

Hyperthyroxinaemia with inappropriately elevated thyroid stimulating hormone levels: an unusual case

Rare situations wherein an elevated free thyroxine concentration are seen in association with a high TSH level include the thyroid receptor resistance syndrome¹ and TSH-producing pituitary tumours.² We report the case of a patient with primary hypothyroidism who presented following an acute overdose of thyroxine and had elevated serum free thyroxine concentrations coinciding with elevated TSH.

A 22-year-old woman presented with an acute ingestion of 150 to 200 tablets of thyroxine sodium (each 100 µg). Eight hours later, she had two episodes of diarrhoea and vomiting. Following this she complained of palpitations and giddiness. She gave prior history of hypothyroidism for a period of five years, treated irregularly. She had stopped medication altogether two months before the present incident. She gave a similar previous history of consumption of a large amount of thyroxine which was uneventful and had been treated effectively with beta-adrenergic blockade.

On arrival at hospital within two hours of ingestion of the medication, she was given a stomach wash out. She was placed on intravenous fluids and given nothing by mouth for a period of 48 hours. She weighed 99 kilograms and her height was 163 centimetres. Her heart rate was 96 per minute and regular at admission. She showed no other abnormality in vital signs, no cardiac arrhythmias, cardiac failure or peripheral signs of thyrotoxicosis over the next six days. She had facial puffiness, pedal oedema, thin eyebrows, dry skin and sluggishly relaxing ankle jerks. There was no thyroid swelling. Her complete blood examination and biochemical tests were essentially normal.

Serial documentation of the patient's thyroid hormones revealed the following pattern:-

Free Thyroxine Concentration (pmol/L) normal range (11-26)

Day 1 (admission): >75, day 2: >75, day 5: 60, day 6: >75

Thyroid Stimulating Hormone (mIU/L) normal range (0.35-3.0)

Day 1: 56, day 2: 13.9, day 5: 0.39, day 6: 0.26.

The patient was discharged thereafter and was apparently well. Further biochemical investigations were not done owing to domestic constraints.

Hyperthyroxinaemia with inappropriately elevated serum levels of TSH can be seen in a number of conditions ranging from raised serum binding proteins, familial dysalbuminaemia, anti-iodothyronine antibodies, heterophilic antibodies, anti-TSH antibodies, acute psychiatric disorders like mania and drug ingestion (e.g. amiodarone).³ Elevations of Free T₄, to the extent seen in this patient, are more often associated with either generalised receptor resistance to thyroid hormone or TSH producing pituitary tumours. TSH concentrations are usually normal or mildly elevated.²

Normal TSH values have been described in patients with elevated serum thyroxine levels on thyroxine therapy,⁴ but not markedly elevated levels of TSH. A review of the literature reveals several situations where patients have ingested thyroxine and triiodothyronine in supraphysiological quantities.^{5,6} Litovitz *et al.*⁵ have reported this in a paediatric population, where four out of 78 cases had symptoms of toxicity like fever, diarrhoea and tachycardia. Nystrom⁶ reported minor toxic symptoms in a young woman where serum thyroxine was elevated five-16 times the mean reference intervals. However, in all these cases, TSH was suppressed. Since our patient had fairly severe clinical hypothyroidism, the thyroxine dose took more than 48 hours to suppress TSH following ingestion, thereby leading to a window period wherein TSH and serum thyroxine were significantly elevated simultaneously. The absence of serious thyrotoxic symptoms could be due to the fact that in a severely hypothyroid patient, receptors for thyroxine are relatively unoccupied and hence even supranormal doses of thyroxine were well tolerated.

In conclusion, we believe that the coincident elevation of TSH and serum thyroxine in patients should bring to mind the possibility of acute ingestion of thyroxine in patients with hypothyroidism. ■

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