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CASE REPORT

Solitary pulmonary metastasis from occult papillary thyroid carcinoma

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Abstract

Pulmonary metastases from thyroid carcinoma typically cause a micronodular or miliary pattern throughout both lungs. Metastasis consisting of a solitary pulmonary nodule measuring 20 mm in diameter is rare. Here we report a case of a 66-year-old woman without a history of papillary thyroid carcinoma who presented with a pulmonary nodule measuring 20 mm in diameter, found on chest computed tomography during a health checkup. The patient underwent a right lobectomy. Microscopic examination showed well-differentiated papillary adenocarcinoma. Immunohistochemical findings were consistent with a diagnosis of pulmonary metastasis from papillary thyroid carcinoma. Solitary metastasis to the lung from occult thyroid carcinoma is quite rare, but if a pulmonary nodule is encountered in a patient without a history of thyroid carcinoma, the possibility must be considered.

Introduction

A nodule or random distribution of multiple nodules greater than 10 mm in diameter is the most common radiographic finding in the setting of pulmonary metastasis. The lung is one of the most common target organs for metastasis, and, therefore, solitary or multiple typical or atypical nodules may develop as a result of extrathoracic cancers of various organs, such as the colon, breast, and pancreas.[1] Knowledge of the radiologic appearance of atypical pulmonary metastases is useful in order to facilitate early diagnosis. Pulmonary metastases from thyroid carcinoma usually cause a micronodular or miliary pattern throughout both lungs. Solitary metastasis to the lung from occult thyroid carcinoma is quite rare, and there are few reports concerning this entity. Here we present a case of solitary pulmonary metastasis from occult papillary thyroid carcinoma.

Case

A 66-year-old woman with no significant medical history presented after a nodule 20 mm in diameter was detected on chest computed tomography (CT) during a health checkup. She was asymptomatic and had been in good health. The physical examination was unremarkable. The chest CT revealed a well-circumscribed nodule without calcifications measuring 20 mm in the right lower lobe of the lung (Fig 1a). Positron emission tomography (PET) showed accumulation of 18F-fluorodeoxyglucose with a maximum standardized uptake value of 7.0 within the nodule only (Fig 1b), suggesting that the nodule was a malignant tumor without obvious concurrent metastatic disease. Preoperative bronchoscopy revealed obstruction of the basal segmental bronchus of the right lung. A transbronchial biopsy of the lesion revealed well-differentiated papillary adenocarcinoma. The routine laboratory tests were normal, as were serum levels of tumor markers, including carcinoembryonic antigen (CEA), serum thyroid-stimulating hormone, and thyroglobulin.

Given the differential diagnosis, which included primary lung cancer or metastatic tumor, a right lower lobectomy was performed to obtain a definitive histologic diagnosis and to accomplish complete removal of the tumor.

Microscopic examination of the resected tumor revealed a well-differentiated papillary adenocarcinoma (Fig 2a). Follicular spaces filled with dense eosinophilic colloidal material

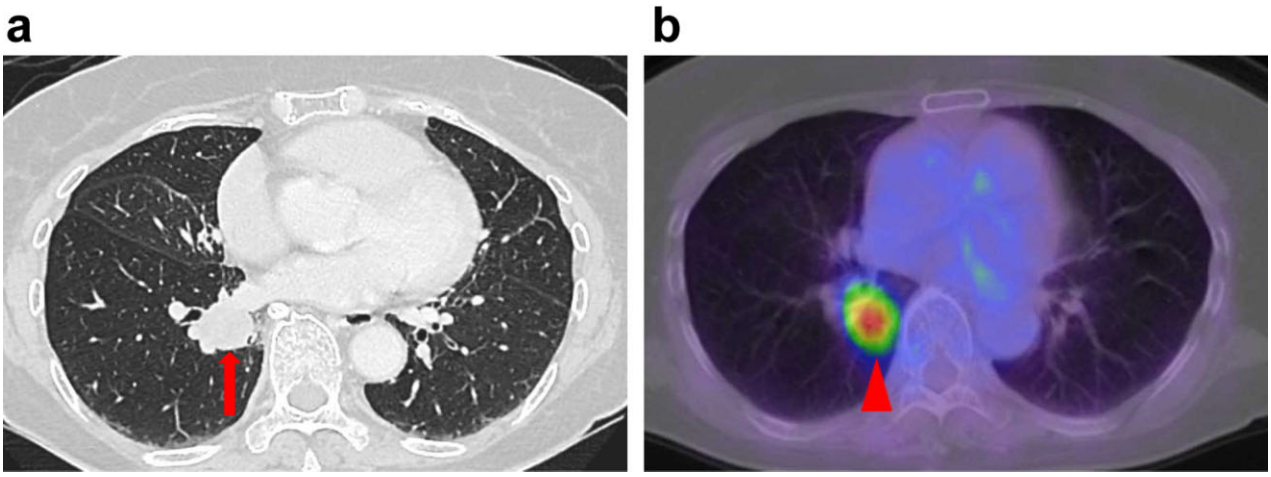

Figure 1 (**a**) Chest computed tomography (CT) showed a well-circumscribed nodule in the right lower lobe measuring 20 mm, and no lymphadenopathy (arrow). (**b**) Positron emission tomography (PET)-CT showed fluorodeoxyglucose (FDG) accumulation of 18F-FDG with a maximum standardized uptake value of 7.0 in the nodule (arrowhead).

were also observed. Immunohistochemically, cancer cells were positive for thyroid transcription factor-1, thyroglobulin (Fig 2b), and cytokeratin (CK) 7, but were negative for CK20 and napsin A. These findings are consistent with a diagnosis of pulmonary metastasis from papillary thyroid carcinoma.

