

Factitious Hyperthyroidism - A Diagnostic Challenge: Case Report

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Received: 30 June 2022; Accepted: 05 July 2022

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ABSTRACT

Thyrotoxicosis factitia is not very uncommon but most often underestimated in the developing world. There are considerable chance of it being underdiagnosed or missed in our routine clinical practice which can have deleterious effects on patients and leads to significant patient morbidity apart from putting burden on health-care resources. It's a condition which arises from the long term ingestion of thyroid hormones most often in those individuals who have psychological issues, for cosmetic reasons or accidental ingestion of high quantity of thyroid hormones, which has been especially seen in medical personnel who have easy access to thyroid hormones. Most of the times the patients deny the fact that they are taking thyroid hormones despite being aware of it. Hereby our team report a case of thyrotoxicosis factitia masquerading as refractory thyrotoxicosis in a young female patient diagnosed to have uncontrolled hyperthyroidism for more than five years on high dose methimazole despite the fact that her thyroid radioactive iodine uptake repeated twice showed very low uptake and was in favor of thyroiditis. A high index of clinical suspicion led to a detailed history and review of her file which eventually led us to the diagnosis of factitial hyperthyroidism.

Keywords: Exogenous Thyroxine, Factitia, Hyperthyroidism, Thyrotoxicosis, TSH

Introduction

Thyrotoxicosis factitia is most often caused by excessive ingestion of thyroid hormones which could be intentional or unintentional (for eg: in dietary supplements). Possible causes of hyperthyroidism are Graves disease, toxic thyroid adenoma, multinodular goiter, some forms of subacute or chronic thyroiditis and rare pituitary thyroid-stimulating hormone (TSH) producing tumors, other causes can be extra thyroid in origin, may occur in ovaric strumma and thyrotoxicosis factitia, due to intentional or accidental excessive intake of pharmaceutical thyroid hormone preparations or thyroxin-contaminated ground beef (Meurisse *et al.*, 2000).

The possibility of thyrotoxicosis factitia should be considered in patients who have features of

hyperthyroidism and psychiatric disturbance without any evidence of goitre or proptosis and the results of thyroid function are conflicting (Harvey, 1973).

Our case report draws highlights one such incident wherein there was frank thyrotoxicosis due to long time ingestion of levothyroxine as an ingredient in weight loss medication (Harvey, 1973). Our patient attended to outpatient clinic during the last five year period with clinical features suggestive of hyperthyroidism, and a combination of thyroid function tests indicating that she was taking exogenous thyroxine.

Case Report

A 43-year-old female patient working as a clerk office referred from gynecology department to control her hyperthyroidism as she was scheduled for hysterectomy due to large multiple uterine fibroids that cause heavy menstruation, she reported to have type 2 diabetes mellitus over the last six years and has been on metformin 1 gm twice daily and liraglutide 1.8 mg once daily, she was also diagnosed to have hyperthyroidism over the last five years and was on carbimazole 60 mg daily. On clinical examination she was thin built, under nourished, slender and emaciated with a BMI of 17. There was no obvious exophthalmos and palpable thyroid nodule or goiter, while other systemic examination was unremarkable. After reviewing her file we found that she underwent multiple plastic surgeries of her breast and abdomen (mammoplasty, abdominoplasty and liposuction), and she has also undergone gastric balloon followed by sleeve gastrectomy to reduce her weight as she was obese six years back and had a BMI of 31. We have found that her TSH was suppressed all the times over the last five years although she claimed taking her carbimazole regularly, Thyroid radioactive iodine uptake (RAIU) scan done twice showed low uptake which concluded with a diagnosis of thyroiditis, in addition our patients background diabetes history was not consistent with her investigations, as her serial glucose and Hba1c laboratory results all were within normal limits even before starting the anti-diabetic medications. we have also noticed that some vital imaging and tests were missing like thyroid ultrasound, serum thyroglobulin and thyroid receptor antibody. After thorough investigations (Table 1) and imaging a diagnosis of thyrotoxicosis factitia was considered, on further detailed questioning the patient eventually confessed that she is taking levothyroxine containing dietary supplement along with liraglutide since long time to reduce weight as she was not happy to be overweight and was eager to lose more.

Ultrasound Thyroid: was normal and no significant pathology. Follow up after two months from stopping her dietary supplement, she gained 10 kg and repeated blood investigation showed significant improvement (Table 2).

Table 1: Initial laboratory results.

