2448-2450.
2. Shahangian S, Alspach TD, Astles JR, et al. Trends in laboratory test volumes for Medicare Part B reimbursements, 2000-2010. Arch Pathol Lab Med. 2014;138(2):189-203.
3. Manson JE, Cook NR, Lee IM, et al. Vitamin D Supplements and Prevention of Cancer and Cardiovascular Disease. N Engl J Med. 2019;380(1):33-44.
4. Kahwati LC, Weber RP, Pan H, et al. Vitamin D, Calcium, or Combined Supplementation for the Primary Prevention of Fractures in Community-Dwelling Adults: Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2018;319(15):1600-1612.
5. Khaw KT, Stewart AW, Waayer D, et al. Effect of monthly high-dose vitamin D supplementation on falls and non-vertebral fractures: secondary and post-hoc outcomes from the randomised, double-blind, placebo-controlled ViDA trial. Lancet Diabetes Endocrinol. 2017;5(6):438-447.
6. Bolland MJ, Grey A, Avenell A. Effects of vitamin D supplementation on musculoskeletal health: a systematic review, meta-analysis, and trial sequential analysis. Lancet Diabetes Endocrinol. 2018;6(11):847-858.
7. Drezner MK. Vitamin D deficiency beyond the basics. Post TW, ed. UpToDate. Waltham, MA: UpToDate Inc. https://www.uptodate.com (Accessed on May 14, 2019.)