Reversible hypercalcemic encephalopathy due to vitamin D intoxication: a case report

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Background: vitamin D intoxication is a rare but potentially severe condition, often related to the inappropriate use of high-dose supplements. Excessive intake can cause hypercalcemia, leading to cognitive, neurological, and systemic alterations and may mimic rapidly progressive encephalopathy or dementia.

Case Report
Female, 79 y.o.
Past medical history: dyslipidemia, anxiety–depressive disorder, chronic smoking.
Recent history: Over the past few weeks, the patient developed confusional state, urinary urgency, lethargy, and gait disturbances.

On admission: Severe hypercalcemia: 16 mg/dL (n.v. 8.2–10.4), suppressed PTH, 25-OH-vitamin D > 400 µg/L (toxicity>90 µg/L)

Diagnostic tools:
-EEG: slow low-voltage background activity with frequent generalized paroxysmal slow spike–wave discharges (Fig. 1a).
-brain CT and MRI: chronic vascular encephalopathy (Fig. 3).
-Whole-body contrast-enhanced CT: No evidence of malignancy.
-Bone scintigraphy: Not relevant.
History revealed prolonged self-administration of high-dose vitamin D (≈30,000 IU/day for several months) associated with vitamin K supplementation.

Neurological examination:
Alert, marked ideomotor slowing, poor cooperation with simple commands and disorientated in time and space. slow speech. No motor or sensory deficits.

Flow-chart for hypercalcemia diagnostic work-up (Fig. 2)

Therapy
-discontinuation of vitamin supplements
-intravenous hydration
-administration of diuretics and bisphosphonates (clodronic acid)

Follow-up
The patient became alert, cooperative, oriented in time and space. No motor deficits or sensory disturbances. Postural tremor in upper limbs was noted. MMSE: 24/30.
-EEG: Presence of theta–delta wave trains over bilateral frontotemporal regions (Fig. 1b).

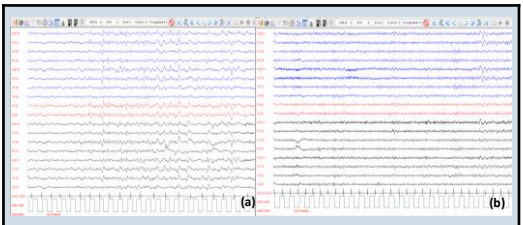

Figure 1) a)EEG during hypercalcemia b) EEG after reduction of serum calcium levels

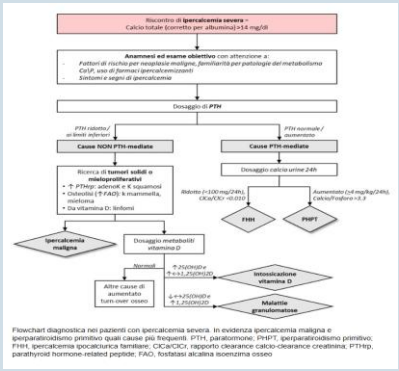

Figure 2) Flow Chart of Hypercalcemia Diagnosis

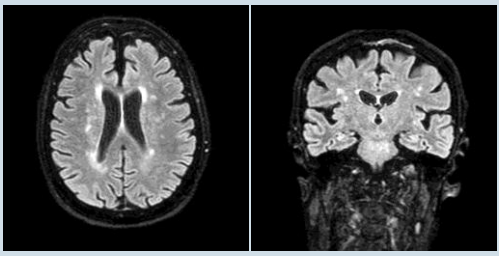

Figure 3) Brain MRI FLAIR sequences, axial and coronal sections

Conclusions
The misuse of vitamin supplements can cause severe clinical syndromes that mimic neurodegenerative disorders.
Early recognition and treatment of hypercalcemia, along with supplement withdrawal, are crucial for cognitive recovery and prevention of permanent damage.
Vitamin D intoxication should be considered among the causes of acute or subacute encephalopathy in older adults and careful medical history is essential for rapid diagnosis.

References: -Tebben PJ, Singh RJ, Kumar R. Vitamin D-Mediated Hypercalcemia: Mechanisms, Diagnosis, and Treatment. Endocr Rev. 2016 Oct;37(5):521-547. doi: 10.1210/er.2016-1070. Epub 2016 Sep 2. PMID: 27588937; PMCID: PMC5045493.
-Gupta AK, Jamwal V, Sakul, Malhotra P. Hypervitaminosis D and systemic manifestations: a comprehensive review. JIMSA (2014) 27:236–7.
-Rösche J, Sieveking C, Kampf C, Benecke R. Creutzfeldt-Jakob–Like Syndrome due to Hypercalcemic Encephalopathy. Clinical EEG and Neuroscience. 2014;46(4):327-330. doi:10.1177/1550059414529764