ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 06 | June - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

HYPOCALCEMIC TETANY SECONDARY TO HYPOVITAMINOSIS-D: A CASE REPORT

Pharmacy

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ABSTRACT

We report the case of a 30 years female patient who developed symptomatic hypocalcemic tetany secondary to hypovitaminosis-D, fallowing treatment for hypothyroidism with levothyroxine. Tetany is a state of hyper excitability of the central and peripheral nervous system that results from abnormally reduced concentrations of calcium, magnesium or alkalosis. Hypocalcaemia is caused by hypomagnesaemia, Hypovitaminosis-D, Hypoalbuminia, hypoparathyroidism, hypothyroidism or hyperventilation which includes alkalosis. Vitamin-D deficiency is the most common cause of hypocalcaemia due to less exposure to sunlight, inadequate dietary intake, malabsorption, anti-epileptic medications. Treatment includes calcium gluconate infusion and vitamin-D3 capsules. The aim of this case report is to alert physicians to the fact that Hypocalcaemic tetany can be initial clinical presentation of Hypovitaminosis-D, which require an immediate treatment and to ensure adequate vitamin-D supplementation by pregnant, lactating mothers, children and adolescents.

KEYWORDS

Hypocalcaemia, Tetany, Hypovitaminosis, Hypoalbuminia, Hypomagnesaemia

INTRODUCTION:

Hypocalcaemia is the most well known cause of tetany, which is defined as serum calcium concentration below 7.5 mg/dl. Initial laboratory testing involves measuring serum calcium, serum potassium, serum phosphates, serum magnesium, vitamin-D and parathyroid hormone levels (PTH) [1]. Medications includes bisphosphonates, aminoglycosides, diuretics, cisplatins, anti-epileptics, and proton pump inhibitors causes hypocalcaemia [2]. Tetany is caused by neuromuscular irritability from hypocalcaemia, hypomagnesaemia, or alkalosis, hypovitaminosis D. Clinically this is characterized by corpopedal spasm, laryngeal stridor, convulsions, depression, paraesthesia, Parkinsonism, dry and scaly skin, low serum levels of calcium, prolonged QT interval, soft tissue calcification, cognitive impairment, neuromuscular irritability and heart failure. Clinically Neuromuscular irritability can be demonstrated by positive Chvosteks and Trousseau signs, paraesthesias, tetany, seizures, muscle cramps. Chvostek sign is evoked by tapping the skin over the facial nerve anterior to the external auditory meatus. It is also present in 10% of normal peoples. Twitching of the facial muscles occurs in individuals with hypocalcaemia. Trousseau sign consists of corpopedal spasms after inflation of sphygmomanometer cuff above the patient systolic blood pressure foe 3-5 minutes. The laboratory tests that confirms the hypocalcaemia are serum calcium, phosphorous, magnesium, potassium, intact parathyroid hormone, creatinine, blood urea nitrogen, albumin, 25- hydroxyl vitamin-D and 25- dihydroxy vitamin-D levels [3,4,1].

We hereby present a case of 30 years old female patient with hypothyroidism who presented with Hypocalcaemic tetany due to vitamin-D deficiency (Hypovitaminosis-D).

Literature search was done by using Pub Med, case reports, search terminologies used includes hypocalcemic tetany, hypovitaminosis D.

CASE PRESENTATION:

A 30 years female patient presented with the complaints of corpopedal spasms of both upper and lower limbs two weeks of duration, multiple episodes a day, and tenderness on touch present. Patient did not have symptoms of polyuria, polydipsia. No history of recurrent urinary tract infections (UTI), regurgitation of food. There was no history of known addictions, self-medications, alternative medicines, fractures and renal stones. No family history of similar symptoms is reported. Stunted growth positive (wt-30 kgs, ht- 121cm). She was a known case of Hypothyroidism since 12 years on medication Thyroxine-100 mcg once a day along with PCOD and Hypovitaminosis-D (Osteomalacia) on medication vitamin D_3 supplementation orally. On presentation, she was conscious and cooperative. She was afebrile, with PR: 82 bpm, BP: 110/70 mm of Hg, RR: 20/min, CVS: S_1 S_2+, CNS: Pain full spasmodic contractions of LL+, plantar decreased, SPo_2: 95%, Trousseau sign was positive at 45 sec but Chcostek sign was negative.

