

## Small Cell Lung Cancer With Metastasis to the Thyroid in a Patient With Toxic Multinodular Goiter

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**Abstract:** Thyroid metastasis of lung cancer is rarely observed in clinical practice. The primary cancers which metastasize to the thyroid gland are mostly renal cell carcinoma, lung cancer, and breast cancer. Transient destructive thyrotoxicosis is caused by massive metastasis of extrathyroid tumors. We herein present a case report of a patient with small cell carcinoma of lung with metastasis to the thyroid and thyrotoxicosis due to toxic multinodular goiter. A 66-year-old man complained of swelling around the right side of the neck, dyspnea, progressive weight loss, and palpitation starting since 3 months before his admission. The patient was diagnosed with small cell carcinoma of lung with metastasis to the thyroid and thyrotoxicosis due to toxic multinodular goiter. The case report presented here illustrates the challenge of making a definitive and adequate diagnosis, particularly if the patient presents with 2 potential causes of thyrotoxicosis. Thyroid scintigraphy is an important tool for differential diagnosis of thyrotoxicosis.

**Key Words:** Small cell lung cancer, thyrotoxicosis, metastasis to thyroid, toxic multinodular goiter

Thyroid metastases are uncommon, accounting for 1.5%–7.5% of all thyroid malignancies. The incidence ranges from 3.9% to 24.2% based on autopsy studies; however, the clinically demonstrated incidence is only between 0.05% and 3.1%. The primary cancer sites of these metastases are commonly the kidneys, lungs, and breasts.<sup>1–4</sup>

Of the pulmonary malignancies metastasizing to the thyroid, adenocarcinoma is the most common reported tumor, followed by squamous, small cell lung cancer (SCLC) and large cell carcinomas.<sup>2–7</sup> Previously, transient destructive thyrotoxicosis caused by massive metastasis of extrathyroid tumors has been described in the literature.<sup>8</sup>

We herein present a very rare case of small cell carcinoma of lung with metastasis to the thyroid and thyrotoxicosis due to toxic multinodular goiter.

### CLINICAL REPORT

A 66-year-old man complained of swelling around the right side of the neck, dyspnea, progressive weight loss, and palpitation starting

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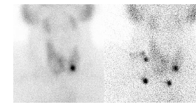
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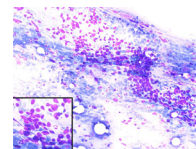
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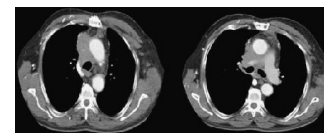


**FIGURE 1.** Thyroid scintigraphy. Bilateral thyroid hyperplasia with a big nodular hypoactive lesion in the right lobe, and bilateral multiple hyperactive nodular lesions.

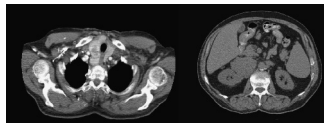
since 3 months before of his admission. There was no history of fever, chest pain, or hemoptysis. He was a chronic smoker for the past 40 years (75 packet-years). The medical record of the patient included a coronary bypass operation. On admission, his radial pulse rate was 112 beats per minute. Physical examination revealed an enlarged thyroid gland. Cardiovascular, abdominal, and neurological system examinations were unremarkable. Laboratory data on admission showed 11.3 g/dL hemoglobin and 68 mm/h erythrocyte sedimentation rate. Thyroid function tests revealed elevated free T4 of 32.11 pmol/L (normal range 12–22 pmol/L), and thyroid-stimulating hormone (TSH) level was 0.03  $\mu$ IU/mL (normal range 0.27–4.2  $\mu$ IU/mL). Serum levels of carcinoembryonic antigen 4.05 ng/mL (normal range 0–4.3 ng/mL), calcitonin 6.49 pg/mL (normal range 0–100 pg/mL), thyroglobulin 64.24 ng/mL (normal range 1.4–78 ng/mL), and antithyroglobulin antibody 1.5 IU/mL (normal range 0–4.11 IU/mL) were not elevated. Other renal and hepatic biochemical profiles were normal. Ultrasonography (USG) of the neck revealed an enlargement of thyroid glands with well-defined hypochoic multiple nodules without any calcific foci, 2 of them being in the right lobe with sizes of 24  $\times$  33 and 8  $\times$  7.5 mm, and the other one in the left lobe with a size of 15.5  $\times$  12 mm. Also, thrombus within both the jugular veins and cervical lymphadenopathy were detected. Thyroid scintigraphy revealed bilateral thyroid hyperplasia with a big nodular hypoactive lesion in the right lobe and bilateral multiple hyperactive nodular lesions (Fig. 1). Fine-needle aspiration of hypoactive thyroid nodule under ultrasound guidance was performed and revealed features of metastatic small cell carcinoma (Fig. 2). Chest radiography revealed a relatively regular central homogeneous density in the right hilar region and bilateral alveolar opacities. Computed tomography (CT) of the chest and abdomen revealed multinodular goiter, a solid mass in the right hilar region, thrombus in the superior vena cava, and a mass with a size of 8  $\times$  5 cm in the right adrenal gland (Figs. 3 and 4). Brain magnetic resonance imaging and bone scintigraphy revealed no abnormality. We were unable to perform fiberoptic bronchoscopy because of high cardiac risk. The patient was evaluated as extensive stage due to adrenal and thyroid metastasis and hyperthyroidism due to toxic adenomas. For



