# An Unusual Combination of Parathyroid Adenoma, Medullary and Papillary Thyroid Carcinoma

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***Received: 2 Sep. 2012; Received in revised form: 19 Nov. 2012; Accepted: 5 Jan. 2013***

**Abstract-** The coexistence of medullary thyroid carcinoma (MTC), papillary thyroid carcinoma (PTC) and parathyroid adenoma is an uncommon clinical entity. Here, we report a case of MTC, PTC, and parathyroid adenoma diagnosed incidentally on a routine physical examination of the neck for the work-up of diabetes. The patient had neither symptoms of hypercalcemia nor those related to MTC and PTC.

*Acta Medica Iranica*, 2013; 51(5): 337-340.

**Keywords:** Medullary thyroid carcinoma; Parathyroid adenoma; Papillary thyroid carcinoma

## Introduction

Primary hyperparathyroidism afflicts up to 0.1% of the general population and is clinically identified with hypercalcemia or as a part of multiple endocrine neoplasia (MEN) (1). In spite of several sporadic articles reporting the coexistence of primary hyperparathyroidism (PHPT) and non-medullary thyroid carcinomas (2), concurrence of parathyroid adenoma, PTC, and MTC is extremely rare. As the coexistence of all these diseases can complicate patient management, patients should be screened cautiously to decrease the incidence of complications such as unrecognized thyroid cancer and the necessity of repeated neck surgery.

Here, a case of concomitant PTC, MTC and parathyroid adenoma, diagnosed incidentally during the routine work-up of diabetes, is described.

## Case Report

A 62-year-old female was presented with history of diabetes mellitus for routine work-up, during which bilateral multinodular thyroid was detected in physical examination without any considerable symptom. Sonographic examination revealed dominant nodules in both right and left lobes. Afterward, the patient underwent fine needle aspiration (FNA) of right thyroid lobe the result of which was suspicious to papillary carcinoma. Subsequently, the patient underwent right lobectomy and a fresh specimen was sent to pathology center for rapid intraoperative diagnosis (frozen section). The specimen had three prominent nodules (1, 2, and 4 cm in diameter) and was surrounded by brown unremarkable thyroid tissue in gross aspect. Cut sections of the biggest nodule showed ill-defined creamy-brown tissue with cystic change. Wall calcification was also detected in other nodules. Pathology results after H&E staining revealed papillary carcinoma (classic type) without necrosis; accompanied with psammoma bodies. The tumor was totally surrounded with fibrous capsule without evidence of capsular, blood vessel or extrathyroid extension. One out of three isolated lymph nodes were involved by the tumor.

According to pathological results and considering the notification of enlarged left inferior parathyroid, concomitant left lobectomy, isthmusectomy and parathyroidectomy were performed and specimens were evaluated pathologically. The specimen of isthmus and left thyroid lobe measured 4.5×1.5×3.5 cm and weighted 14 g. Multiple cut sections showed a well defined creamy-gray rubbery tumoral lesion measuring 1.8×1.5 cm located in left lobe. The microscopic features of this part approved medullary carcinoma. Tumor greatest diameter was 1.8 cm which was not encapsulated. There was no evidence of vascular invasion, extrathyroid extension, tumor multicentricity or C-cell hyperplasia. Regarding the parathyroid gland, the specimen consisted of an irregular creamy-gray soft tissue that weighted 1.5 g and measured 1.5×0.5×0.3 cm. The pathological feature of this specimen revealed active parathyroid lesion, compatible with parathyroid adenoma (Figure 1).

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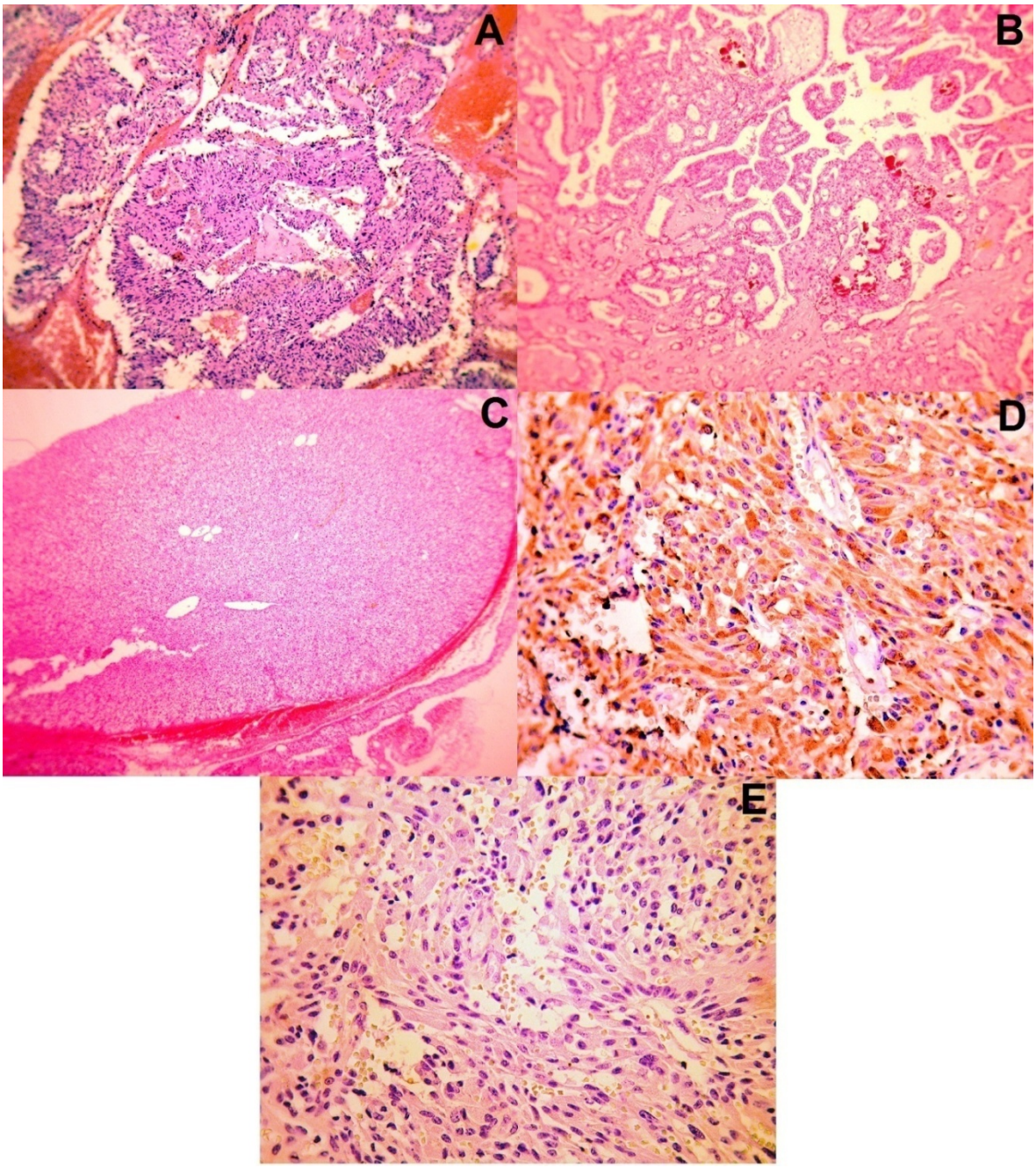


