



# Clinically Significant Thyroid Metastasis of Lung Cancer: A Rare Case Report

## Akciğer Kanserinin Klinik Olarak Saptanan Tiroid Metastazı: Nadir Bir Olgu

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### Abstract / Öz

Although thyroid tumors are commonly primary, metastases are extremely rare. We report a rare case of metastatic adenocarcinoma of primary lung origin presenting as a solitary thyroid nodule. A 55-year-old female housewife with no significant past medical history, admitted to our emergency department, complained of anterior neck swelling and dyspnea for one month. In radiological assessment, goiter with retrosternal extension, right primary pulmonary mass with bilateral pleural effusion, and metastases of the brain, thyroid, mediastinal lymph node, and left lung were detected. Dyspnea improved after chest drainage. Cytological examination and biopsies were performed, and histopathological and immunohistochemical examinations revealed primary lung adenocarcinoma and thyroid metastasis. The patient was discharged after pleurodesis without complications. Even though primary tumors of the thyroid are more common and usually benign, metastasis should always be kept in mind, especially in patients with a positive history of renal cell, breast, and lung cancer.

**Keywords:** Thyroid, metastasis, lung cancer

Tiroidin metastatik tümörleri yaygın olarak görülen primer tiroid tümörlerine kıyasla son derece nadirdir. Yazımızda primer akciğer adenokarsinomlu ve tiroidde tek metastatik nodülü olan nadir bir olguyu sunmayı amaçladık. 55 yaşında ev hanımı bayan hasta, boyunda şişlik ve hafif nefes darlığı şikâyeti ile acil servisimize başvurdu. Radyolojik incelenmesinde; retrosternal uzanımlı tiroid, sağ akciğerde kitle ve bilateral pleval efüzyon, ve beyin, tiroid, mediastinal lenf nodu ve sol akciğer metastazları saptandı. Dispne göğüs drenajından sonra düzeldi. Sitolojik inceleme ve biyopsiler yapıldı. Histopatolojik ve immünhistokimyasal incelemeleri sonucunda primer akciğer adenokarsinomu tiroid metastazı saptandı. Plöredez sonrası hasta komplikasyonsuz şekilde taburcu edildi. Tiroidin primer tümörleri daha sık ve genellikle iyi huylu tümörler olmasına rağmen özellikle renal hücreli karsinom, meme ve akciğer kanseri öyküsü olan hastalarda metastaz her zaman akılda tutulmalıdır.

**Anahtar Kelimeler:** Tiroid, metastaz, akciğer kanseri

## Introduction

The thyroid gland is one of the most vascularized organs in the body, and one would expect it to be a site of metastatic disease. However, the thyroid gland is protected from colonization by tumor cells by its rich vascular supply. On the other hand, when the thyroid gland is altered by goiter, neoplasm, or inflammation, metabolic changes related to a decrease in oxygen and iodine content might enhance metastatic growth (1).

Although thyroid tumors are commonly primary, metastases are extremely rare. We report a rare case of metastatic adenocarcinoma of primary lung origin presenting as a solitary thyroid nodule.

## Case Report

A 55-year-old female housewife with no significant past medical history, admitted to our hospital, complained of anterior neck swelling and dyspnea for one month (Figure 1). Chest X-ray on admission revealed right pleural effusion. Diagnostic thoracentesis showed bloody and exudative pleural fluid. In radiological assessment, including thoracic contrast-enhanced computed tomography (CT) (Figure 2), brain magnetic resonance imaging (MRI), and whole-body positron emission tomography/computed tomography (PET/CT), goiter with retrosternal extension, right primary pulmonary mass with bilateral pleural effusion, and metastases of the brain, thyroid, mediastinal lymph node, and left lung were detected. A chest drain was inserted for draining the pleural fluid. Dyspnea improved after drainage. Diagnostic bronchoscopy was performed with biopsies, and cytological examination was positive for malignant cells. Thyroid ultrasound-guided fine-needle aspiration biopsy (US-FNAB), transbronchial needle aspiration biopsy (TBNAB), and right hemithorax computed tomography (CT)-guided transthoracic needle aspiration biopsy (TNAB) were performed, and the histopathological and immunohistochemical examinations revealed primary lung adenocarcinoma and thyroid metastasis. Pleurodesis was performed after the reduction of pleural fluid drainage. With improvement in her general condition, the patient was discharged on postoperative day 12. Written informed consent was obtained from the patient who participated in this study.

