

Case Report

Synchronous Parathyroid Adenoma and Papillary Thyroid Carcinoma: 99mTc-MIBI Scan Findings

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ABSTRACT

Simultaneous existence of parathyroid adenoma and thyroid nonmedullary carcinoma is rarely observed. A 52-year-old female was diagnosed approximately 4 years ago with primary hyperparathyroidism (PHPT) on the basis of hypercalcemia and elevated serum parathyroid hormone (PTH) level. Clinically, PHPT diagnosed patient was examined with Tc-99m MIBI scintigraphy to investigate parathyroid adenoma. Early Tc-99m MIBI images showed focal focused enhanced activity retention on both thyroid left lobe upper pole and thyroid lower pole inferior neighborhood. However, late images indicated thyroid activity washout and persistence of activity on left lobe lower pole. The observed lesion on left lobe lower pole neighborhood was identified as parathyroid adenoma. One-day thyroid scintigraphy was also conducted to correlate enhanced activity retention on the left lobe upper pole. Results on thyroid scintigraphy showed hypoactivity, and thyroid fine-needle aspiration cytology process was suggested from the nodule. Simultaneous existence of parathyroid adenoma and thyroid nonmedullary carcinoma is rarely observed. Diagnosis and treatment of hyperparathyroidism is crucial during preoperative period. Even observed rarely, parathyrotoxicosis diagnosed patients can develop thyroid cancer along with parathyroid adenoma.

KEYWORDS: Parathyroid adenoma, primary hyperparathyroidism, scintigraphy, thyroid papillary carcinoma

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INTRODUCTION

Primary hyperparathyroidism (PHPT) is recognized as a common endocrine disease, with a prevalence of 0.1%–0.2%.^[1-3] Concomitant thyroid disease is not unusual among patients with PHPT.^[3-5] Parathyroid adenoma is clinically recognized in patients presenting with either hypercalcemia or it may be a part of multiple endocrine neoplasia (MEN) type 1 or IIa.^[2] Coexistence of PHPT and nonmedullary thyroid carcinoma (NMTC) was previously reported in case reports and some surgical series.^[4-7] Here, we describe a case of NMTC (papillary carcinoma) associated with parathyroid adenoma with PHPT.

CASE REPORT

A 52-year-old female was diagnosed approximately 4 years ago with PHPT on the basis of hypercalcemia (11.7 mg/dL; reference range 8.3–10.6 mg/dL) and

elevated serum parathyroid hormone (PTH) level (254.4 pg/mL; reference range 15–65 pg/mL). The serum thyroid-stimulating hormone was at the normal

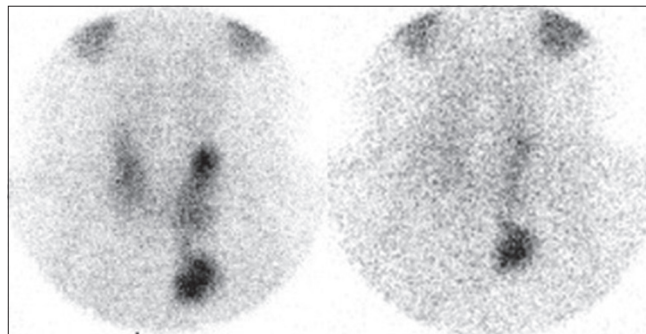



Figure 1: Tc-99m-MIBI parathyroid scan

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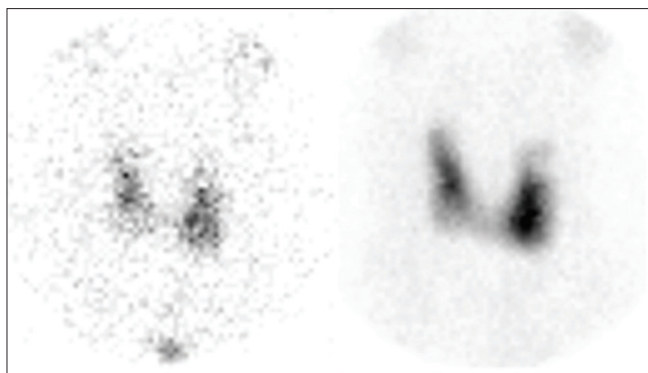