**FIGURE 2.** Small cell carcinoma. Fine-needle aspiration smears show loose aggregates of atypical monotonous cells displaying nuclear molding in the necrotic background. Higher magnification of the tumor cells (inset) (May-Grunwald-Giemsa, original magnification  $\times$ 100).



**FIGURE 3.** Chest CT shows a solid mass in the right hilar region.



**FIGURE 4.** Computerized tomography shows multinodular goiter, a solid mass in the right thyroid hilar region, and a mass in the right adrenal gland.

these reasons, surgery was not considered. Then the patient was submitted to methimazole 15 mg/day and propranolol 80 mg/day for hyperthyroidism, and etoposide and cisplatin treatment protocol for small cell lung cancer. The patient died 11 months after the diagnosis was established.

## DISCUSSION

SCLC is an extremely rapidly progressive lung cancer. In general, metastasis can be in the bone, liver, brain, or pleura. Metastasis to the thyroid gland is very rare and there are only a few case reports or studies about it. The most common histological subtype of lung cancer metastasis to the thyroid is adenocarcinoma, and small cell lung cancer is unusual and unexpected.<sup>7-9</sup>

Metastatic thyroid tumor is rarely diagnosed clinically. Furthermore, metastatic thyroid tumor complicated with thyroid dysfunction is extremely rare. There exists the possibility of thyroid dysfunction due to thyroid destruction in patients with thyroid metastases. Transient thyrotoxicosis caused by massive metastasis of extrathyroid tumors has been described in the literature.<sup>8</sup> Destructive thyroiditis is the general term for a number of disorders (such as carcinoma metastatic to the thyroid) characterized by hyperthyroidism due to release of preformed thyroid hormone. The radioactive iodine uptake is absent in all cases when hyperthyroidism is present. The duration of hyperthyroidism is changed by the amount of thyroid hormone present. In contrast to destructive thyroiditis, radioactive iodine uptake in toxic multinodular goiter demonstrates multiple areas of focal increased and suppressed uptake.

Our case presented with a 3-month history of swelling around the neck, dyspnea, progressive weight loss, and palpitation. In the first evaluation, the clinical and radiological findings of our patient did not indicate metastasis to the thyroid gland. He had elevated FT4 level and markedly decreased TSH level with multinodular goiter on neck USG. In contrast to destructive thyroiditis, our patient's thyroid scintigraphy revealed bilateral thyroid hyperplasia with a big nodular hypoactive lesion in the right lobe and multiple hyperactive nodules in the left and right lobe when hyperthyroidism was present. The patient underwent fine-needle aspiration for the hypoactive thyroid nodule under ultrasound guidance, and pathological examination of the specimen revealed features of a metastatic small cell carcinoma. He had a solid mass in the right hilar region, thrombus in the superior vena cava, and a mass with a size of  $8 \times 5$  cm in the right adrenal gland on thorax CT. The initial diagnosis was stage 4 lung cancer (metastasis to the adrenal and thyroid gland). We did not perform fiberoptic bronchoscopic examination because of high cardiac risk. We accept the primary site as the lung, and etoposide and cisplatin treatment protocol was started. The patient died 11 months after the diagnosis was established.

As a result, lung cancer metastasis to the thyroid gland is rare. Thyrotoxicosis in patients with lung cancer is mainly due to the destruction of thyroid gland by metastasis. However, as in our case, thyrotoxicosis may be the main cause of hyperthyroidism such as Graves diseases or toxic nodules.

The case report presented here illustrates the challenge of making a definitive and adequate diagnosis, particularly if the patient presents with 2 potential causes of thyrotoxicosis. Thyroid scintigraphy

is an important tool for the differential diagnosis of thyrotoxicosis. In conclusion, thyrotoxicosis has multiple etiologies, manifestations, and potential therapies. Appropriate treatment requires an accurate diagnosis and is influenced by coexisting medical conditions.

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## Aesthetic Mental and Cervical Reconstruction After Severe Acne Inversa by Using a Bilateral Pedicled Expanded Forehead Flap

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**Abstract:** Acne inverse (AI), also known as hidradenitis suppurativa, is characterized by inflammatory nodules, fistulating sinus

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