This case was presented as a poster presentation in the 22<sup>nd</sup> Annual Meeting of the Asian Society for Cardiovascular and Thoracic Surgery ASCVTS 2014 3-6 April 2014, İstanbul, Turkey and "Best Poster Award Winner".

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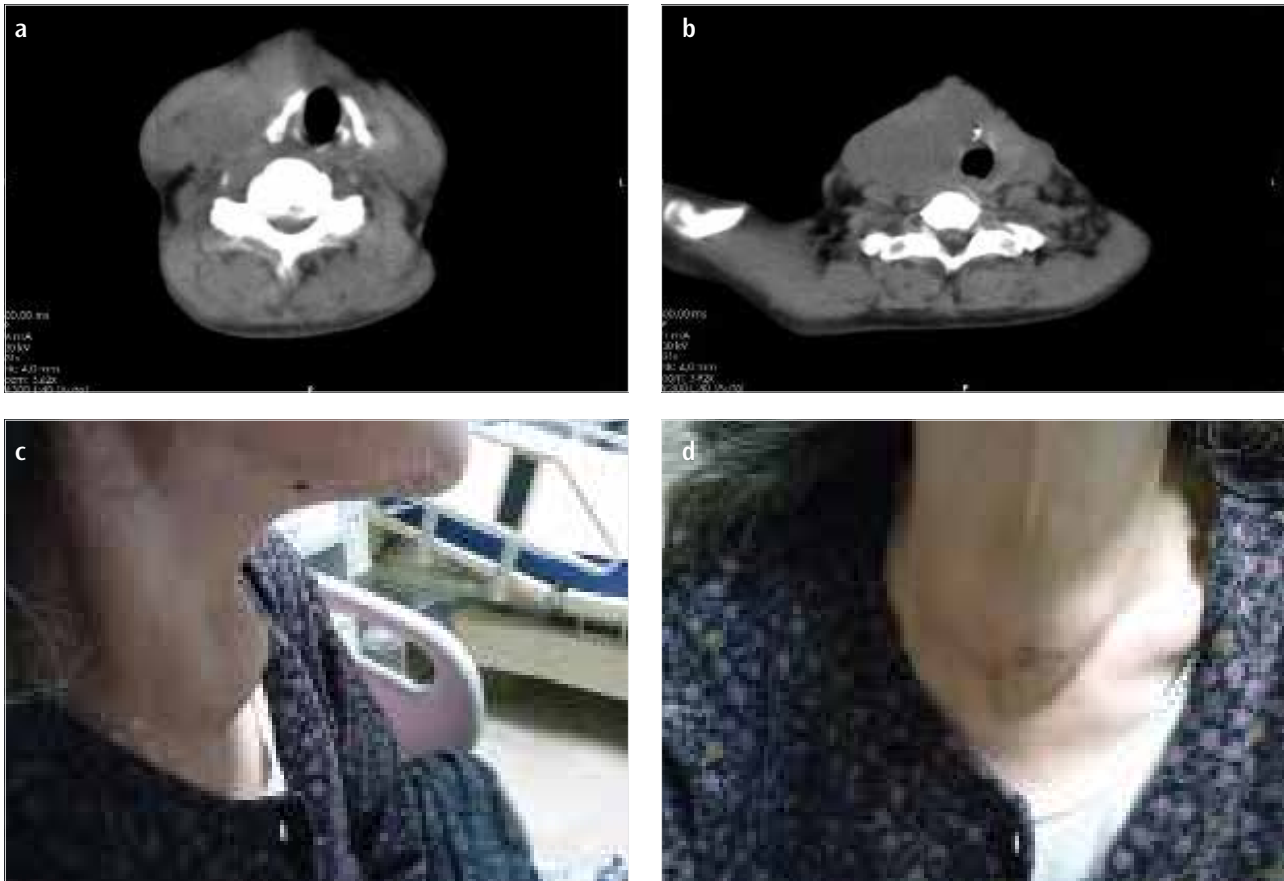
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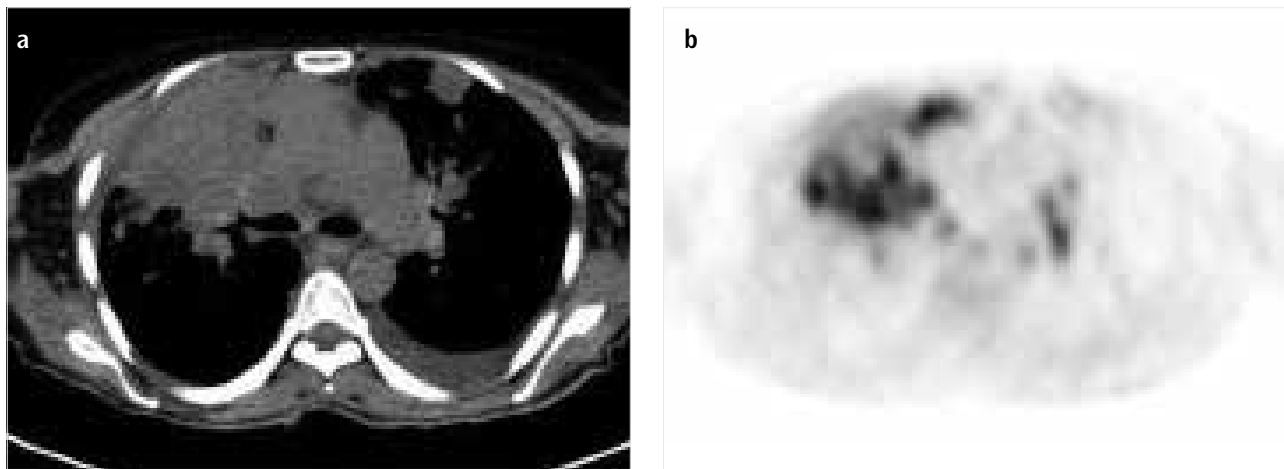
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**Figure 1. a-d.** (a, b) Axial CT showing a hypodense solid mass lesion on the left thyroid lobe. (c, d) Lateral and anterior photographs of the neck showing a lump on right thyroid gland area



