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Case Report

Hyperthyroidism With Parathyroid Adenoma

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Abstract

Hypercalcemia may occur in hyperthyroid patients due to overactive bone absorption. The coexistence of hyperthyroidism and hyperparathyroidism is highly unusual. We herein report a 37-year-old woman who suffered from urolithiasis and hyperthyroidism. Further inquiry revealed that the patient also had parathyroid adenoma. She was successfully treated for euthyroidism with methimazole followed by subtotal thyroidectomy and parathyroidectomy for the hyperparathyroidism. We also discuss the possible conditions other than hyperthyroidism that may result in hypercalcemia. (*Tzu Chi Med J* 2010;22(4):241–243)

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1. Introduction

Hypercalcemia is common in active hyperthyroidism patients due to increased absorption of bone or altered catecholamine metabolism (1). It returns to normocalcemia if thyroid function improves. However, it is hard to diagnose when there is concomitant hyperthyroidism and primary hyperparathyroidism because the vague symptoms of hyperthyroidism often mask the symptoms of hyperparathyroidism. This case report calls attention to the fact that hypercalcemia in hyperthyroid patients may be due to coexistent diseases other than hypercalcemia. Five clinical clues can help identify the possibility of conditions other than hyperthyroidism that may result in hypercalcemia.

2. Case report

A 37-year-old woman with a history of right renal stone received lithotripsy 1 year prior to presenting herself to a nephrologist due to bilateral flank pain in April 2009. On questioning the patient, it was discovered that she had had heat intolerance, irritability, insomnia and epigastric pain. On physical examination, she was 167 cm in height, 67.5 kg in weight, with a pulse rate of 112 bpm and a blood pressure of 112/74 mmHg. She had bilateral mild exophthalmos, lid retraction and grade 1 diffuse goiter; a fingertip sized nodule was detected over the left lower lobe. The remainder of the physical examination was normal.

Table — Results of laboratory evaluation

	Reference values	Results
Blood		
TSH (μIU/mL)	0.35–5.5	0.004
Free T4 (ng/dL)	0.89–1.8	2.66
T3 (ng/dL)	60–181	206.78
TSH-receptor ab (%)	<15	36.9
Anti-TPO ab (IU/mL)	0–34	592
Anti-thyroglobulin ab (IU/mL)	0–60	162.3
Calcium (mmol/L)	2.20–2.55	2.96
Phosphate (mg/dL)	2.7–4.5	2.6
Intact PTH (pg/mL)	14–72	203.5
Magnesium (mg/dL)	1.7–2.55	2.32
GPT (IU/L)	3–31	29
Plasma glucose (mg/dL)	60–100	82
24-hour urine		
Epinephrine (μg)	<22.4	<3
Norepinephrine (μg)	11.1–85.5	17.2
Dopamine (μg)	50–450	126.8

TSH=thyroid-stimulating hormone; ab=antibody; TPO=thyroid peroxidase; PTH=parathyroid hormone; GPT=glutamic-pyruvate transaminase.

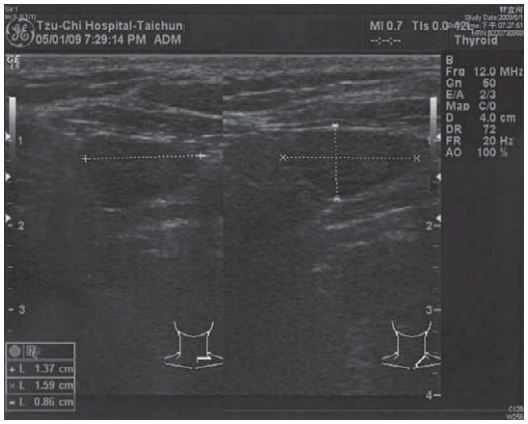

Fig. 1 — An extrathyroid hypoechoic nodule detected over the left lower neck.

Laboratory investigations (Table) revealed hypercalcemia, hypophosphatemia, and a high intact parathyroid hormone level. Thyroid function was tested and disclosed very low thyroid-stimulating hormone level, and high free T4 and T3 levels. Normal findings were found for Na (140 mmol/L), K (3.8 mmol/L) and Mg (2.32 mg/dL). Liver and renal functions were also normal.

Thyroid ultrasonography showed a diffuse goiter that was consistent with Graves' disease. However, there was a 1.59×1.37×0.86 cm hypoechoic mass over the left lower pole (Fig. 1). A technetium-99m methoxyisobutylisonitrile (^{99m}Tc-MIBI) scan disclosed significant radiotracer uptake by this nodule, indicating the likelihood of parathyroid tissue (Fig. 2).

