LCG Greece Research

## *Statement of concern*

# The current enthusiasm for vitamin D as an aid against Covid-19 poses a risk to many patients. A warning to all doctors and the public.

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## Abstract

As a result of recommendations from some influencers on vitamin D as a helpful supplement against Covid-19, the number of people taking vitamin D as a regular dietary supplement has increased, as has the amount of the dose taken individually. As a globally active health network, the Lazar Medical Consortium Group (LCG) has access to privacy-protected patient data in more than 25 countries. We searched the records of 14.742 patients worldwide for vitamin D intake on record, onset as well as duration of intake, and symptoms coded according to ICD-10 that were consistent with vitamin D-related hypervitaminosis. The evaluation revealed evidence of a worldwide overuse of vitamin D so massive that medical providers working with the Lazar Medical Consortium Group have all received a Red Label Notice to educate patients at every patient contact against the danger of taking too much vitamin D (>1000. I.U. per day).

## General considerations

Vitamin D3 is a fat-soluble pro-hormone that, after several metabolic steps, has a half-life in the patient's body of 3 months to 2 years (depending on dose and individual metabolism). In its target tissues, and especially in the kidneys, it is converted to its active form, 25(OH)2vitamin D3 (calcitriol) with half-life of three to five days. The last activation step is highly regulated, which is why the body has a high but not unlimited tolerance to the vitamin precursors, and not at all for the already activated form. Higher dosages, that is more than 1000 I.U. per day. should only be taken under medical supervision and in consideration of the individual vitamin D status. With a - not medically justified - regular daily intake of vitamin D via high-dose preparations, the risk of health damage such as the formation of kidney stones or renal damage increases. Even acute kidney failure can be the result of a vitamin D overdose. Recommendations for taking vitamin D supplements have been making the rounds on the internet for quite some time, currently also as a "cure" against a severe course of a Covid-19 disease. We do not doubt some positive effects of vitamin D in the context of the Covid-19 disease, however, vitamin D is being promoted as 'just another food supplement', which it is not. The best way to achieve a sufficient vitamin D supply is through the skin's own Physical exercise and outdoor activity also strengthen muscles and bones. In addition, eating fatty sea fish such as herring or salmon once or twice a week can be helpful to keep the vitamin D level in a good balance. High risk groups for an insufficient vitamin D supply therefore only include people who spend little or no time outdoors or - for religious reasons - never go outside with their bodies uncovered. In the northern hemisphere people's bodies produce high amounts of Vitamin D mainly from March to October due to the geographic location. However, the body is able to build up vitamin D reserves in fat and muscle tissue which remain there for months to years, dependent on the amount. At the same time, this ability to store vitamin D also entails the dangers associated with the careless use of vitamin D supplements. A chronic vitamin D overdose leads to overstimulated calcium absorption in the intestines and calcium reabsorption from the bones and therefore to hypercalcemia (calcium in serum higher than 2.5 mmol/l) and hypercalciuria (calcium excretion higher than 10 mmol/24h). As a result, the kidneys will be damaged by calcium deposition, leading to a decreased glomerular filtration rate. On the other hand, the renal tubules are unable to concentrate urine as well, which may temporarily lead to polyuria and secondary polydipsia. Both lead to functional renal insufficiency. Prolonged hypercalcemia may further lead to calcium deposition in soft tissues such as blood vessels, heart, lungs, muscles and tendons. All positive effects of vitamin D against osteoporosis will be inverted into a negative ones. The patient's bones will become decalcified faster and faster. Other symptoms, especially of chronic overdose, are loss muscle, tendon pain, headache, fever, irritability, hypoparathyroidism, and even death.[1-5]

## Data

Thanks to the Lazar Medical Consortium Group and its involvement in medical service companies we were are to obtain data anonymized of 14.742 patients worldwide for vitamin D intake on record, onset as well as duration of intake, and

symptoms coded according to ICD-10 that were consistent with vitamin D-related hypervitaminosis. We had expected some cases of overdose and negative reactions of the body, but we were surprised about the extent that the uncritical promotion of vitamin D supplements has on people's health. In the institutions from which we obtained the data, the use of dietary supplements is asked about as a standard procedure.

Table 1. ***Regular use of vitamin D supplements*** *(all patients)*

| 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|
| 16.1% | 15.8% | 27.1% | 39.6% |

Table 2. ***Average dose taken***

| 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|
| 435 I.U | 420 I.U. | 3830 I.U. | 5.250 I.U. |

Table 3. ***Mild symptoms of hypervitaminosis D*** *(e.g. hypercalciuria)*

| 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|
| 2.3% | 1.8% | 4.3% | 17.7% |

Table 3. ***Severe symptoms of hypervitaminosis D*** *(e.g. GFR <60, exacerbation of osteoporosis)*

| 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|
| 0.2% | 0.15% | 0.56% | 1.8% |

In 2021, an unexpected number of involuntary overdoses occurred, resulting in elevated calcium levels in hypercalcemia. The clinical symptoms range from fatigue and muscle weakness to vomiting and constipation to cardiac rhythm disturbances and calcification of blood vessels. Kidney stones, renal calcification and ultimately a decrease in GFR were also seen.

Significant hypercalcemia was seen in patients who took megadoses >10,000 I.U., whereas no hypercalcemia was observed in patients who took doses below 250 µg (1,000 IU). Between the two extremes, the picture was inconsistent, suggesting a tolerance threshold that varies from person to person.

## Discussion

Despite all limiting factors in the analysis of anonymized patient data, a highly significant increase in the number of patients taking vitamin D as a dietary supplement can be observed since 2020. The average intake has also increased massively in the patient population we evaluated. A correlation with the increasingly strong advertisement of vitamin D as a protection against severe Covid courses is certainly given.[6-8] However, we can neither prove nor disprove causality with our evaluation design.

What is striking, nonetheless, is the onset of mild adverse effects already well below the limit of 10,000 I.U. of vitamin D per day in the form of a dietary supplement, which is considered safe in many countries. We see a reasonable upper limit for adults between 1,000 and 4,500 I.U. per day. There may be people who can tolerate a long-term intake of more than 10,000 I.U. without harm, but such megadoses are completely unnecessary (except in the case of specific diseases). In addition, we assume massive under-reporting of early signs of overdose. For this purpose, the decisive parameters in blood and urine are measured far too rarely.[10-12]

In addition, there is the highly complex metabolic pathway of what the layman knows as vitamin D. This is accompanied by enormously long half-lives of weeks to years, so that the substitution of vitamin D in the right quantity can only be controlled to a very limited extent.[12]

## Conclusion

The fact that a well-adjusted vitamin D level has numerous of positive effects on health is now beyond question. This is obviously also the case against Covid-19. However, adults should not consume more than 1,000 to 4.000 I.U. and have both vitamin D levels and calcium in blood and urine checked regularly by a physician., especially while taking supplements at the upper dose limit. The administration of vitamin D to children and adolescents should only be carried out by a pediatrician, even if the preparations are freely available in the supermarkets.

## Conflicts of interest

none

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