

Parathyroid adenoma with concurrent toxic thyroid adenoma: a rare combination

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Background: Hypercalcemia in association with hyperthyroidism is a well-recognized phenomenon. Primary hyperparathyroidism due to parathyroid adenoma in association with thyroid adenoma is extremely rare. These cases can present a diagnostic and therapeutic challenge to the treating physician as the patient may present with symptoms of either disease.

Case summary: A 47-year-old female patient presented with non-specific complaints including fatigue and muscle cramps. Diagnostic workup revealed significantly elevated plasma calcium levels in association with hyperthyroidism. There was a considerable delay in measuring the parathyroid hormone levels which were significantly elevated. Nuclear medicine studies revealed features consistent with a parathyroid adenoma and a concurrent thyroid adenoma. The patient was rendered euthyroid and subsequently taken to theatre for a thyroid lobectomy and removal of the associated parathyroid adenoma. One year later the patient remains normocalcemic, euthyroid and clinically well.

Conclusion: Toxic thyroid adenoma with concurrent parathyroid adenoma and primary hyperparathyroidism is rare. The possibility of primary hyperparathyroidism should be considered where hypercalcemia persists on correcting the hyperthyroidism. Removal of both adenomas will result in cure of the patient.

Key words: Primary hyperparathyroidism; hyperthyroidism; toxic thyroid adenoma; parathyroid adenoma.

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Introduction

Hypercalcemia plus hyperthyroidism is documented in up to 22% of patients with hyperthyroidism.¹ The predominant cause of hypercalcemia in these patients is related to the activation of osteoclasts and subsequent bone reabsorption. If the calcium level does not correct on rendering the patient euthyroid then the possibility of primary hyperparathyroidism must be considered and the parathyroid hormone level checked. If the treating clinician does not bear this in mind then there may be a long delay in appropriate diagnosis and management. A hot thyroid nodule in association with primary hyperparathyroidism is a rare phenomenon. In the literature thus far, thirteen cases of primary hyperparathyroidism with coexistent hyperthyroidism have been described.²⁻⁷ This will be the fourteenth case in the world literature and the first case in the South African literature. This case report will provide important information regarding how these cases present.

The challenge faced with patients presenting with hyperparathyroidism and hyperthyroidism is that the patients may not show classical features of either disease. In the

reviewed literature it seems that the hyperthyroid symptoms dominate (diarrhea, weight loss and tachycardia) as these symptoms tend to be more acute.^{4,5} In a number of cases, however, the patients presented with hypercalcemic symptoms and on subsequent evaluation were found to have associated thyroid nodules. In the case series by Klemm et al. only two of the eight cases demonstrated biochemical hyperthyroidism. The remainder had radioisotope imaging which confirmed hot thyroid nodules.⁷ The previous cases in the literature and this case demonstrate that if a patient presents with hypercalcemia and hyperthyroidism, if, on correcting the thyroid function, the calcium level does not normalise it is important to check the parathyroid hormone level. If primary hyperparathyroidism is suspected, the patient should be worked up further by neck ultrasound plus MIBI scan, if further imaging is necessary.⁸ If thyroid nodules are detected on ultrasound scan, the patient should undergo thyroid scintiscan to establish the presence of hot nodules. If a patient has a parathyroid adenoma and a hot nodule, the therapy of choice is combined resection of the parathyroid adenoma plus resection of the nodule.⁷ This will cure the patient of both pathologies.

Patient Information

A 47-year-old female presented to the medical outpatient department with a 2-year history of fatigue and generalised cramps. Her medical history was notable for hypertension treated with hydrochlorothiazide 12.5 mg orally daily, Enalapril 20 mg orally daily and Amlodipine 10 mg orally daily. She also received Aspirin 150 mg orally daily. The patient had no known allergies. Systemic enquiry revealed no history of psychiatric illness, changes in weight or bowel habits. The past surgical history was notable for a caesarian section.