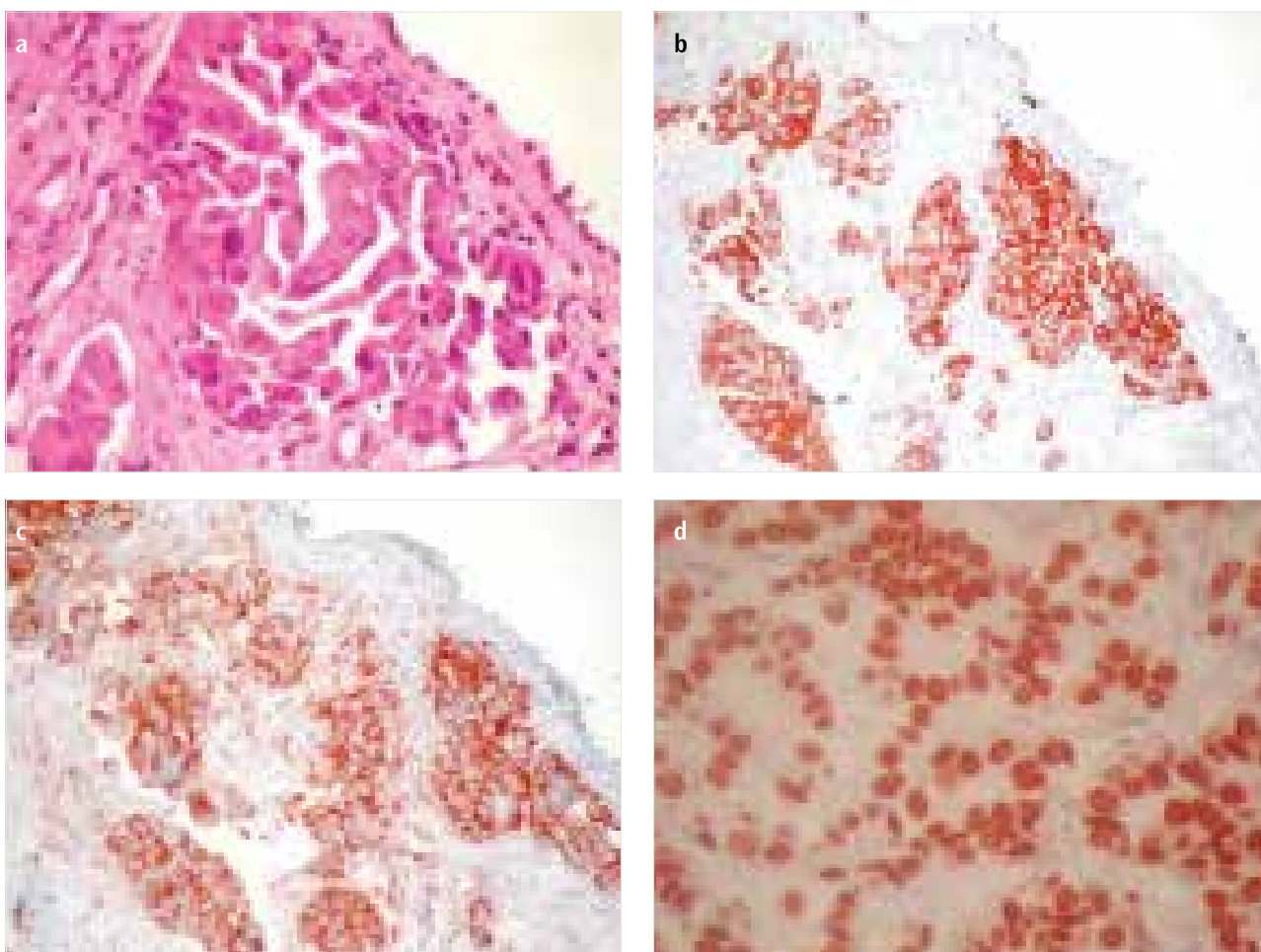
**Figure 2. a, b.** (a) FDG PET-CT showing metastatic infiltration of the right lung, metastatic paratracheal and hilar lymph nodes, and (b) nodular metastasis on the left lung and left pleural effusion