Table 1: Initial blood chemistry studies

Test (Units)	Value	Normal range
Serum calcium (mg/dl)	7.2	8-10
Sr. potassium (mEq/L)	3.1	3.5-5.5
Phosphorus (mg/dl)	2.2	3.0-4.5
Sodium (mEq/L)	132	135-145
Magnesium (mg/dl)	2.1	1.7-2.2
Albumin (mg/dl)	3.8	3.5-4.8
Alk. Phosphatase (U/L)	428	20-70
SGOT (IU/L)	23	10-35
SGPT(IU/L)	20	10-40
Sr.creatinine (mg/dl)	0.68	0.5-1.4
Urea (mg/dl)	18	10-40
T. Bilirubin (mg/dl)	0.5	0.2-1.0
Con. Bilirubin (mg/dl)	0.1	0.1-0.3
Total proteins (g/dl)	6.9	6.0-8.0
T3 (ng/dl)	0.3	0.87-1.78
T4 (ng/ml)	11.4	54.8-142.8
TSH (mlU/L)	>48.6	0.5-5.0
Sr. Ck/Cpk (IU/L)	317	40-200

Hypocalcaemia was initially treated with 5 ml of calcium gluconate in 500 ml of normal saline is given intravenously 10 ml per hourly. Oral calcium supplementation was started at a dose of 500 mg of elemental calcium three times a day (1500 mg). Hypovitaminosis was treated with vitamin D3 (calcitriol) supplementation of dose 60000 IU once in a week. Hypokalaemia was treated with oral potassium chloride solution 10 ml in one glass of water three times a day. Thyroxin 100 mcg daily was prescribed to treat hypothyroidism and add tablet baclofen (antispasmodic) to treat muscular pains. Patent symptoms had improved partially, her serum calcium, potassium corrected to 8

mg/dl and 3.3 mmol/L. Stop calcium gluconate infusion on third day but again she develops corpopedal spasms at night then start calcium gluconate infusion.

Patient experience fever (99c) and diarrhoea three times at night due to potassium chloride oral solution so reduces the dose to 5 ml in one glass of water and add tablet Sporolac-DS orally, for fever add Azithromycin 650 mg and Paracetamol 500 mg and pantoprazole 40 mg once in a day, one hour before breakfast. she did not have any further episode of tetany. Calcium gluconate infusion was tapered and stopped, with continuous oral calcium (500 mg) with vitamin D_3 (60000 IU once a week) along with routine thyroid medications.

Discharge medications includes calcium carbonate 500 mg orally once in a day, vitamin D_3 60000 IU once in a week orally, levothyroxine sodium 100 mcg orally once in a day with empty stomach and advised with calcium rich products (milk and milk products) in her diet and fallow up with the endocrinology outpatient department after 2 weeks, maintain normal calcium levels in between 8 -9 mg/dl with regular monitoring of calcium and vitamin D_3 levels.

DISCUSSION:

In this report, we presented a case of hypocalcemic tetany secondary to hypovitaminosis D. Hypocalcaemia is defined as serum calcium concentration is below 7.5 mg/dl. Calcium is necessary for normal neuromuscular activities. Serum Calcium levels regulated by parathyroid hormone (PTH), vitamin-D and calcitonin. Hypocalcaemia may be due to vitamin-D deficiency or resistance, which is essential for the intestinal absorption of calcium. Sunlight is the main source for vitamin-D. Inadequate dietary vitamin-D or malabsortion, less exposure to sunlight, dark skin, high altitudes, older age, due to some medications like anti-epileptics are the most common causes for hypocalcaemia. Even though dietary intake of vitamin-D is sufficient, malabsorption of vitamin-D by the intestine, and due to rare form of vitamin-D resistance, due to renal 1α- hydroxyl deficiency or tissue vitamin-D receptor mutations, lead to increased risk of hip fractures [5, 6]. Vitamin D is important for calcium/phosphorous metabolism in the body and also acts as an immunomodulator. It plays a major role in the prevention of autoimmune diseases, cancers, and psychiatric conditions [7]. Vitamin D deficiency is the main risk factor for osteoporosis, fractures, falls and also associated with prostate, breast and colon cancers, type-2 DM and cardiovascular disorders mostly in elder patients [8].

Severe vitamin-D deficiency is associated with hypocalcaemia and causes tetany or seizures that requires immediate approach, including intravenous calcium infusion, vitamin D supplementation along with adequate exposure to the sunlight has been recommended for the patient [9].

Our patient was an elderly lady who presented with Hypocalcaemic tetany due to vitamin-D deficiency. The patient developed hypocalcemic tetany with hypophosphatemia, hypokalaemia, with normal serum creatinine and albumin fallowing treatment with hypothyroidism. We suspect that the etiology of hypocalcaemic tetany in our patient was clearly due to the deficiency of vitamin D.

CONCLUSION:

The overall goal of the therapy is to maintain serum calcium ranges to normal, maintain it and control the patient clinical manifestations.

This case report shows that hypovitaminosis-D consequent to hypocalcaemic tetany can present with acute symptoms and signs of hypocalcemia requiring hospital admission. We aim to highlight the aggressive approach to hypocalcemic tetany in patients with hypovitaminosis- D and to sensitize a rigorous surveillance in order to ensure adequate vitamin- D supplementation and we should also take more care in calcium metabolism and vitamin D status in pregnant, breastfeeding women, infants and adolescents. Prevention of vitamin-D deficiency is very important by taking adequate vitamin-D supplementation.

CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest to repot.

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