Labs	Results	Normal range
WBC	6700	4000-10000
HB %	11.4 gm/dl	12.0-15.0 gm/dl
Platelets	362,000	150,000-400,000
Urea	6.2 mmol/L	2.5-7.8 mmol/L
Creatinine	72 umol/L	44-80 umol/L
Sodium	138 mmol/L	133-146 mmol/L
Potassium	2.5 mmol/l	3.5-5.3 mmol/L
Magnesium	0.76 mmol/l	0.7-1.0 mmol/L
Total Protein	71 gm/L	60-80 gm/L
Albumin	33 gm/L	35-50 gm/L
ALT	9 U/L	0.0-33 U/L
AST	12 U/L	0.0-32 U/L
TSH	<0.01 mIU/l	0.3-4.2 mIU/l
FT4	35.5 pmol/l	11.6-21 pmol/l
FT3	18.6 pmol/l	3.7-6.4 pmol/l
TPO Antibodies	Negative	
TRAB Antibodies	Negative	
Thyroglobulin	1.45 ng/ml	1.50 – 36 ng/ml

Table 2: Two months follow up results after stopping her herbal weight losing medicine that contain thyroxine.

Labs	Results	Normal Range
TSH	0.2 mIU/l	0.3-4.2 mIU/l
FT3	6.0 pmol/l	3.7-6.4 pmol/l
FT4	14.0 pmol/l	11.6-21 pmol/l
K+	3.8 mmol/L	3.5-5.3 mmol/L

Discussion

Thyrotoxicosis factitia is defined as hyperthyroidism due to excessive intake of exogenous thyroxine, which is either intentional for therapeutic TSH suppression in cases of thyroid malignancy specially after post thyroidectomy in papillary and follicular thyroid carcinoma and rarely in some cases to treat obesity (Cohen *et al.*, 1989), or unintentional as an ingredient and contamination of supplements like weight reducing supplements which claimed to be herbal but has an appreciable amount of both T3 and T4 content or animal thyroid tissue (Kang *et al.*, 2013).

It is also seen in individuals with a background of underlying psychiatric disease, for cosmetic reasons or accidental ingestion of high quantity of thyroid hormones, most often seen in paramedical personnel who have access to thyroid hormone or in patients for whom thyroid hormone medication has been prescribed in the past (Williams text book of endocrinology, 2020).

The diagnosis of factitial hyperthyroidism is certain when there are typical thyrotoxic manifestations like abdominal cramps, diarrhea, weight loss, heat intolerance, with imaging suggestive of thyroid atrophy and low tracer uptake or hypo functioning thyroid gland with RAIU together in the absence of preexisting disease of the thyroid. Infiltrative ophthalmopathy is never a feature. Serum TSH levels are suppressed and serum T4 is high in most of the cases unless the patient is taking T3, in such situation the T4 might be subnormal. Serum T3 concentrations is high in either case. The presence of low serum thyroglobulin (Tg) is a clear indication that the thyrotoxicosis results from exogenous hormone and not from thyroid hyperfunction unlike in true thyrotoxicosis we find elevated Tg levels.

Other clinical complications commonly include skeleton system (osteoporosis) and the cardiovascular system (tachyarrhythmias mainly atrial fibrillation) which are the major target tissues adversely affected by chronic use of exogenous thyroxine, however, abnormalities in other systems have been reported.

A patient taking excessive amounts of levothyroxine and concealing this from her doctors can pose a difficult diagnostic problem.

In terms of published literature, Braustein, *et al.* reported five cases of unintentional thyrotoxicosis factitia where all of them ingested levothyroxine pills as they believed that this hormone is non-toxic substance that would help them to lose weight (Braunstein *et al.*, 1986).

Hamburger Thyrotoxicosis was a rare form of exogenous thyrotoxicosis which resulted when the grounded beef contained thyroid tissue. This condition disappeared when there was a change in slaughtering practices. The possibility of such a condition needs to be considered in the event of an epidemic exogenous thyrotoxicosis (Hedberg *et al.*, 1987).

Generally, thyrotoxicosis factitia entity is caused due to secret ingestion of excessive amount of thyroxine by neuropsychiatric patients (Harvey, 1973). The diagnosis of thyrotoxicosis factitia depends on careful history to determine the use of exogenous thyroxine or dietary supplements, a detailed examination to exclude goiter and exophthalmos, thyroid image with normal ultra-sound and low thyroid iodine uptake and laboratory findings with suppressed TSH, high FT4 and FT3, with negative thyroid receptor antibody and low thyroglobulin (Mariotti *et al.*, 1982).

In our case since the patient was referred for control of hyperthyroidism from gynecology unit as patient was supposed to go for elective resection of multiple uterine fibroids. With detailed history, careful reviewing of patient previous files and labs along with focused clinical examination, there was a high index of clinical suspicion about the exogenous use of levothyroxine and there were missing

investigations like ultrasound thyroid and thyroglobulin levels. Since the patient was diagnosed as hyperthyroidism five years ago with suppressed TSH on carbimazole maximum dose at present and still her TSH was suppressed along with missing investigations. Given the patients inclination towards cosmetic looks, leading question were put to the patient about the use of any weight reducing medications, and to our surprise she was taking herbal medications for weight loss with levothyroxine as one of its content. We report this case as it was misdiagnosed as thyrotoxicosis for five years and initiated on carbimazole. This case highlights the importance of detailed history taking & medication reconciliation which is vital in such a diagnostic dilemma.

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