## Discussion

Thyroid cancers can be classified according to their pathological characteristics and origin as primary or secondary (i.e., metastases) (2). Thyroid nodules are common and usually benign, but one-tenth of them are malignant (3). Metastatic thyroid tumors represent between 1.4% and 2.5% of all thyroid cancers (4) and between 0.05% and 0.1% of all thyroid diseases. Thyroid metastasis is mostly discovered during the investigation or after the diagnosis of the primary tumor and usually indicates an advanced stage with a poor

prognosis (5). The average survival from diagnosis to death is two months (4). The most common tumors that metastasize to the thyroid are breast (21%), kidney (12%), and lung (11%) tumors followed by tumors of the gastrointestinal system and melanomas (1).

In patients with pulmonary tumors metastasizing to the thyroid, adenocarcinoma is the most common reported tumor, as it was in our case, followed by squamous and small-cell carcinomas. On rare occasions, large cell or adenosquamous varieties have been shown to metastasize to the thyroid (4).



**Figure 3. a-d.** The microscopic view of TBNAB and TNAB showing a tumoral lesion under the bronchus epithelium composed of pleomorphic cells with glandular structures, large eosinophilic cytoplasm, large hyperchromatic nuclei, and prominent nucleoli (H&E staining, 400× magnification), (b) Cytoplasmic immunohistochemical staining for CK7 in tumor cells from the bronchoscopic biopsy, (CK7 staining, 200× magnification), (c) Cytoplasmic granular immunohistochemical staining for Napsin A in tumor cells from the bronchoscopic biopsy. (Napsin A staining, 200× magnification) AX200, (d) Nuclear immunohistochemical staining for TTF-1 in tumor cells from the bronchoscopic biopsy. (TTF-1 staining, 400× magnification)

