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The Diagnostic Specialist

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D-Facts

Enhanced Clinical Effectiveness via Vitamin D Testing

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Abstract

- Clinicians should request regular measurement of vitamin D levels for a rational diagnosis and treatment of their patients.
- Severe hypovitaminosis D, causing non-specific musculoskeletal pain, is easily misdiagnosed and mistreated with expensive and toxic medications. Measurement of 25-hydroxyvitamin D levels and replenishment with vitamin D shows clinical benefits in these cases.
- Reaching and maintaining sufficient vitamin D levels is also helpful in numerous extra-skeletal diseases including diabetes, metabolic syndrome, cardiovascular disease, cancer and can significantly reduce the related economic burden.
- Several clinical cases show that the response to a certain dose of vitamin D can vary significantly from patient to patient. Therefore, effective dosing must be guided by measurement.

Enhanced Clinical Effectiveness via Vitamin D Testing

Gregory A. Plotnikoff, MD, MTS, FACP

Physicians cannot determine vitamin D status by a patient's history and physical exam. Rational diagnosis and treatment requires measurement. This requirement is no different from other invisible contributors to health or illness such as cholesterol levels, vitamin B12 levels or thyroid stimulating hormone (TSH) levels. Truly, not a single physician can ascertain these levels without actual measurement.
In fact, evidence is accumulating rapidly that clinicians should be obtaining vitamin D levels at least as often as they check cholesterol, B12 and TSH levels.

As a physician with a very busy practice, I cannot emphasize enough the importance of D measurement. In this brief article, I will share clinical insights to enhance clinical effectiveness and reduce human suffering.

My interest in vitamin D was prompted by the challenges of chronic, non-specific musculoskeletal pain. In accordance with my training, I had followed the usual path of medications, physical therapy and encouragment with very little to no improvement in a large percentage of my primary care patients. I had no explanation and no truly effective treatment until I read an article in the BMJ entitled "Hypovitaminosis D in Immigrant Women: Slow to be Diagnosed"[1].
This article prompted me to measure and then later to publish vitamin D levels on 150 consecutive patients I saw with chronic pain and no significant improvement despite medical efforts.
The results were stunning: 93% of all these patients were deficient. The mean level was just 12 ng/mL. I found five patients with levels so low they were below the level of detection. Each of these five had been misdiagnosed and placed on expensive and toxic medications or received unnecessary surgery. One gentleman alone received medical interventions costing over $200,000 with no clinical benefit, before measurement demonstrated profound vitamin D deficiency. With replenishment, his chest and back pain and weakness disappeared[2].

So I was hooked. Now ten years later, we also know that measurement and rational replenishment of vitamin D can be immensely helpful in numerous diseases including those related to insulin resistace such as type II diabetes, metabolic syndrome, polycystic ovary disease and atherosclerotic arterial disease. Simply raising a vitamin D level from 10 ng/mL to 30 ng/mL improves insulin sensitivity by 60%[3].
Clearly, metabolic syndrome, diabetes and cardiovascular disease are hugely expensive burdens for Western governments. And certainly the medical literature documents that vitamin D can play a significant role in minimizing the burden of these illnesses including all-cause mortality[4,5].

But consider also the burden of cancer. Can vitamin D testing save money and save lives in this field as well? Consider the following true cases.

Case 1

Slender, white mother of two, aged 42 with a history of stage II breast cancer and no malabsorption. She was placed on 2,000 IU of vitamin D which she took daily. She returned to Dana Farber Cancer Institute two years later and had her vitamin D level checked. The result? A very disappointing 19 ng/mL.

We now know that for vitamin D supplementation "one size does not fit all." Absorption can vary significantly and dose-response curves do not exist. This is a crucial fact given recent publications linking low vitamin D with increased breast cancer mortality.
The key point: clinicians cannot assume that any given dose is sufficient for reaching or maintaining vitamin D sufficiency. Effective dosing must be guided by measurement.

Case 2

56 year old white female with a history of estrogen receptor positive breast cancer found in three lymph nodes has completed surgery, chemotherapy and radiation. The standard of care now is to treat with an oral anti-estrogen agent called an aromatase inhibitor. These medications are life-saving. They can also have severe side effects including joint pains and muscle pains. In fact, the symptoms can be so severe that many women choose to discontinue these life-saving medications because the symptoms are just too overwhelming.

However, we now know that vitamin D supplementation to levels greater than 66 ng/mL significantly reduce these unbearable symptoms and allow women to continue on the life-saving medication.
Measurement is absolutely needed because there is no one size supplement that will guarantee achievement of this level. To re-emphasize this key point: People vary too much in their baseline D levels, absorption capacity and body mass index for any one suggested dose to be effective.

Case 3

53 year old woman of Pakistani origin with a history of invasive ductal carcinoma of her right breast was treated with mastectomy, radiation and the anti-estrogen agent tamoxifen. Two years later, she developed migratory musculoskeletal pains in multiple locations with bony tenderness and whole body discomfort. A chest X-ray demonstrated changes in her ribs consistent with metastatic disease. A follow up radioisotope bone scan demonstrated multiple areas of uptake in her ribs and sacroiliac joint. The combination of symptoms with the positive bone scan was consistent with metastatic breast cancer to the bone.

She began treatment with an aromatase inhibitor and an oral bisphosphonate. Despite this treatment for her bone metastases, her pain worsened and new areas of bony tenderness developed. A repeat bone scan showed no improvement and a poor prognosis was given.
Chemotherapy was planned but she left London in order to see her family in Pakistan.

She returned to London 6 months later completely symptom free.
A whole body CT scan at that time demonstrated no abnormalities aside from a pelvic stress fracture. Was this spontaneous remission?

The following winter, her symptoms returned. When her pain worsened significantly, she was treated with second line intravenous agents for metastatic breast cancer. She unexpectedly developed significant signs of hypocalcemia which prompted evaluation of her vitamin D status. She was found to have a serum 25-OH vitamin D of just 19 ng/mL and a parathyroid hormone level markedly elevated at 474 ng/L (normal 10-60 ng/L). She was diagnosed with severe vitamin D deficiency with secondary hyperparathyroidism and began treatment with high-dose vitamin D.

Four years later, her doctors report her to remain in excellent health with continued complete resolution of her symptoms and completely normal bone scans[6].

Vitamin D assessment is not just for pain or metabolic syndrome or cancer but also for reduced falls in the elderly as well as improved outcomes in pregnancy. The scientific support is strong yet the public awareness remains weak.

From this brief article, I would like the reader to consider these take home messages:

1 **Vitamin D deficiency is a world-wide phenomenon with profound negative impacts on both lives and health budgets.**

2 **A correct diagnosis and a cost-effective treatment plan require serum measurements of vitamin D.**

3 **Treating without measurement means that a significant percent of people will be undertreated.**

For these reasons, promotion of vitamin D testing will clearly result in reduced suffering and better outcomes for individuals, families and societies.

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