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Case Report

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Suicide attempt of an overt hypothyroid patient with levothyroxine: A case report

Ayse Sahin Tutak✉

Adıyaman University of Medical Faculty, Adıyaman, Turkey

ABSTRACT

Rationale: Levothyroxine is the most commonly used agent in thyroid hormone replacement therapy. Although there are many hypothyroid patients who use levothyroxine as a treatment, high level of thyroid stimulating hormone is found in a limited number of levothyroxine overdose cases worldwide.

Patient concern: A 34-year-old male patient taking 4.5 mg levothyroxine for suicide.

Diagnosis: Overdose of levothyroxine.

Interventions: The patient was admitted to the intensive care unit for follow-up treatment. Cardiac rithym and vital parameters of patient were closely monitored.

Outcomes: The patient discharged without any life-threatening complications.

Lessons: Patient with initial high thyroid stimulating hormone levels may not be in hyperthyroidism crisis by levothyroxine poisoning.

KEYWORDS: Levothyroxine intoxication; Serum thyroid stimulating hormone level; Clinical observation

1. Introduction

Levothyroxine intoxication for suicidal purposes is rare and often asymptomatic[1]. Intake of 3-4 mg of levothyroxine at one time is well tolerated[2]. The clinical presentation levothyroxine intoxication is more severe in adults than in children. Common symptoms include nervousness, insomnia, elevated body temperature, increased blood pressure and muscle weakness, while coma, convulsion, acute psychosis, thyroid storm, tachycardia, and arrhythmia may be rare in clinical symptoms. It is not predictable which severe symptoms will develop for different patients[3]. Since triiodothyronine (T3) is biologically essential active, symptoms are observed as tetraiodothyronine (T4) changes to T3. The conversion usually continues for 48-72 h. The average half-life of levothyroxine is 7 d[4]. Therefore, it is expected that the total T4, T3, and free T4 (FT4), T3 (FT3) levels of the patient receiving levothyroxine will increase, while the serum thyroid stimulating hormone (TSH) level will be suppressed, and the normal biochemical profile will be shown in the patient with levothyroxine intoxication after 7-day follow-up treatment[3].

For the cases with levothyroxine intoxication, gastric lavage and activated charcoal are recommended, rather than emetic agents. propranolol (10-40 mg 3 times daily), dexamethasone (4 mg daily *p.o.*), sodium ipodate, cholestyramine (4 g every 8 h *p.o.*), propylthiouracil (it can inhibit T4>T3 transcription), plasmapheresis (very rare), hemodialysis (possibly limited value) should be administrated. If a thyroid storm develops, the patients should be treated in the ICU[3].

In this study, we aimed to share our clinical and laboratory follow-up experience about an overt hypothyroid patient taking an overdose of levothyroxine for suicidal purposes.

2. Case report

Informed consent was obtained from the patient. A 34-year-old male patient was presented to the outpatient clinic with complaints of fatigue. When TSH of 48.60 (normal range: 0.34-5.60) uIU/MI, FT4 of 0.23 (normal range: 0.61-1.48) ng/dL, FT3 of 3.69 (normal range: 1.71-4.51) pg/mL, anti-thyroid peroxidase of 17.2

✉To whom correspondence may be addressed. E-mail: aysesahintutak@hotmail.com

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Table 1. Vital parameter changes.

Variables	Day 1	Day 2	Day 3	Day 4	Day 5	Day 8	Reference range
Pulse/min (lowest- highest)	41-48	45-55	50-68	54-72	50-68	65-70	
Thyroid stimulating hormone	48.60	13.61	4.69	2.46	1.30	1.178	0.34-5.60 uIU/mL
Free triiodothyronine	0.23	1.61	1.31	1.32	1.21	1.17	0.61-1.48 ng/dL
Free tetraiodothyronine	3.69	5.45	4.80	4.43	3.62	3.95	1.71-4.51 pg/mL
Blood pressure measurement	120/70	120/80	135/80	135/85	130/80	130/85	
Fever measurement	36.1	36.5	36.5	36.6	36.4	36.8	

(normal range: 0-0.561) IU/mL were detected in the examinations, levothyroxine was administrated at a dose of 100 mcg/d. The first day of treatment of the patient was presented to the emergency department 2 h after taking 4.5 mg levothyroxine for suicide. In the emergency department, the patient had a Glasgow coma score of 15/15, and pulse between 40-45 times/min. The ECG indicated that the patient had sinus rhythm, so he was hospitalized to the ICU. During the 7-day follow-up of the patient, TSH, FT3, FT4 were recorded daily. The first three-day record showed rapidly decreased TSH and elevated FT3 and FT4. After the treatment lasting for 7 d, the pulse rate returned to normal and TSH was suppressed. The patient was discharged on the 8th day without any life-threatening complications (Table 1).

3. Discussion

Although levothyroxine is the most commonly used agent in thyroid hormone replacement therapy, a limited number of levothyroxine overdose cases have been reported worldwide[5], and the severe toxicity cases are rare neither. The onset of symptoms may be delayed up to 6-11 d and does not correlate with plasma T4 levels. The severity of levothyroxine toxicity cannot be predicted by the dose of levothyroxine and the initial serum T4 levels but the symptoms as T4 changing to T3. The conversion of T4 to T3 usually takes 48-72 h[4,6]. Hemodialysis has little preventive effect on this transformation in the treatment because T3 and T4 are highly bound to protein[4]. In a study of levothyroxine poisoning, five patients were found to be in a coma, and one of the patients presented with stupor, all with thyrotoxicosis, two with left ventricular, and three with arrhythmia[7]. Another study also claimed no relationship between the severity of symptoms and the dose of levothyroxin[8].

Lower incidence of the overdose of levothyroxine found in adult groups and most of the cases resulted from suicidal purposes. It is known that hypothyroid patients are always accompanied by psychotic disorders[9], But the patient in our study declined the psychiatry treatment. Some studies showed not all levothyroxine intoxication cases had high basal TSH values, but our patient showed TSH of 48 uIU/MI that is quite high. The patient was in sinus bradycardia when he was admitted to the ICU. It is known that sinus bradycardia can be seen in hypothyroidism[10].

In conclusion, we think that the basal TSH value of our patient is clearly high and this is different from other cases. We think that the high basal TSH value is important whether the clinical symptoms developed or not.

Conflict of interest statement

The authors report no conflict of interest.

Authors' contribution

The writing of the article and all its contributions belong to the author A.S.T.

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