On physical examination, the patient looked well and was in no pain, distress or discomfort. The vital signs were within normal range. There was no tremor or hoarseness. A firm, smooth mass was noted on the right side of the neck. The mass measured approximately 1x1cm and moved on swallowing. It was non-tender and had no bruits on auscultation. The cardiovascular, respiratory and abdominal examinations were non-contributory.

The laboratory investigations revealed hypercalcemia with a corrected calcium of 3.9 mmol/l (2.15–2.50) and hyperthyroidism (Thyroid-stimulating hormone (TSH) 0.23 IU/ml (0.35–4.94), Thyroxine (T4) 20 pmol/l (9–19), Tri-iodothyronine (T3) 6 pmol/l (2.6–5.7). The renal function was normal. The patient was initially managed by the physicians at the medical outpatient department. She was rendered euthyroid with medical therapy (carbimazole). Radioisotope ablation was not used. Subsequent calcium levels remained elevated. To our knowledge, the hypercalcemia was not treated by the attending clinicians. She was referred to the endocrine unit 6 months later where the possibility of primary hyperparathyroidism was considered due to persistently elevated calcium in spite of the patient being euthyroid. The parathyroid hormone level was measured and was found to be markedly elevated at 10.4 pmol/l (1.6–7.2). Further diagnostic testing was performed.

A subsequent ultrasound examination of the neck revealed a right thyroid lobe nodule measuring 0.5 x 0.8 cm (Figure 1). Dual phase tomographic imaging was performed following the IV injection of 740 MBq 99m Tc SestaMibi (Figure 2). The top row of images represents slices from early images (20 minutes post-injection) which reveal a small focal area of increased uptake in the region marked by the red arrow. Normal bio-distribution is noted in the salivary glands, thyroid gland and skeletal muscles. The bottom row depicts delayed images (2 hours post-injection), demonstrating retention of tracer (red arrow) in the above mentioned focus with “wash-out” from the thyroid gland, which represents a hyper-functioning/ hyper-metabolic parathyroid adenoma.

Following discussion at the multidisciplinary team meeting, the patient was scheduled for a right thyroid lobectomy and concurrent removal of the right inferior parathyroid gland. Intraoperative parathyroid hormone assay is not available at our hospital, therefore frozen section to confirm removal of parathyroid tissue was requested.

Postoperatively the patient was transferred to the intensive

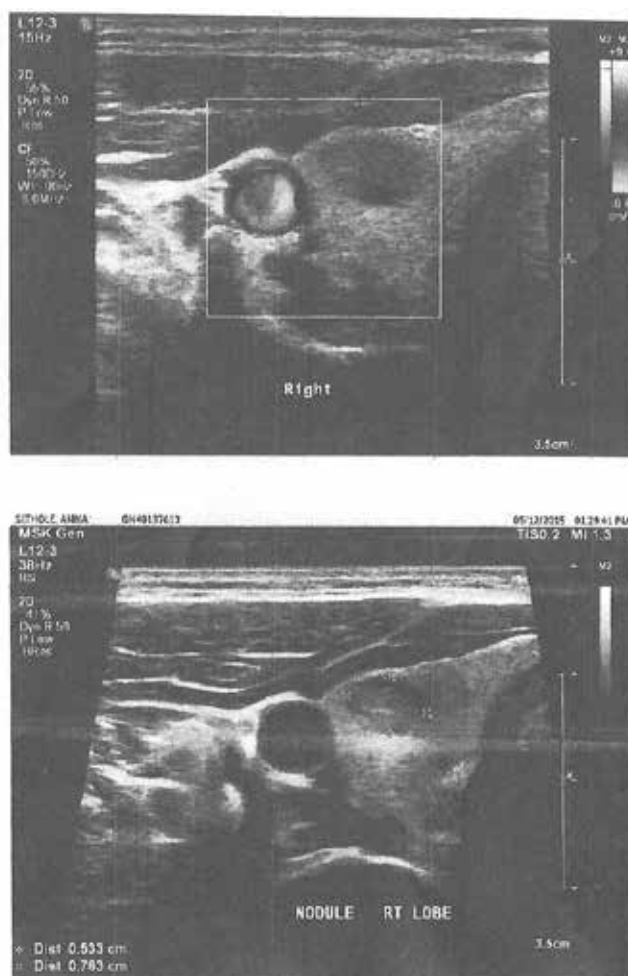


Figure 1. Ultrasound - thyroid

care unit for monitoring. The postoperative ionized calcium levels were low (1.0 mmol/l), requiring intravenous calcium replacement in the intensive care unit. Oral calcium carbonate was concurrently commenced at a dose 1250 mg orally four times a day. On discharge on day 4, the corrected calcium was 2.34 mmol/l.

