



Parathyroid Adenoma/Thymoma Case Report

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Abstract

The coexistence of hyperparathyroidism and thymomas is relatively rare. The authors herein present a case of concomitant multiple parathyroid adenomas and a type AB thymoma, identified by Tc99m-sestamibi SPECT CT.

Introduction

The parathyroid glands and the thymus have a close embryological and anatomical relationship; however reports of simultaneous parathyroid pathology and thymoma are rare in the literature. We report on a patient with primary hyperparathyroidism secondary to a parathyroid adenoma who was found to have a type AB thymoma in the anterior mediastinum, which was localized on a pre-operative sestamibi scan.

Case Presentation

The patient is a 60 year old male with a history of tremors, mental status changes, constipation, and somnolence who was found to have hypercalcemia and elevated levels of parathyroid hormone by his internist and was referred to a head and neck surgeon for further management.

Prior to referral, his calcium level was 14.3 mg/dL (normal range: 8.4-10.5 mg/dL) and his parathyroid hormone (PTH) level was 232 pg/mL (normal range: 15-65 pg/mL). Pre-operatively the patient underwent a Tc99m-sestamibi SPECT CT for parathyroid lesion localization. The scan showed a focus of increased MIBI accumulation in the anterior mediastinal region 5 cm inferior to the inferior margin of the medial head of the left clavicle and another focus contiguous with and extending posteriorly from the upper pole of the left thyroid lobe, suggesting two parathyroid lesions. Based on this scan, the presence of a thoracic surgeon was arranged in case the mediastinal parathyroid could not be resected via a cervical approach. Chest CT with contrast was obtained; it demonstrated a 3.2 cm × 2.2 cm soft tissue lesion in the thymic bed thought to correspond with the focus seen on prior imaging and consistent with a parathyroid adenoma.

The patient underwent video-assisted thoracoscopy for the thymic mass followed by left and right superior parathyroidectomy with intraoperative PTH assay. The PTH did not decline after resection of the enlarged left superior parathyroid prompting exploration of the right neck and resection of a large right superior parathyroid and an appropriate decline in PTH levels (baseline PTH 232 pg/mL, pre-excision of mediastinal lesion-128 pg/mL, 10 minutes post-excision of mediastinal lesion-127 pg/mL, pre-excision of left superior parathyroid-110 pg/mL, 10 min post-excision of left superior parathyroid-91 pg/mL; 5 minutes post-excision of right superior parathyroid-41 pg/mL). Bilateral normal inferior parathyroids were identified and left in place.

Pathology revealed enlarged and hypercellular left and right superior parathyroids (1.5g and 0.87g, respectively). The histopathological evaluation revealed the mediastinal mass to be a type AB thymoma. The tumor was 3.0 cm, with negative margins, and no lymphovascular invasion; the regional lymph nodes were negative for tumor. It was Stage 2a (microscopic transcapsular invasion) on the Masaoka staging system. The patient exhibited no symptoms associated with myasthenia gravis either in the pre-operative or post-operative period.

Two weeks post-operatively the patient's calcium level was 10.4 mg/dL, PTH level was 34 pg/mL. Calcium levels were 10.5 mg/dL and 10.4 mg/dL and PTH levels were 20 pg/mL and 25 pg/mL two and eight months post-operatively, respectively. No new lesions and no evidence of recurrent disease could be detected on any of the follow-up visits.

Discussion

We present an unusual case of a patient with concurrent parathyroid adenoma and thymoma.

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Thymoma is a group of heterogeneous lesions with different morphological features and clinical courses [1]. Its greatest prevalence is in patients in their fifth and six decades of life [2]. In most cases thymoma is asymptomatic and may be an incidental finding, however it can present with symptoms of compression or invasion of adjacent structures or can be associated with a number of parathymic syndromes, the most common of which are myasthenia gravis, pure red cell aplasia, and hypogammaglobulinemia [2,3]. Thymomas (30% to 50%) are associated with myasthenia gravis [3]. Thymomas are epithelial neoplasms; most are surrounded by a fibrous capsule, but some may invade through the capsule and extend into adjacent structures [3]. Thymoma can be divided into subtypes based on the World Health Organization histological classification system and staged according to a system proposed by Masoaka who a staging system based on the presence of invasion of the thymoma into the capsule and surrounding structures [4,5]. Surgical excision is the gold standard of treatment, however radiation therapy is recommended for patients with invasive or incompletely resected lesions; and there may be a role for chemotherapy in patients with unresectable or recurrent thymoma [6,7]. Thymoma is a relatively rare neoplasm with an incidence of 0.13 per 100,000 people and it is the most common tumor of the anterior mediastinum. The finding of concurrent thymoma and parathyroid adenoma is even rarer, with only a handful of cases in literature.

