Testing vitamin D levels

Adrienne J. Lindblad ACPR PharmD Scott Garrison MD PhD James McCormack PharmD

Clinical question
What is the evidence for testing serum vitamin D (VTD) levels in adults?

Bottom line
Routine testing of VTD levels is unnecessary. Laboratories often report serum VTD levels between 50 and 80 nmol/L to be insufficient, but this claim is not supported by evidence. Additionally, large variability in testing limits interpretation of repeat measurements.

Evidence

- A systematic review on 25-hydroxyvitamin D (25[OH]D) suggests levels greater than 75 nmol/L “are not consistently associated with increased benefit”; greater than 50 nmol/L are “practically sufficient for all persons”; between 30 and 50 nmol/L “places some, but not all, persons at risk for inadequacy”; and less than 30 nmol/L puts one “at risk relative to bone health.”
- No RCTs in falls or fractures investigated treating specific VTD level targets.
- The proportions of the Canadian, American, and British populations with 25(OH)D levels less than 75 to 80 nmol/L are 97%, 77%, and 87%, respectively; but this is not necessarily a concerning level, according to the systematic review. However, of potential concern, 61% of Canadians had levels less than 50 nmol/L, and 13% had levels less than 40 nmol/L.

Context

- Some provincial laboratories consider 25(OH)D levels of 74 nmol/L or less to be “insufficient,” but this is not supported by the evidence.
- Every 800 IU of VTD increases 25(OH)D by 8 to 16 nmol/L; however, the dose-response relationship is not directly linear and is affected by many factors (eg, season, adiposity, skin pigmentation).
- Vitamin D assays have a coefficient of variation that might be as high as 10% to 20%, meaning changes in levels with doses of 800 IU/d might not be discernible owing to variability in testing.
- Guidelines suggest supplementing without testing, and explain when testing might be helpful.
- Mega VTD doses (ie, 150 000 IU every 3 months) have been associated with increased adverse events (eg, falls, fractures).
- In trials, enrolment was not based on VTD levels and treating on speculation was beneficial; doses were not adjusted based on VTD levels.
- A 25(OH)D assay costs $61.32.

Implementation

Routine VTD testing is not required or recommended; however, testing might be beneficial for some when clinically indicated: those with parathyroid disease, hypocalcemia, hypercalcemia, hyperphosphatemia, serious renal or liver disease, or malabsorption syndromes; those taking medications that affect VTD metabolism (eg, valproate) or absorption (eg, cholestyramine); or those with possible hypervitaminosis D. Do not test calcitriol levels unless 1α-hydroxylase abnormality is suspected. Patients older than age 50 can take up to 1000 IU/d of VTD to reduce the risk of falls, fractures, and overall mortality.

Dr Lindblad is Knowledge Translation and Evidence Coordinator with the Alberta College of Family Physicians. Dr Garrison is Associate Professor in the Department of Family Medicine at the University of Alberta in Edmonton. Dr McCormack is Professor in the Faculty of Pharmaceutical Sciences at the University of British Columbia in Vancouver.

The opinions expressed in this Tools for Practice article are those of the authors and do not necessarily mirror the perspective and policy of the Alberta College of Family Physicians.

References