

Vitamin D toxicity presenting with altered sensorium and hypercalcaemia

Sir,

Vitamin D deficiency defined as serum 25-OH Vitamin D <20 ng/ml, is usually present all over the world across all age groups.^[1] Hospital- based studies showed a prevalence of 37%-99%^[2] in Indian patients while school- based studies showed an incidence of 34.2%.^[3] As vitamin D plays an important role in the pathology of a wide range of chronic health conditions like osteoporosis, heart disease, cancer, and diabetes mellitus, there is a widespread view among physicians to treat vitamin D deficiency with supplementation orally or intramuscularly. However, supplementation without adequate monitoring may lead to vitamin D toxicity with deleterious side effects. The following case illustrates this condition.

A 72 -year- old female, a known case of diabetes mellitus, hypertension presented with an increase in the frequency of urination and vomiting for 3 days, trembling of hands and feet for 2 days, and confusion and altered sensorium for 1 day. There was no history of fever, headache, seizure, body ache, cough, or substance abuse. Two years back patient developed severe osteoporosis and was prescribed vitamin D along with calcium tablet. On examination, patient was afebrile, drowsy with GCS-E2V2M5-9/15,.

No neck rigidity, plantars bilaterally extensor. Blood investigation revealed - Calcium 17.66 mg/dl, Phosphorus 1.44 mg/dl and parathyroid hormone (PTH) 6.0 pg/dl (15-60pg/dl). Magnetic resonance imaging (MRI) of brain and cerebrospinal fluid (CSF) study was normal with the absence of JE, HSV1 and 2 and Cryptococcal antigen.

The following differential conditions were considered ::multiple myeloma; gastrontestinal, breast, lung malignancy; Sarcoidosis; vitamin D toxicity; and milk alkali syndrome. However, serum electrophoresis for M band, ACE level and computed tomography scan of thorax and abdomen were normal. Further investigation was done in the form of bone marrow biopsy- which was normal; parathyroid hormone- related peptide-which was normal; however vitamin D (25 hydroxy vitamin D) was >150 ng/dl (super toxic level).

On reviewing the medication, it was found that patient was consuming 2400 IU of vitamin D every day for the last 2 years without any monitoring.

The patient was shifted to the intensive care unit (ICU) and treated with aggressive Iv fluids (Normal Saline-3L/ day), biphosphonate tablet, diuretic, low- dose steroid followed by improvement of patient sensorium and calcium level and was subsequently discharged.

Vitamin D is a fat- soluble vitamin which plays an important function in the human body ranging from bone mineralisation, muscle function, cell differentiation and immune modulation.^[4] Being a fat- soluble vitamin

it remains in the body for a long time unlike the water-soluble vitamins. The regular daily allowance for vitamin D is- 400 IU/day for babies below 1 year, 600 IU/day for aged between 1 and 70 years, 800 IU/day for aged above 71.^[5] However over and aggressive correction to correct deficiency can lead to vitamin D toxicity.

The mechanism of vitamin D toxicity involves increased concentration of vitamin D metabolites which reach the vitamin D receptor in the nucleus of target cells and cause exaggerated gene expression. Among the metabolites, 25(OH)D has the strongest affinity to VDR, and so high concentration stimulates transcription.^[2]

Hypervitaminosis D may present with one or more of the following symptoms and signs of hypercalcaemia^[6] like nausea, vomiting, polyuria, dehydration, confusion, renal failure, pancreatitis and short QT interval.

Diagnosis of symptomatic hypervitaminosis D is based on the clinical features of hypercalcaemia along with elevated serum and urine level of calcium, reduced serum PTH, and serum 25(OH)D₃ level >100 ng/dl.

Treatment consists of discontinuation of vitamin D supplement, reduction of dietary calcium, avoidance of

sunlight along with treatment of hypercalcaemia in the form of fluid administration, diuretic, biphosphonate, glucocorticoids and Calcitonin

Vitamin D toxicity should always be considered in any patient presenting with symptoms of hypercalcaemia in the form of polyuria, vomiting and altered sensorium in critical care unit patients. Especially important is creating awareness among physicians regarding the toxicity of vitamin D resulting from excessive overdose or lack of monitoring of vitamin D level following supplementation [Figure 1].

Declaration of patient consent-

The author certifies that all appropriate patient consent forms have been obtained. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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Figure 1: Investigations		
Investigation	Level	Interpretation
Serum calcium	14.3 mg/dL	High
Serum PTH	6.8pg/dL	Low
Serum electrophoresis and immunofixation study	No M band or abnormal protein found	Normal
MRI brain, thorax, abdomen	No abnormality detected	Normal
Bone marrow biopsy	No abnormal cells detected	Normal
Parathyroid hormone-related peptide (PTHrp)	0.5	Normal
CSF Study	Normal total cells. Negative for HSV, JE, cryptococcal	Normal
Vitamin D level	>150 ng/dL	Super toxic level

PTH-Parathormone, MRI-Magnetic resonance imaging, CSF-Cerebrospinal fluid

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