The patient was not discharged on oral calcium but was advised on the symptoms of hypocalcaemia. Pathological assessment of the specimens revealed a hyperplastic nodule in the right thyroid lobe (Figures 3 and 4) and a parathyroid adenoma (Figures 5 and 6).

One year following surgery the patient is asymptomatic and biochemically euthyroid. Recent laboratory investigations revealed normal calcium and parathyroid hormone levels.

Discussion

Due to the vague nature of the complaints in this case, the patient was initially managed at the medical outpatients department. It took almost two years before the diagnosis of primary hyperparathyroidism was made. This is one important point we would like to highlight. In general, the clinician must have a high index of suspicion in making the diagnosis

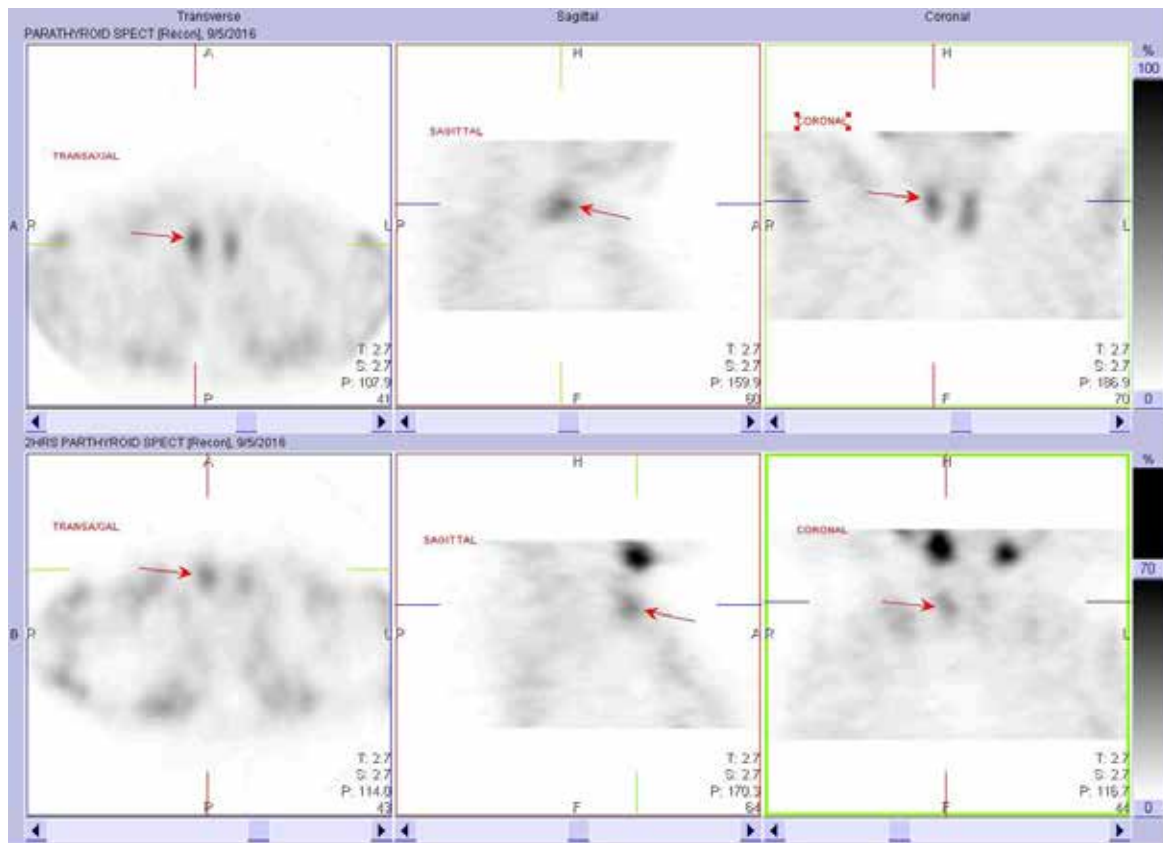


Figure 2. Parathyroid SPECT

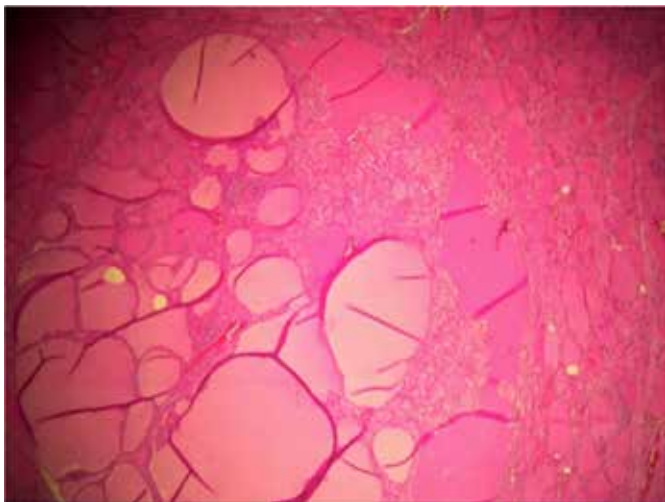


Figure 3. Hyperplastic nodule in thyroid

of primary hyperparathyroidism, and calcium levels with parathyroid hormone should be checked. Once the diagnosis is suspected the workup is relatively straightforward. The coexistence of the hyperparathyroidism and hyperthyroidism is not common. The majority of the cases in the literature involved concurrent hot thyroid nodule on scintigraphy with primary hyperparathyroidism. The TSH was only suppressed in two cases.⁷ In this rare entity, the symptoms of either hyperthyroidism or hyperparathyroidism dominate. In the