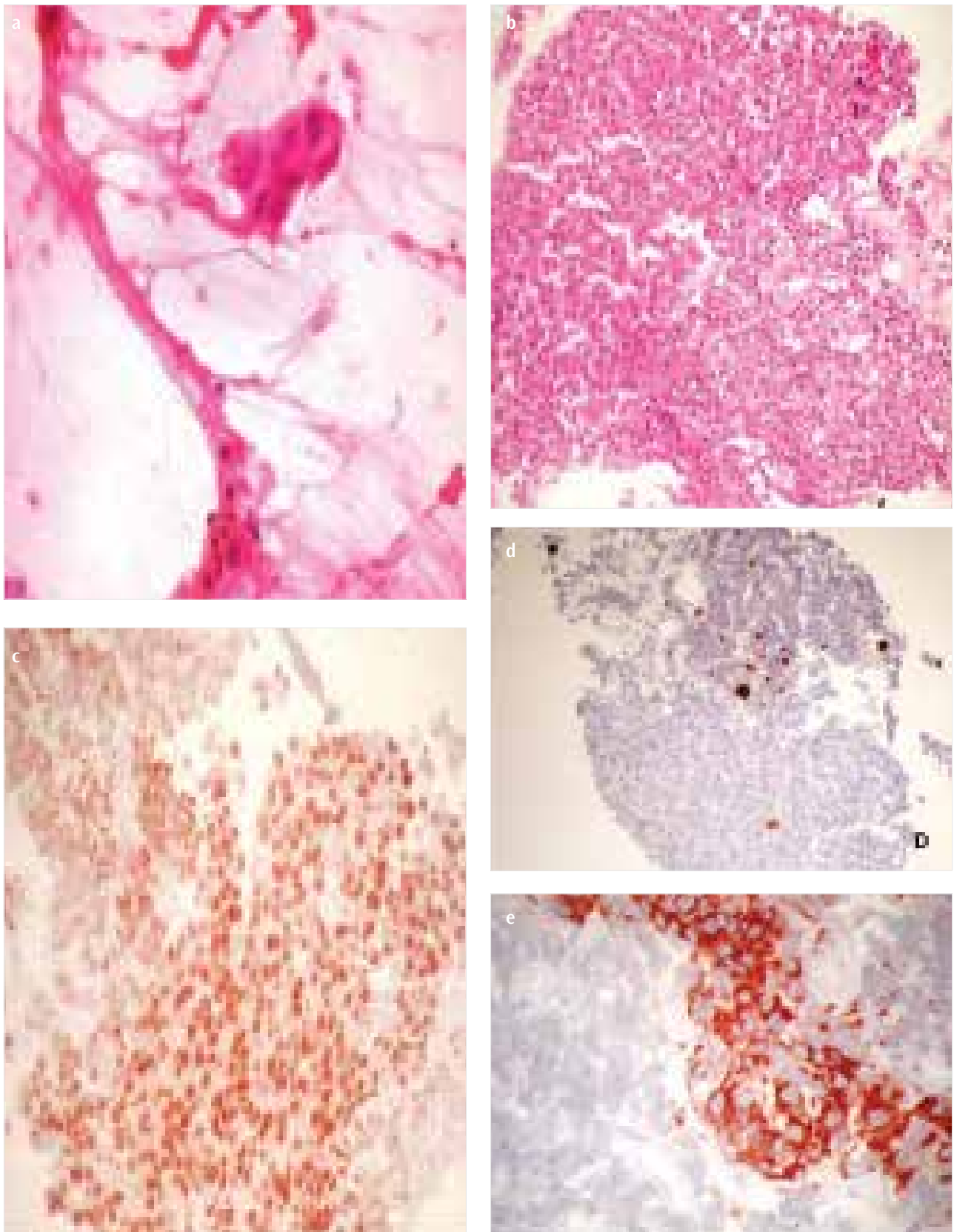
Thyroid gland metastases are most often clinically silent. Common manifestations are palpable mass, cough, dysphonia, dysphagia, and stridor due to the tumor size and enlargement of the thyroid (1). The patient was admitted to our hospital with a complaint of painless anterior neck swelling and dyspnea for one month. There were no malignant tumors in the patient's medical history. In radiological assessment, goiter with retrosternal extension, right primary pulmonary mass with bilateral pleural effusion, and metastases of the brain, thyroid, mediastinal lymph node, and left lung were detected. The patient was surgically treated for dyspnea.