The patient had an uneventful hospital stay and was discharged on postoperative day seven. After the lobectomy, thyroid ultrasonography was performed and showed no obvious abnormalities in the thyroid gland. Serum thyroid-stimulating hormone and thyroglobulin levels were within the normal range.

Discussion

The lung is one of the most common target organs for metastasis from various malignancies, and metastatic lesions manifest radiographically as solitary or multiple nodular patterns. When detected, the possibilities include primary lung cancer, metastatic lung cancer, and benign tumors, such as granulomas and hamartomas. Surgical resection, chemotherapy, radiation, or combined approaches are proposed, depending on the primary site of origin.

Pulmonary metastases from thyroid carcinoma usually cause a multiple nodular pattern or miliary pattern

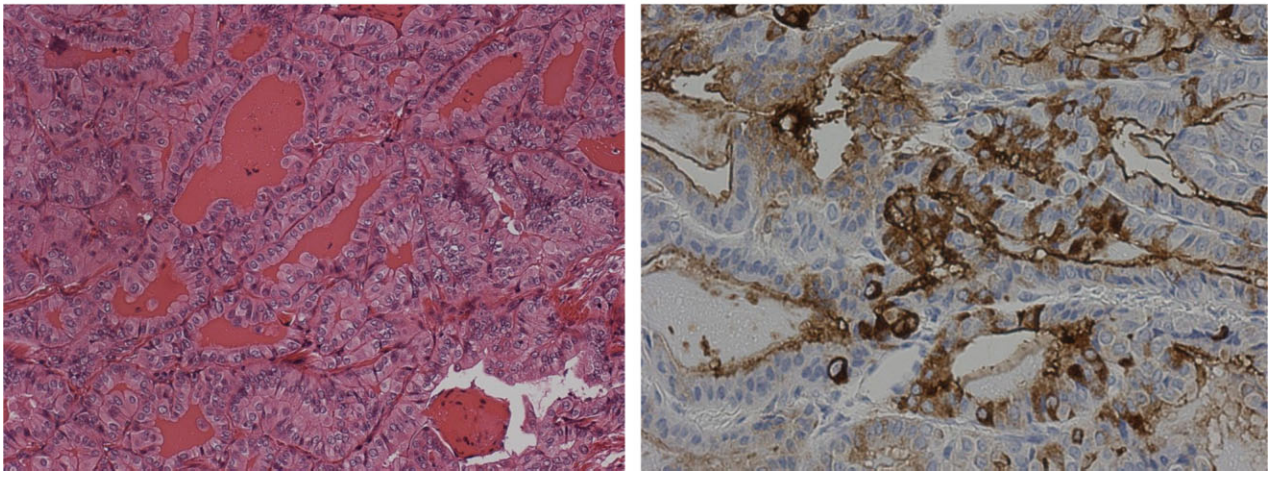

Figure 2 (**a**) Histologically, the resected tumor consisted of a well-differentiated papillary adenocarcinoma (hematoxylin & eosin stain × 100). (**b**) The cancer cells were immunohistochemically positive for thyroglobulin (thyroglobulin stain × 100).

throughout both lungs. Solitary metastasis to the lung from thyroid carcinoma is quite rare and, to our knowledge, only a few cases have been reported in the English literature.[2–7] All of these occurred in women and were papillary carcinomas. Three cases presented with pulmonary metastasis followed by thyroidectomy and three were occult thyroid cancer cases diagnosed after metastasectomy, as in our case. Because a preoperative diagnosis of the pulmonary nodule was established in only one of these cases, surgical resection should be considered an acceptable approach to establish the correct diagnosis and treatment regimen. However, the tumor was located centrally, so partial resection or segmentectomy was not indicated for fear of a positive surgical margin. Although histological confirmation was obtained before surgical resection in the current case, we determined this to be a primary lung cancer and did not consider the possibility of metastasis from thyroid carcinoma, because of radiographic imaging results.

Several tumor markers and CKs have been developed as immunohistochemical tools in the diagnosis of cancers. CK7 and CK20 are the most commonly used CKs in surgical pathology, and the expression patterns of these are helpful to detect the origin of pulmonary tumors. Lung adenocarcinomas and thyroid tumors reportedly are usually CK7-positive and CK20-negative, and colorectal cancers usually CK7-negative and CK20-positive.[8] Thyroglobulin, produced only by thyroid tissue, is also a valuable marker distinguishing cancers of thyroid origin. Use of the combination of these markers in immunohistochemical analysis is beneficial to identify the origins of malignant lung tumors.

In the present case, we did not perform thyroidectomy and are following the patient closely. It is debatable whether patients with papillary microcarcinoma should always undergo surgery, because a high incidence of occult papillary carcinoma has been observed in autopsy studies. Ito *et al*. suggested that papillary microcarcinomas do not frequently become clinically apparent, and that patients can choose observation while their tumors are not progressing; although they are pathologically multifocal and there is a high incidence of lymph node involvement.[9]

Conclusion

Metastatic pulmonary tumors from thyroid carcinoma are often associated with multiple minute nodules, and solitary nodular pulmonary metastasis is unusual. If a pulmonary nodule or nodules are encountered in a patient without a history of thyroid carcinoma, chest physicians and thoracic surgeons should bear in mind the possibility of metastasis from occult disease.

Disclosure

No authors report any conflict of interest.

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