Testing vitamin D levels

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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[1] 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[2-4]; but this is not necessarily a concerning level, according to the systematic review.[1] However, of potential concern, 61% of Canadians had levels less than 50 nmol/L,[2] and 13% had levels less than 40 nmol/L.[1]

Context

- Some provincial laboratories[5] 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).[1,6]
- Vitamin D assays have a coefficient of variation that might be as high as 10% to 20%,[1] meaning changes in levels with doses of 800 IU/d might not be discernible owing to variability in testing.
- Guidelines[7] 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).[8,9]
- In trials, enrolment was not based on VTD levels and treating on speculation was beneficial[10,11]; doses were not adjusted based on VTD levels.[12-14]
- A 25(OH)D assay costs $61.32.[15]

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.[7] Do not test calcitriol levels unless 1-α-hydroxylase abnormality is suspected.[1,7] Patients older than age 50 can take 800 to 1000 IU/d of VTD to reduce the risk of falls, fractures, and overall mortality.[16]

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