Most of the thyroid metastasis is detected after the diagnosis or during the work up of the primary tumor (5). Due to the lack of specific markers obtained from imaging techniques, including ultrasonography, computer tomography, or scintigraphy that enable the differentiation between the primary thyroid neoplasm and the metastases, the differential diagnosis can be very challenging. US- FNAB is a standard diagnostic procedure to differentiate between primary and metastatic nodules (1). US-FNAB and CT-guided TNAB were performed in our case, and a section prepared from the TNAB of the right lung was microscopically examined. A tumor that had infiltrated the stroma under the bronchus epithelium was observed. The tumor was composed of pleomorphic

cells with glandular structures, large eosinophilic cytoplasm, large hyperchromatic nuclei, and prominent nucleoli (Figure 3a). Immunohistochemical staining of the tumor cells was positive for TTF-1, CK7, and Napsin A (Figure 3b-d). The case was reported as "Primary Lung Adenocarcinoma."

US-FNAB was performed on the mass in the thyroid, and atypical cells with extensive eosinophilic cytoplasm, large hyperchromatic nuclei, and prominent nucleoli were observed on

colloidal ground determine whether these atypical cells belonged to the primary thyroid pathology or the lung tumor metastasis, a needle core biopsy was taken. In the needle core biopsy of the thyroid, a tumoral lesion was observed next to the normal thyroid tissue. The tumor was histomorphologically similar to the tumor in the TBNAB bronchoscopic biopsy observed for TTF-1 in both the thyroid tissue and the tumor tissue (Figure 4c). Although colloidal staining for thyroglobulin in the thyroid tissue was observed, the tumor tissue was negative (Figure 4d). Immunoreactions with Napsin A were seen in the tumor tissue (Figure 4e). The histopathology based on the immunohistochemistry was diagnosed as metastases to the thyroid from lung adenocarcinoma. According to the literature, metastatic involvement of the thyroid gland is rare. The inci-



**Figure 4. a-e.** (a) The microscopic view of the US-FNAB from the mass in the thyroid. Thyrocytes that do eosinophilic cytoplasm, large hyperchromatic nuclei, and prominent nucleoli are at the top of picture. (H&E staining, 400× magnification), (b) The microscopic view of the needle core biopsy of the thyroid. Normal thyroid tissue is shown in the lower right corner, and the tumoral lesion is shown in the upper left corner, which is histomorphologically similar to the tumor with TNAB. (H&E staining, 200× magnification), (c) Nuclear immunohistochemical staining for TTF-1 in both tumor tissue and thyroid tissue in the needle core biopsy of the thyroid. (TTF-1 staining, 200× magnification), (d) Immunopositivity for thyroglobulin in the thyroid tissue and colloid staining is shown at the top of the image, and immunonegativity of the tumor cells in the needle core biopsy of the thyroid is shown at the bottom of the image. (Thyroglobulin staining, 100× magnification), (e) Cytoplasmic granular staining for Napsin A in tumor cells from the needle core biopsy of the thyroid. (Napsin A staining, 400× magnification).

dence of clinically significant (palpable mass) metastasis is much lower than the incidence found at autopsy because metastasis of autopsy cases includes nonclinical subjects comprising occult cancer and widespread cancer at the time of death. In addition, a palpable thyroid metastasis as the first presenting symptom is an extremely rare finding, and only a handful of cases are known to date, the majority of which have been comprised of conventional renal cell carcinoma as the primary tumor, and lung being the primary tumor is still a rare occurrence (5).

## Conclusion

Metastatic involvement of the thyroid gland usually indicates advanced-stage disease and poor prognosis. Although many authorities suggest surgery in the case of single palpable metastases or to alleviate airway obstruction, there is no consensus on its treatment. Treatment instead depends on individual circumstances. Even though primary tumors of the thyroid are more common and usually benign, the rare possibility of metastases should always be kept in mind in the differential diagnosis, and this should be supported by additional immunohistochemical assays, especially in patients with a positive history of renal cell, breast, and lung cancer.

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