

Vitamin D

- In 2012 the UK Chief Medical Officer advised that a significant proportion of the population may be at risk of vitamin D deficiency and that all those at risk consume a supplement.
- At the time concern was expressed about the strength of the evidence base to support this advice, the safety of long term consumption of supplements, possible increase in "pill burdens" and the very high cost.
- A local decision was made that patient requirements would be assessed on an individual case basis and that patients requiring supplements would be encouraged to buy them.
- This bulletin summarises the current advice on Vitamin D levels, doses and what is known about supplementation in various patient groups.

What is a healthy Vitamin D level?

There are considerable seasonal variations in values for vitamin D. In most people vitamin D levels are lowest in mid-winter at about 40 nanomoles/L and are highest at about 70 nanomoles/L mid-summer.

- Concentrations of < 25 nanomoles / L probably put individuals at risk of osteomalacia.
- Concentrations of > 25 nanomoles / L usually protect against rickets and osteomalacia, providing the individual is not on a severely calcium-deficient diet.
- Concentrations of > 70 nanomoles/L are considered Vitamin D replete, so no attention is required.

For the many people who fall into the range of 25 to 50 nanomoles/L and have no symptoms, the clinical need to supplement is very much a "grey area". These levels are considered to be associated with many adverse outcomes, but there is no evidence of a causal association and no proven benefit for replacement.

The current advice is that if levels are definitely < 25, the patient should be advised to consume an oral dose of 20,000IU cholecalciferol twice a week for twelve weeks. This dose may need to be increased if absorption problems exist. If levels are between 25 and 50 then a daily 1,000 IU dose available over the counter is recommended. BNF-approved preparations are expensive and are not on the prescribing list. Increased exposure to sunlight, ideally with increased exercise, would appear to be the best approach for asymptomatic patients with levels of between 25 and 50.

What is the evidence to support the use of supplements to prevent fractures and falls?

Osteoporosis expert consensus in 2003 found that one author considered the minimum level optimal for fracture prevention to be 50 nanomoles / L, one said 70 nanomoles / L, two said 75 nanomoles / L and two said 80 nanomoles / L.

A Cochrane review in 2009 reported that Calcium 1.2g plus vitamin D 20 micrograms per day reduced fractures in higher risk, institutionalised people, but not in lower risk people living in their own homes. The NNT to prevent hip fractures in higher risk people was 37 over 2 to 3 years. A meta analysis by Bischoff-Ferrari in 2009 found that a vitamin D supplement of 17.5 to 25 micrograms per day, with varying amounts of calcium resulted in a 19% relative risk reduction in falls in people over 65 years.

Are there any extra-skeletal benefits of vitamin D supplementation?

1. Chronic diseases

A BMJ article in 2010 stated that observational studies had shown that vitamin D insufficiency, although not enough to cause symptomatic bone and muscle disease, "is associated with an increased risk of mortality and of several common diseases such as cardiovascular disease, type 2 diabetes, bowel cancer, breast cancer, MS and type 1 diabetes". However most of this evidence was extrapolated from epidemiological studies and no account was taken of confounding factors. They merely showed that there may have been a link in the study populations between a low vitamin D level and these chronic illnesses. There is no evidence that low vitamin D levels cause these illnesses and even less that supplementation will have any effect, especially when taken by otherwise healthy people, even if a safe and effective dose could be determined. A Lancet article in 2012 entitled "Increasing requests for vitamin D measurement: costly, confusing, and without credibility" drew similar conclusions. A key article in JAMA in 2011 concluded that the evidence that vitamin D prevents cardiovascular disease and diabetes "fell short".

2. Effect on mortality

A Cochrane review from 2011 (n= 74,789 in 32 trials) found that vitamin D3 reduced mortality, but the NNT was 200 over 2 years. This was statistically significant only when given with calcium and in people known to have serum levels of below 50 nanomoles/L. There was no benefit found from other forms of vitamin D and no benefit on cardiovascular or cancer mortality. Crucially 79% of the study participants were women aged over 70 years.

3. Effect on chronic pain

Cochrane in 2010 reviewed 4 trials including 294 people with chronic painful conditions. Only one study reported a beneficial effect, the other three found no benefit of vitamin D over placebo in treating chronic pain.

What about vitamin D from sunlight?

The usual advice is that in a fair skinned person, 2 to 3 periods per week of 20 to 30 minutes of sunlight exposure on the face and forearms at midday are sufficient to achieve healthy vitamin D levels. Any longer may increase the risk of skin cancer and sunscreen should be avoided as it prevents the synthesis of vitamin D. Older people and / or those with darker skin need more time.

Work in the UK looked at the incidences of levels below 40 nanomoles/L vs geographical location and season in a cohort of patients. Only 5 to 10% of people of white ethnicity in the South of England in Summer had these lowish levels. This rose to 60 to 70% of people in Scotland in Spring. People who are obese were also twice as likely to have low levels. Pregnant women, particularly those who are obese, are likely to be vitamin D deficient.

What about increased CV risk and calcium supplementation?

Two meta-analyses by Bollard from 2010 and 2011 reported that calcium supplements, without vitamin D increased the risk of MI by about a third. There were non-significant increases in the incidence of stroke and death. The MHRA, in 2011, advised that "no change" to the current practice of using calcium and vitamin D to prevent postmenopausal fractures should be made.

So what?

Since the advice of the UK CMO was produced, no extra evidence has become available to suggest that supplementation with vitamin D improves outcomes for or chronic diseases in patients who are not pregnant, obese or require post menopausal osteoporosis prophylaxis. Therefore it would seem prudent to recommend increased sunlight exposure and to only treat those who are symptomatic and/or have very low levels.

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