

# Concurrent papillary thyroid cancer and parathyroid adenoma as a rare condition: a case report

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[Received 27 I 2012; Accepted 10 II 2012]

## Abstract

Although the pathological relationship between parathyroid and thyroid diseases is common, an association between parathyroid adenoma and thyroid cancer is rare. Concomitant thyroid cancer in patients with primary hyperparathyroidism (pHPT) has been reported at varying frequencies.

WE present here a 23-year-old man who had papillary thyroid carcinoma in the right thyroid lobe and a parathyroid adenoma in the left thyroid lobe, which were confirmed surgically.

**KEY words:** primary hyperparathyroidism, papillary thyroid carcinoma, thyroid disease

Nuclear Med Rev 2012; 15, 2: 153–155

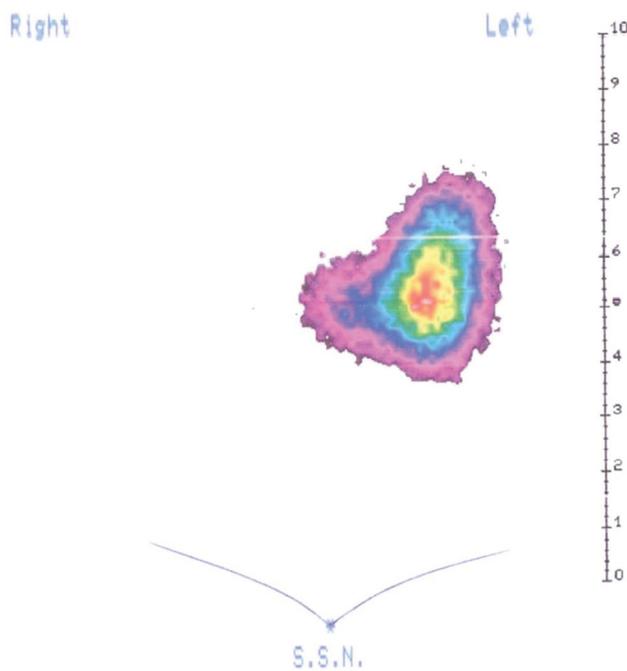
## Introduction

The correlation between concurrent thyroid and parathyroid disease was initially described in 1947 [1]. The existence of parathyroid adenoma resulting in primary hyperparathyroidism (pHPT) and concomitant thyroid papillary cancer is rare [2]. Probably this can be partially explained by different embryologic source of thyroid follicular cells and parathyroid cells. Conversely, the co-existence of parathyroid adenoma and medullary thyroid cancer (MTC) deriving from parafollicular cells is more common due to similar origin of both cell types. We present here a 23-year-old man who had papillary thyroid carcinoma in the right thyroid lobe and a parathyroid adenoma in the left thyroid lobe, which were confirmed surgically.

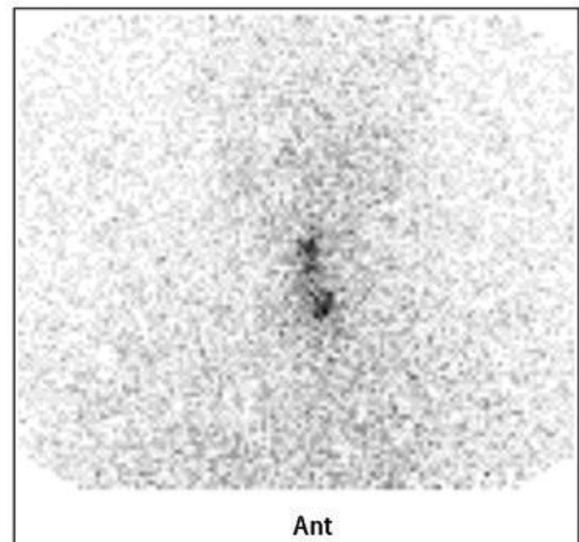
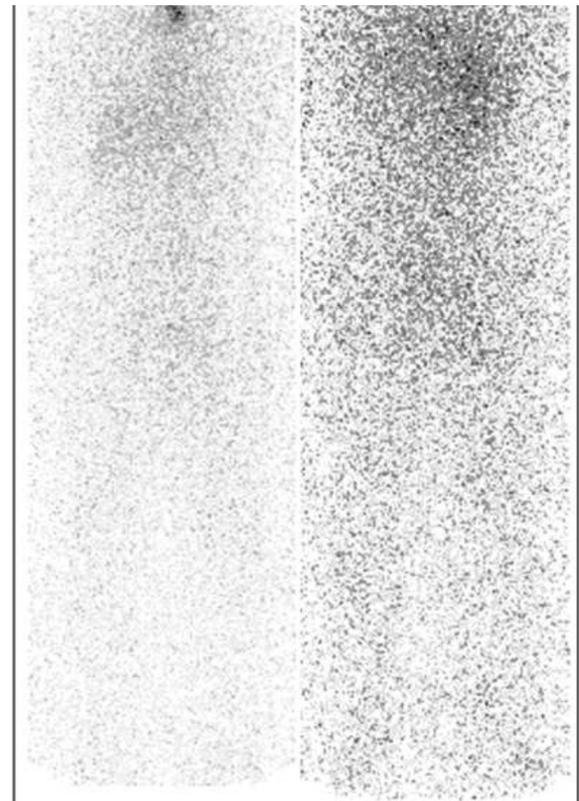
## Case Report