**Figure 1.** (A) H&E of Medullary carcinoma ×100 (B) H&E of papillary carcinoma ×100 (C) H&E of parathyroid adenoma ×40 (D) Immunohistochemistry with anti-calcitonin ×100 (E) Immunohistochemistry with anti-thyroglobulin ×100

In addition, small portion of thyroid gland, fragments of fibroadipose tissue and skeletal muscle were detected. Immunohistochemical staining of left thyroid tumor was also performed by application of antibodies against Synaptophysin, Chromogranin, CEA, Calcitonin, and Thyroglobulin which was positive in tumor cells except for Thyroglobulin (Figure 1). She was discharged without any significant sign or symptom.

## Discussion

The coincidence of thyroid and parathyroid disease was first described in 1947 (3). The coexistence of parathyroid adenoma and PTC is rare. Distinct embryologic source of thyroid follicular cells and parathyroid cells is a probable reason for this rare coincidence. However, the coexistence of parathyroid adenoma and MTC is more common considering the fact that both cell types

are originated from parafollicular cells. The frequency of PHPT in patients afflicted with thyroid disease is ranged from 0.3 to 8.7% (2). Otherwise, the frequency of thyroid disease in patients undergoing parathyroidectomy is ranged from 2.5 to 17.6% (4).

The incidence of concurrence primary PHPT and thyroid carcinoma is not ascertained because few studies have been performed the result of which show different frequencies of 3.7% and 8.0% (5-6). Recently, a 55 years old female with concomitant PTC and parathyroid adenoma has been reported with laboratory findings revealing hypercalcemia (7). Moreover, a 39-year-old man was presented with parathyroid adenoma, a multifocal PTC, and lymph node metastases of a papillary thyroid carcinoma (8). Furthermore, a 23-year-old man has been recently presented with concomitant and parathyroid adenoma PTC in the right and left thyroid lobes, respectively (9). Controversial reasons have been described for this association including increased levels of endogenous calcium or growth factors as goitrogenic factors (10).

PHPT; usually diagnosed in a pathology specimen, was diagnosed prior to the diagnosis of the thyroid carcinoma in most of the previous reports (5,6). As different from previous reports, in the present study, parathyroid adenoma was diagnosed during the right lobectomy due to bilateral multinodular thyroid, and the thyroid carcinomas (papillary and medullary) were diagnosed from pathology specimens.

Although, the exact pathogenesis of concomitant PHPT and thyroid carcinoma has not been established, the oncogenic consequence of hypercalcemia and low-dose head and neck radiation therapy have been assumed to induce thyroid and parathyroid tumors (11,12). However, the present patient did have neither a history of prior head and neck radiation nor a clinically diagnosed hypercalcemia.

In spite of the fact that concurrent thyroid cancer and parathyroid adenoma is rare, special care should be required for the diagnosis of this coexistence in order to prevent repeated surgeries. Ultrasonography (US), fine-needle aspiration (FNA), and 99mTc-MIBI scan are among the recommended diagnostic tools for parathyroid adenoma and concomitant thyroid cancers. On the other hand, the coexistence of PTC and PHPT may culminate in a discrepancy between the clinical characteristics and the FNA cytology diagnosis that can result in a possible false-positive diagnosis (13). However, postoperative histopathologic findings can more certainly diagnose the concomitant parathyroid adenoma and thyroid carcinoma (14). In the present study, the confirmation of PTC, MTC, and parathyroid adenoma was made using the rapid intra and post operative histopathologic results.

This case represents the probability of coexistence PTC, MTC, and parathyroid adenoma that to our knowledge, has not been reported in previous articles.

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