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 review1 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%, respectively2-4; 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 laboratories5 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.
• Guidelines7 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 beneficial10,11; 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 IU/d of VTD to reduce the risk of falls, fractures, and overall mortality.16

References

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