Similar to our patient, there have been several reports of thymoma which were detected on sestamibi localization for parathyroid adenoma. Leung et al. [8] reported a case of a 62 year old male with hyperparathyroidism whose Tc-99m sestamibi scan demonstrated increased uptake in the superior mediastinum, with a confirmation of a nodule in the location on CT scan. After resection of the mass, pathology revealed a thymoma with negative histochemical staining for PTH. Postoperatively the patient's PTH and serum calcium levels remained high and a repeat scan was performed without localization of any abnormality. The patient underwent a bilateral neck exploration which resulted in the discovery and resection in a right inferior parathyroid adenoma. Walton et al. [9] described a case of a 60 year old female with an ectopically located parathyroid adenoma localized by 99mTc/99mTc-MIBI scan to the upper mediastinum; on pathology a thymoma was found to be present in the specimen along with the parathyroid adenoma. The patient exhibited no signs or symptoms of myasthenia gravis. Ceriani et al. [10] presented a case of a 63 year old male with primary hyperparathyroidism whose Tc99m sestamibi scan showed uptake in the upper half of the thyroid lobe and near the anterior myocardial wall. MRI of the mediastinum revealed in 3.5 cm mass in the pericardial adipose tissue. He showed no signs or symptoms of myasthenia gravis and the acetylcholine receptor antibodies measurement in the serum was negative. He underwent resection of left parathyroid adenoma with subsequent normalization of his calcium and PTH levels. He later underwent a thorascopic resection of a type AB-B1 thymoma.

Cunningham et al. [11] reported a rare case of a concurrent parathyroid adenoma and PTH-secreting thymoma. Initially technetium Tc99m sestamibi scan demonstrated uptake in the anterior mediastinum with mild uptake in the right inferior thyroid gland attributed to a multinodular goiter; CT scan demonstrated a mass. The patient underwent resection of the suspected ectopic parathyroid adenoma with appropriate intra-operative drop of PTH levels of greater than 50%, however the lesion was found to be a PTH-secreting invasive type AB thymoma on pathology.

During a subsequent visit PTH levels were once again increased, a second Tc99m sestamibi scan demonstrated a mass inferior to the right thyroid lobe, the patient underwent a resection of parathyroid adenoma and her calcium and PTH levels were within normal range post-operatively. Of note, Rizzoli et al. [12] described a case of a patient with hyperparathyroidism who was found to have a PTH-secreting thymoma without a parathyroid lesion. This lesion secreted authentic parathyroid hormone, rather than PTH-related protein.

Other authors reported cases of coexisting parathyroid adenoma and thymoma without mention of sestamibi uptake by the thymoma (whether such imaging was performed or not). Byrne et al. [13] demonstrated the first recorded case of hyperparathyroidism associated with thymoma in a 65 year old female with myasthenia gravis. As her myasthenia gravis symptoms gradually worsened and she was scheduled for a thymectomy. Because of her mild hypercalcemia she also underwent a parathyroid exploration. This patient turned out to have four glands parathyroid hyperplasia (rather than adenoma) on frozen section and underwent resection of three and a half glands. On pathology the thymus lesion demonstrated features consistent with a likely benign lymphocytic thymoma. Maria et al. [14] reported resection of a mass in proximity to a 68 year old female's parathyroid adenoma which was subsequently identified as a type a thymoma. This patient did not have symptoms of myasthenia gravis. Suzuki et al. [15] described a case of a 50 year old female with hyperparathyroidism and no symptoms of myasthenia gravis that was found to have concurrent noninvasive thymoma and hyperparathyroidism secondary to a right superior parathyroid adenoma. Lastly, Triggiani et al. [16] reported on a case of widely invasive type B3 malignant thymoma (well-differentiated carcinoma with prevalence of epithelial component) associated with both myasthenia gravis and parathyroid adenoma in a 46 year old female with hyperparathyroidism.

Although the existence of concurrent parathyroid adenoma and thymoma is rare, parathyroid glands and the thymus share a close anatomical relationship and a common embryological origin which could help explain the occasional presence of both types of lesions simultaneously (Nathaniels, Ceriani) [17]. Inferior parathyroid glands and the thymus arise from the 3rd brachial pouch, while the superior parathyroids arise from the 4th (Nathaniels) [17]. The mediastinum is the most common site of ectopic parathyroid glands; in fact Jaskowiak et al. [18] found that the thymus was the most common site for ectopic thyroid adenomas (17%) and mediastinal parathyroids remain in close association with the thymus (Nathaniels).

Conclusion

We present a patient with concurrent parathyroid adenoma and thymoma. Although this is a rare association, the head and neck surgeon should be cognizant of its potential existence, particularly in the setting of mediastinal uptake on technetium Tc99m sestamibi scan or presence of a mediastinal mass on imaging. The surgeon should also be aware of the extremely rare possibility of the presence of a PTH-secreting thymoma in the absence of a concurrent parathyroid lesion as the cause hyperparathyroidism.

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