Case Report

Nodular Metastatic Lung Tumor from Thyroid Carcinoma

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Pulmonary metastases from thyroid cancer usually present with a micronodular or miliary pattern throughout both lungs; pulmonary metastasis with nodules measuring 10 mm in diameter is very rare. We herein present a 74-year-old woman with a history of papillary thyroid cancer treated surgically 17 years previously who presented with pulmonary metastatic nodules measuring 15 mm in diameter on chest radiography. If a pulmonary nodule or nodules are encountered in a patient with a history of thyroid cancer, though very rare, the possibility that it is a metastasis must be borne in mind.

Keywords: thyroid cancer, pulmonary metastasis, nodular metastasis

Introduction

A nodule or random distribution of multiple nodules greater than 10 mm in diameter is the most common radiographic finding of pulmonary metastasis. The lung is one of the most common target organs for metastasis from various malignancies. Therefore, a typical or atypical nodule or nodules may also develop as a result of extrathoracic cancers originating in various organs such as the colon, breast, and pancreas. Atypical pulmonary metastases can be encountered and knowledge of their radiologic appearance is useful to facilitate early diagnosis. Pulmonary metastases from thyroid cancer usually present with a micronodular or miliary pattern throughout both lungs; nodular pulmonary metastases measuring 10 mm in diameter are very rare. We herein present a case of nodular pulmonary metastasis from thyroid carcinoma.

Case Report

A 74-year-old woman with a history of papillary thyroid cancer treated surgically 17 years previously presented with findings of a nodule 15 mm in diameter on chest radiography, which was performed as an annual follow-up for her hypertension. She was asymptomatic and had been in good health. The physical examination was unremarkable. The chest computed tomography (CT) revealed a well-circumscribed mass in the right upper lobe that measured 15 mm and had a slightly lobulated margin (Fig. 1). The routine laboratory tests were normal, as were tumor markers including carcinoembryonic antigen. Positron emission tomography showed accumulation of 18F-fluorodeoxyglucose (FDG) with a maximum standardized uptake value (SUVmax) of 11.2 in the early phase and of 13.6 in the late phase in the nodule (Fig. 2). Considering the chest CT findings, which suggested that a transbronchial approach would be difficult, we did not perform a transbronchial biopsy. Given the possible diagnoses, which included metastatic tumors or primary lung cancer, a segmentectomy was performed. Microscopic examination of the resected tumor revealed...
papillary thyroid carcinoma. Immunohistochemical staining of the tumor cells was positive for cytokeratin (CK) 7 and thyroid transcription factor-1 (Fig. 3) and negative for CK20. These findings were consistent with the diagnosis of pulmonary metastasis from thyroid cancer.

Thereafter, the patient received total thyroidectomy and I-131 therapy.

Discussion

The correct diagnosis of a pulmonary nodule in patients with a medical history of malignant tumors in either intrathoracic or extrathoracic sites is difficult but important for proceeding with the optimal treatment. Surgical resection, chemotherapy, radiation, or combined approaches are proposed depending on the primary site from which the nodule originates. If the patient has a history of cancer, we must consider pulmonary metastasis even after a long disease-free interval. Nodular metastatic lesions of about 10 mm in diameter to the lung from thyroid cancer are quite rare; to our knowledge, 16 patients have been reported in the English literature.2-17 In addition, autopsy studies reported two cases with occult pulmonary metastasis (>10 mm in diameter) from thyroid cancer.18,19 The 16 cases, who were ante-mortem diagnosed, were female in all cases, and the thyroid cancer was papillary carcinoma in all but one case—a case of follicular carcinoma.10 In four of the cases, the patients presented with pulmonary metastasis after thyroidectomy, as was observed in our case. In 14 of the 16 patients, specimens for pathological diagnosis were obtained surgically; in the other two, the specimen was obtained by endobronchial ultrasound-guided transbronchial needle aspiration13 and by percutaneous needle biopsy.17 Therefore, surgical resection is currently an acceptable approach for correct diagnosis and treatment.

Many recent publications have provided data that support the use of FDG-positron emission tomography (PET) scanning for primary and metastatic pulmonary nodules.20 However, information available so far describing the role of 18F-FDG PET/CT in pulmonary metastasis from thyroid cancer is limited. Only 3 patients have been evaluated by FDG-PET for nodular pulmonary metastasis from thyroid cancer.16,17 Shigematsu, et al. reported a case with nodular pulmonary metastasis measuring 23 mm from papillary thyroid cancer.16 PET imaging showed the accumulation of FDG with SUVmax of 8.9 in the nodule.16 Jung, et al. described two patients with papillary thyroid cancer with pulmonary nodular lesions 13 and 9 mm in diameter detected by FDG-PET/CT.17 They reported the SUVmax value (= 6.5) for only the patient with the 13-mm nodule. In our patient, PET imaging showed the accumulation of FDG with a SUVmax value of 13.6 in the 15-mm nodule,
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which seemed to be higher than the values reported in previous cases.\textsuperscript{16,17} In addition, Lan, et al. reported the use of dual-phase FDG-PET imaging for diagnosing malignant disorders.\textsuperscript{21} They reported that the difference in the time course of FDG uptake could be used to improve the ability of PET to distinguish between benign and malignant lesions and that the SUV\textsubscript{max} of the late-phase images tends to be higher than the early-phase images in malignant lesions.\textsuperscript{21} In the present case, the early-phase SUV\textsubscript{max} was 11.2, and that of the late-phase, 13.6. From the results of this imaging technique, we suspected malignancy and decided to perform a segmentectomy.

Production of thyroglobulin is well known to be limited to thyroid tissue or cancer originating from the thyroid. Therefore, it is a valuable immunohistochemical marker for distinguishing cancers of thyroid origin from other origins. Recently, immunostaining patterns of CKs have been developed as tools in the diagnosis of various cancers. Thyroid and lung cancers usually have a CK7-positive and CK20-negative pattern.\textsuperscript{22} In addition, thyroid transcription factor 1-positive is thought to indicate thyroid and lung cancer. These immunohistochemical findings, which were obtained in our patient, will help the correct diagnosis of a metastatic pulmonary nodular mass or masses.

**Conclusion**

Metastatic pulmonary tumors from thyroid cancer are often associated with multiple minute nodules, and nodular pulmonary metastasis is unusual. If a pulmonary nodule or nodules are encountered in a patient with a history of thyroid cancer, even after a long disease-free period, chest physicians and thoracic surgeons should bear in mind the possibility of a metastasis.

**Disclosure Statement**

None.

**References**

5) Harach HR, Franssila KO. Occult papillary

![Fig. 3](A) The resected tumor revealed a histologically well-differentiated papillary adenocarcinoma (hematoxylin & eosin; ×100). (B) The cancer cells were immunohistochemically positive for thyroglobulin (thyroglobulin; ×200).