The patient was subsequently treated with 20 mg methimazole and 1600 mg clodronate daily to control

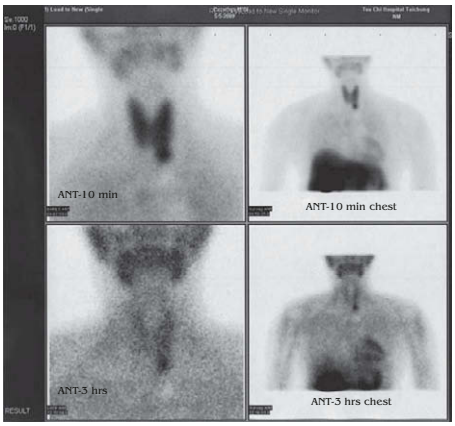

Fig. 2 — Left lower parathyroid lesion detected by ^{99m}Tc-MIBI scan.

her hyperthyroidism and hypercalcemia over 3 months. At this point, the patient underwent bilateral subtotal thyroidectomy and removal of the parathyroid adenoma, which weighed 1.4 g. The pathological findings were diffuse hyperplasia of thyroid gland and adenomatous features of parathyroid tissue. Postoperatively, she had transient and mild hypocalcemia as expected. By October 2009, she was euthyroid and normocalcemic, both clinically and biochemically, in the absence of any medication.

3. Discussion

It is well known that hyperthyroidism may result in hypercalcemia, although typically this is mild; this is due to enhanced bone resorption or altered catecholamine metabolism. The prevalence of hypercalcemia in hyperthyroid patients is estimated to be between 17% and 22% (2–4). We have a tendency to assume that slight hypercalcemia in patients with hyperthyroidism is actually related to the presence of excessive thyroid hormone. In this patient, the elevation of blood calcium could have been easily overlooked or assumed to be secondary to hyperthyroidism, had there not been a past history of renal stone. Certainly, a history of urolithiasis is useful information when there is suspicion of hyperparathyroidism. Nevertheless, it is still hard to determine whether hyperthyroidism is concomitant with primary hyperparathyroidism based on clinical manifestations when it is at an early stage. Direct measurement of parathyroid hormone level is the most useful, but can be a costly laboratory parameter in the differential diagnosis of hypercalcemia (5). In the review by Lam et al (6), thyrotoxicosis with typical symptoms appeared first in 53% of patients (7). In contrast to the increased appetite and frequent defecation typically encountered in uncomplicated hyperthyroid patients, the presence of constipation,

anorexia, and polyuria may suggest the coexistence of significant hypercalcemia in hyperthyroid patients. It should also be considered in patients with a diastolic blood pressure greater than 95 mmHg, which is secondary to hypercalcemia [2]. Therefore, hypophosphatemia is probably another useful clue when suspecting the possibility of hyperparathyroidism in conjunction with hyperthyroidism [8]. Extreme hypophosphatemia is present in 60% of patients with coexistent hyperthyroidism and parathyroid adenoma [9]. If the patient's serum calcium level is more than 3.75 mmol/L (15 mg/dL) [10], then the hyperparathyroid hormone level should be checked, and high levels of this hormone are most frequently caused by parathyroid adenoma. In patients with hyperthyroidism and asymptomatic hypercalcemia, after 6 weeks of antithyroid drug treatment, 13.5% were found to have hypercalcemia coexistent with the primary hyperparathyroidism [11]. Last but not least, persistent hypercalcemia on restoration of euthyroidism is undoubtedly suggestive evidence of the presence of a non-thyroid-related cause of the hypercalcemia.

Since hyperthyroid-related hypercalcemia is usually mild, it was unlikely to be the cause of the above hypercalcemia symptoms. We would like to remind clinicians that it is imperative to consider that there may be other coexistent underlying causes of hypercalcemia other than hyperthyroidism-related hypercalcemia, as was found in our case. Five potential clinical clues that should lead the clinician to suspect the possibility of a cause other than hyperthyroidism when a hyperthyroid patient has hypercalcemia are:

1. symptoms or a history of urolithiasis with or without profound catabolic changes to the bones;
2. presence of decreased appetite or anorexia, constipation, loss of initiative and a diastolic blood pressure greater than 95 mmHg in hyperthyroid patients;
3. serum calcium greater than 3.75 mmol/L;
4. extreme hypophosphatemia;
5. persistent hypercalcemia even when euthyroidism is restored.

Hypercalcemia is common in patients with active hyperthyroidism. We usually assume that mild hypercalcemia in hyperthyroidism will invariably normalize upon restoration of euthyroidism. However, in some hyperthyroid patients, hypercalcemia may be due to a cause other than metabolic changes due to excessive thyroid hormone. We have provided clinical and laboratory clues that will help the clinician to be suspicious of the possibility of coexistent conditions (most frequently hyperparathyroidism) that may contribute to hypercalcemia in patients with an overactive thyroid. An analysis of patient's presenting symptoms, their signs, the degree of hypercalcemia, an assessment of the serum phosphate level and an analysis of the course of the hypercalcemia should lead to a correct diagnosis.

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