Clinical Practice Assessment

Screening for Vitamin D Deficiency

Clinical Question:
In what clinical setting is screening for 25-OH Vitamin D deficiency useful?

Bottom Line:
Screening for Vitamin D deficiency is not recommended. Measuring 25-OH Vitamin D levels is only necessary in the evaluation of suspected disorders of calcium regulation or metabolic bone disease. In other patients supplementation with Vitamin D at a dose of 1000 IU daily can be offered without a need for measuring 25-OH Vitamin D levels. The risk of hypercalcaemia with supplementation at this level is insignificant.

Synopsis:
Recently many widespread health benefits have been associated with Vitamin D supplementation. Profound deficiency causes osteomalacia with the associated clinical findings of deep proximal bone pain, weakness and fractures. Meta-analysis studies have shown Vit D supplementation of 400-700-1000 IU reduces the incidence of falls and mortality. Similar Vitamin D doses with calcium supplementation reduces fracture incidence. Less certain associations with Vitamin D include decreased risks of cardiovascular disease, diabetes and even cancer. It remains unclear as to the association of other clinical finding to Vitamin D deficiency or the benefits of treatment beyond that of 1000 IU per day. There is no accepted or recommended reason for measuring 25-OH Vitamin D based on clinical symptoms.

Vitamin D deficiency (measured by serum 25-OH Vitamin D levels) leads to secondary hyperparathyroidism and bone loss. Vitamin D supplementation has been shown to decrease plasma levels of parathyroid hormone (PTH), to temper the elevations of bone turnover markers and increase bone mineral density. The 25-OH Vitamin D level needed to prevent secondary hyperparathyroidism has been estimated to be between 10ng/ml to 50ng/ml and is generally accepted above 20ng/ml. In those with osteoporosis, supplementation of Vitamin D with calciferol should be given if a 25-OH Vit D level < 20ng/ml with a goal of maintaining the level above 32ng/ml. One can expect a 20ng/ml level to increase to 32ng/ml with 1700 IU of Vitamin D a day.

Conditions associated with low Vitamin D levels include: malabsorption, osteoporosis, chronic renal disease, drugs including phenytoin, phenobarbitol, carbamazepine, isoniazide, theophyline, rifampin, antiretroviral agents and glucocorticoids.

In evaluating patients with disorders of calcium regulation, osteoporosis (meaning a high fragility fracture risk) or those who on bone density have a Z-score of < -2.0, measuring a 25-OH Vitamin D levels is indicated. Vitamin D deficiency with secondary hyperparathyroidism is common and replacement along with a total calcium intake of 1000-1200mg/day total lowers the incidence of future fractures. Unless the history or exam suggests the possibility of other medical issues being present the evaluation for causes of osteoporosis beyond a 25-OH Vitamin D level needs to only include a complete chemistry panel, TSH, PTH and a 24-hour urine for calcium.
Treatment options:

- Forms of inactive Vitamin D (calciferol):
  - Cholecalciferol Vitamin D3 synthesized in the skin by sunlight UVB
  - Ergocalciferol Vit D2 present in plants and some fish
  - Vitamin D3 may be up to 3x more potent than Vit D2
  - Available strengths of Vitamin D3 include 400, 1000, 2000, 5000 and 50,000 IU tabs

- Effectiveness of Vitamin D supplementation:
  - 1000 IU=25ug of Vitamin D which typically increases the serum 25-OH level by 7 ng/ml
  - 25-OHD ng/ml x 2.50 converts to nmol/l. 20ng/ml=50nmol/l

Sources:

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