A 23-year-old man with a recent history of papillary carcinoma of the thyroid in the right lobe presented to our nuclear medicine department for 99mTc thyroid scan. Microscopic finding showed papillary thyroid carcinoma (mixed papillary and follicular variant) in the surgical right lobe. The patient's past medical history was unremarkable. His 99mTc thyroid scan showed normal left lobe and isthmus in terms of shape, size, and uptake (Figure 1). In post-surgical thyroid laboratory findings, he had elevated serum calcium (10.9 mg/dl; normal range: 9–10.5 mg/dl) and low serum phosphate (2.3 mg/dl; normal range: 2.5–4.5 mg/dl). Serum calcium and phosphate were rechecked, and hypercalcemia and hypophosphatemia were confirmed along with an elevated parathyroid hormone (PTH: 247 pg/ml; normal range: 15–65 g/ml), indicating primary hyperparathyroidism. Also, the parathyroid 99mTc-MIBI scan demonstrated parathyroid adenoma in the left lower pole of the thyroid (Figure 2). Because of above findings yielded, thyroid left lobectomy was also carried out and surgical cure was obtained. Surgical cure was confirmed by histopathologic verification of the removed abnormal parathyroid tissue, with a decrease of serum calcium and PTH levels to normal ranges.

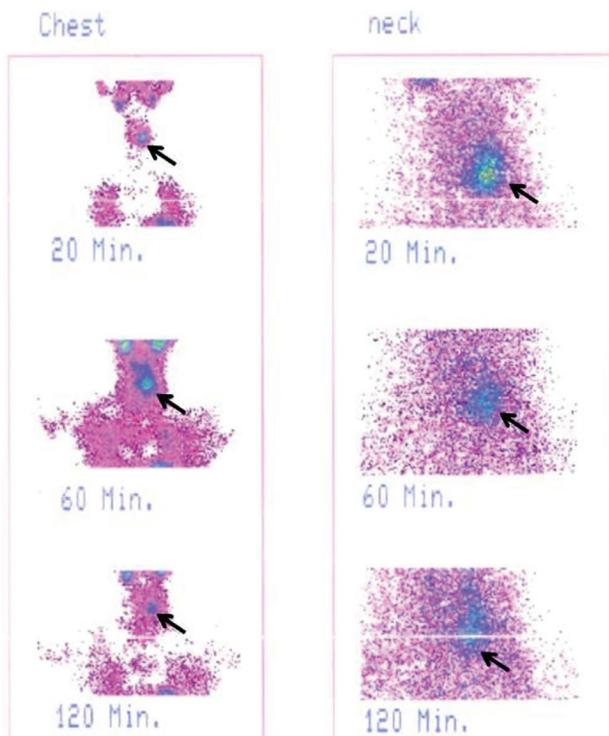
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**Figure 1.** The <sup>99m</sup>Tc thyroid scan showed normal left lobe and isthmus in terms of shape, size and uptake. The right lobe resected surgically



**Figure 3.** The post-ablation whole-body scan with <sup>131</sup>I depicted remnant functioning thyroid tissue in the thyroid bed. No clear evidence of distant metastasis was noted throughout the body



**Figure 2.** Parathyroid <sup>99m</sup>Tc-MIBI scan revealed parathyroid adenoma underlying the left lower pole of thyroid

About one month later, the patient was treated with radioiodine and a post-ablation whole-body scan with <sup>131</sup>I revealed just remnant thyroid tissue in thyroid bed (Figure 3). Then, six months post radioiodine therapy, his whole-body scan with <sup>131</sup>I

depicted negative study. Finally, noteworthy clinical improvement was achieved and he was advised to follow up with regular visits to our department.

### Discussion

Thyroid cancer accompanied with pHPT has been encountered in 3.1% to 17% [3] of cases. The reason for this association is controversial. Some researchers have shown this concomitant as coincidental [4], whereas other authors have explained in-

creased endogenous calcium levels or probably growth factors, such as epithelial growth factors and insulin-like growth factors, as goitrogenic factors [3, 5, 6].

In a study of 824 patients who had undergone cervical exploration leads to thyroid lobectomy, thyroid carcinoma was detected in 2.6% patients with pHPT. But, it is also remarkable that in this large series no synchronous development of thyroid and parathyroid carcinoma was seen [4].

In 2009, another patient was described: a 59-year-old man who had presented with severe clinical manifestations of pHPT eight years previously because his serum calcium was 14.4 mg/dl and his PTH serum level was 2.023 pg/ml. The patient was found to have synchronous parathyroid carcinoma on the left side as well as papillary thyroid carcinoma and parathyroid adenoma on the right side [7].

In 2011, an extremely rare maternal condition was reported during pregnancy. She was a 23-year-old pregnant woman referred with severe hyperemesis and weight loss at 32 gestational weeks [8]. She was diagnosed with pHPT because of parathyroid adenoma and treated with surgery where a synchronous thyroid papillary carcinoma was detected [8]. Previously reported patients had been considerably older in mean age.

Although, concurrent thyroid cancer and parathyroid adenoma is rare, the diagnosis of this coexistence should be considered in pHPT because of the prevention of repeat surgery like in our patient. In term of localization, ultrasonography (US) can improve localization of thyroid nodules, and accurate diagnosis of thyroid nodules is performed by combining fine-needle aspiration (FNA) with sensitivity 89%, specificity 91%, and accuracy 90% [9]. In addition, today the  $^{99m}\text{Tc}$ -MIBI scan is considered as a localization tool with the greatest sensitivity, and there are advantages, including the detection of ectopic glands. Therefore, the combination of  $^{99m}\text{Tc}$ -MIBI, US, and US-FNA (if needed) are recommended as the best diagnostic tool for parathyroid localization of pHPT and concomitant thyroid disease. However, removal of relevant thyroid nodules is suggested during parathyroid surgery.

## Conclusions

This case demonstrates the need for clinical alertness of concurrent hyperparathyroidism and thyroid cancer. Therefore, careful thyroid assessment is recommended for all patients with primary hyperparathyroidism

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