Figure 4. Hyperplastic nodule thyroid High Power

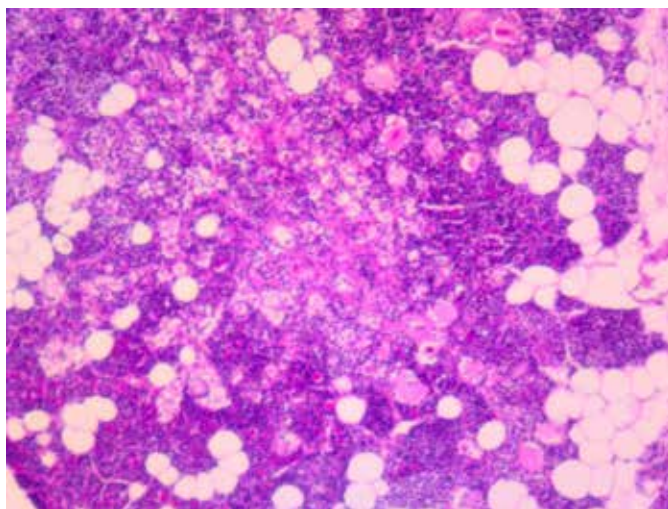


Figure 5. Parathyroid adenoma showing oxyphil cells

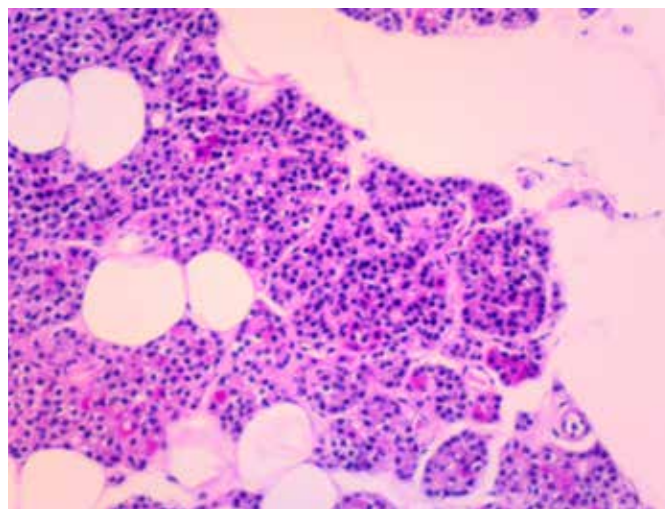


Figure 6. Parathyroid gland low power showing stromal fat

cases where TSH was suppressed and T4 elevated the patients would present with the more acute hyperthyroid complaints such as diarrhea, weight loss and hyperkinesia. In our case the hypercalcemic symptoms dominated, but were not initially investigated. The parathyroid lesions can usually be located on ultrasound; alternatively, scintigraphy is helpful.

Hot nodules are often identified in euthyroid goiters in areas of iodine insufficiency. These nodules may become autonomous over time therefore the recommendation is resection of both the thyroid nodule and the parathyroid adenoma.⁹

In terms of the operative management, our approach is in line with international standards with removal of both adenomas.⁷ Intraoperative parathyroid hormone assay with subsequent reduction in parathyroid hormone levels would have been invaluable in concluding that the parathyroid adenoma had been removed.

The most common histology found in the literature was thyroid adenoma plus parathyroid adenoma. This is in keeping with the findings in our case.

Conclusion

It is important to have a high index of suspicion to diagnose primary hyperparathyroidism and avoid delaying management of the patients. Hypercalcemia after induction of euthyroidism is an indication to measure parathyroid hormone levels. Co-existence of parathyroid and thyroid adenoma is rare but does occur. The patient may present with symptoms of either disease. The co-existence of a parathyroid adenoma and toxic adenoma should be managed by combined resection of both adenomas. This approach results in durable relief of symptoms and effectively cures the patient.

