# Hypervitaminosis D with Dyslipidemia: An Unusual Scenario

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Vitamin D plays an important role in calcium homeostasis, and for skeletal growth and bone strength. Vitamin D toxicity may occur at excessively high doses. For many people, the word ‘vitamin’ implies something that is beneficial and essential, not potentially harmful. We recently encountered an infant with iatrogenic hypervitaminosis D associated with asymptomatic dyslipidemia.

A six-month-old girl was brought to us with fever for one day and one episode of generalized seizure. There was no history of cough, rash, ear discharge, polyuria, polydypsia, constipation, nausea, vomiting or similar such episode. She received two mega doses (600,000 IU each) of oral vitamin D in last two months. Blood counts, kidney function tests, urine examination, blood culture, CSF examination and ultrasonography of the abdomen were normal. Serum levels of 25-OH Vitamin D3 were high (>160 ng/mL) with a normal serum calcium (10.1 mg/dL) and normal serum parathyroid hormone (46 pg/mL). We incidentally sent her serum lipid profile, which revealed high triglycerides (403 mg/dL), normal total cholesterol (123 mg/dL), and high VLDL cholesterol (81 mg/dL). The lipid profile of parents and other siblings were within normal limits. Secondary causes of hyperlipidemia were ruled out.

| *Parameter* | *Results* | *Reference range [2]* |
|---|---|---|
| Total Cholesterol | 123 mg/dL | 106-186 |
| Triglycerides | 403 mg/dL | 65-234 |
| HDL Cholesterol | 27 mg/dL | 24-84 |
| VLDL Cholesterol | 81 mg/dL | 0-30 |
| LDL Cholesterol | 15 mg/dL | 34-111 |

Vitamin D receptors are found ubiquitously, including in adipose tissue, and 25(OH)D plays an important role in lipid metabolism via several mechanisms, including induction of an increase in lipoprotein lipase activity, increased lipogenesis and lipolysis, and enhanced intestinal calcium absorption, which could reduce the formation of calcium fatty soaps in the gut and increase the absorption of fat. In a recent report, cholesterol and triglyceride levels were found to be increased in an adolescent following vitamin D treatment. Similar findings in adults have been reported earlier.

Define

1- lipogenesis

2- lipolysis

## Lipid Profile

An association between vitamin D deficiency and atherogenic dyslipidemia has also been suggested. In a cross-sectional study that included 107 811 patients, vitamin D was associated with a significant increase in total cholesterol and high-density lipoprotein cholesterol. Recently, using the filaggrin genotype as an instrumental variable to estimate the causal effect of vitamin D on serum lipids, Skaaby et al[109] showed a 23.8% higher high-density lipoprotein cholesterol level and a 30.5% lower serum level of triglycerides per doubling of vitamin D.

The mechanisms by which vitamin D may affect the lipid metabolism are largely unknown. In vitro studies showed that incubation with calcitriol increases lipoprotein lipase expression and activity in cultured adipocytes.[110]

Recently, serum 25(OH)D was found to be positively associated with lipoprotein lipase concentration, a finding that could explain the inverse association between serum 25(OH)D and triglycerides.[111] Moreover, a 25(OH)D receptor binding site modifying the *APOA5* promoter polymorphism was found to be associated with lower high-density lipoprotein in 25(OH)D-deficient individuals.[112]

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**Thank you for your attention**
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