Figure 2: Tc-99m thyroid scan

level (1.44 IU/L, reference ranges 0.63–4.82 IU/L). However, the free thyroxine level was abnormally high (1.97 ng/dL, reference ranges 0.88–1.72 ng/dL). Clinically, PHPT diagnosed patient was examined with Tc-99m MIBI scintigraphy to investigate parathyroid adenoma. Early Tc-99m MIBI images showed focal focused enhanced activity retention on both thyroid left lobe upper pole and thyroid lower pole inferior neighborhood. However, late images indicated thyroid activity washout and persistence of activity on left lobe lower pole. The observed lesion on left lobe lower pole neighborhood was identified as parathyroid adenoma [Figure 1]. One-day thyroid scintigraphy was also conducted to correlate enhanced activity retention on the left lobe upper pole. Results on thyroid scintigraphy showed hypoactivity [Figure 2]. The neck ultrasound showed two 1.5 cm long hypoechoic nodules on the left thyroid lobe, and thyroid fine-needle aspiration cytology (FNAC) was performed in the presence of ultrasonography. Aspiration biopsy and cytology appeared suspicious of malignancy; according to the Bethesda system, she underwent total thyroidectomy and parathyroidectomy. Postoperative histopathologic diagnosis suggested papillary carcinoma for the left lobe upper pole-localized lesion and parathyroid adenoma for left lobe lower pole neighborhood lesion. During the postoperative period, normal behavior on PTH levels and unnoticeable complication development was observed. In addition, a sharp drop was identified on the PTH level from 254.4 pg/mL to 48 pg/mL after the operation and blood calcium levels returned to normal values.

DISCUSSION

PHPT is now, after introduction of routine measurement of serum calcium, recognized as a common endocrine disease, with a prevalence of 0.1%–0.2%.^[1,2,7] Women are affected more frequently than men, especially after menopause.^[2] More than half of the PHPT patients are older than 50.^[2] An increased serum calcium

level is the widely accepted evidence for diagnosis of hyperparathyroidism.^[1,2] In addition, unusually, high levels of serum PTH for the corresponding serum calcium confirm the diagnosis.^[1,2,5] The autonomous hypersecretion of PTH-driven PHPT mostly occurs in the setting of a parathyroid adenoma (80%) but can also be observed in the forms of parathyroid gland hyperplasia (15%–20%) and carcinoma (<0.5%).^[2] Surgical removal or parathyroidectomy is the only known cure for PHPT and is currently the best treatment.^[1,2] Papillary thyroid cancer is the most common type of thyroid cancer. It usually presents as a solitary or dominant nodule, but multifocality is also common.^[3,4] Papillary thyroid cancer is mostly observed in women and in younger people. It usually grows slowly but can sometimes spread to lymph nodes in the neck or nearby. Annually documented cases in the United States exceed 45, 000, and this specific type of carcinoma has the fastest increase rate among any malignancy in the thyroid. Family history and previous head and neck radiation increase the risk.^[4,5] Total thyroidectomy, which may be followed by ablation with radioactive iodine, is the recommended management for PTC, and the prognosis is usually favorable.^[5,6] Coexistence of PHPT and NMTC was previously reported in case reports and some surgical series.^[5-10] In most reports discussing the coexistence of these two diseases, PHPT was diagnosed before the identification of the thyroid carcinoma which was usually diagnosed in pathology specimens.^[5-10] The overall incidence of all types of thyroid cancer in the USA. is 7.7/100.000 person-years. The incidence of papillary thyroid cancer is 5.7 per 100.000 person-years.^[7,8,10] In a large series, NMTC was reported in the range of 2.1% and 4.3% in total patients subjected to surgery for PHPT.^[6,10] These results suggest that papillary thyroid cancer is slightly often in patients with PHPT.^[9] The genetic association of hyperparathyroidism and medullary thyroid carcinoma has been well recognized in the context of the MEN, type II. However, the coexistence of parathyroid adenoma and NMTC pathogenesis was not well studied.^[7,9,10] The oncogenic effect of hypercalcemia on the thyroid gland assumed, and low-dose radiation therapy for the head and neck, especially during childhood and adolescence, is known to induce thyroid and parathyroid tumors.^[4,5,9] Our patient did not have a history of prior neck irradiation or other risk factors associated with thyroid cancer (i.e., family history, prior thyroid cancer).

Cinnamon and friends investigated relationship between PHPT and thyroid cancer. In their exemplary study, four patients with PHPT and small (<1 cm) thyroid nodules, which was negative in the preoperative cytology, were examined.^[9] Although FNAC was negative in these

patients, final surgical specimen was consistent with papillary thyroid carcinoma, and preoperative cytology was false-negative. They emphasized that PHPT should be considered as a noteworthy risk factor for thyroid cancer.^[9] Since the coexistence of both disease processes can complicate patient management through untreated hypercalcemia, unrecognized thyroid cancer, and the necessity of reoperative neck surgery, patients should be screened for both disease entities carefully.^[6,7,10]

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Conflicts of interest

There are no conflicts of interest.

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