Informed Consent

Informed consent was obtained from the patient for the use of clinical details in our case report.

Additional Information

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Competing Interest:

None declared

REFERENCES

1. Lam HC, Ho LT, Tang KT, Ching KN. Concurrent hyperthyroidism and hyperparathyroidism: influence of hyperthyroidism on serum magnesium, free calcium and parathyroid hormone. *J Formos Med Assoc.* 1989; 88: 601-5.
2. Piccione W, Selenkow HA, Cady B, Management problems in coexisting parathyroid crisis and florid thyrotoxicosis. *Surgery.* 1984;96:1109-14.
3. Arem R, Lim-Abraham MA, Malette LE. Concomitant Graves Disease and Primary Hyperparathyroidism: Influence of hyperthyroidism on serum calcium and parathyroid hormone. *Am J Med.* 1986;80:693-8.
4. Lam HC, Ho LT, Tang KT, Ching KN. Primary hyperparathyroidism and coexisting hyperthyroidism – review of the literature. *Chin Med J (Taipei).* 1989;43:105-12.
5. Jap TS, Kwok CF, Ho LT, Won JGS, Ho Dm. Coexisting hyperthyroidism and hyperparathyroidism: two case reports. *Chin Med J (Taipei).* 1990;46:177-80.
6. Tourarkissan B, Sloan DA, Schwartz RW. Coexisting hyperthyroidism and primary hyperparathyroidism. *Surgery.* 1993;113:716-8.
7. Klemm T, Lamesch P, Paschke R. Coincidence of hot thyroid nodules and primary hyperparathyroidism. *Exp Clinl Endocrinol Diabetes.* 1999;107:295-8.
8. Tublin ME, Pryma DA, Yim JH, et al. Localization of parathyroid adenomas by sonography and technetium tc 99m sestamibi single-photon emission computed tomography before minimally invasive parathyroidectomy: are both studies really needed? *J Ultrasound Med* 2009;28(2):183-90.
9. Sandrock D, Obricht T, Emrich D, et al. Long term follow up in patients with autonomous adenoma. *Acta Endocrinol* 128;51-55,199.