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Small Cell Lung Cancer Metastasis to Thyroid Gland

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Case Report

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ABSTRACT

Small Cell Lung Carcinoma is an aggressive lung cancer with a prognosis that typically depends on its metastatic burden. The common sites of metastasis upon diagnosis are lung, liver, bone, brain and adrenal glands. This study reports the case of a 57-year-old female initially diagnosed with limited stage-small cell lung carcinoma. While the patient was undergoing treatment, two thyroid nodules were discovered on a re-staging Positron Emission Tomography-Computed Tomography (PET-CT) scan. The patient underwent Fine Needle Aspiration (FNA) of the larger nodule with indeterminate results, leading to a thyroidectomy. The nodules were both tumors, but were of differing pathology, making them a rare case of "collision tumors." One of the tumors was small cell metastasis, which is uncommon in the thyroid. The patient is now being treated for recurrent extensive disease-small cell lung carcinoma. This case exhibits the indication for investigating the rare occurrence of thyroid metastasis in small cell lung carcinoma upon diagnosis, and during restaging.

Keywords: Lung cancer; Tumor; Thyroid; Metastasis

INTRODUCTION

Small Cell Lung Carcinoma (SCLC) is an aggressive form of lung carcinoma, commonly discovered with diffuse poly metastasis already present. The most common sites of metastasis are the liver, bone, brain, and adrenal glands. Metastasis to the thyroid gland is rare with a frequency of only 36% of all malignant thyroid tumors.

In an examination in clinical studies, metastasis to the thyroid is rare, but in autopsy studies, it has been reported that up to 24% of patients with non-thyroid malignancies have metastasis to the thyroid gland. Clinical studies show the most common type of thyroid metastasis is renal cell carcinoma of the clear cell type, but autopsy studies show

the most common primary tumor is lung malignancies. The top six most common primary malignancies, which metastasize to the thyroid, are renal cell carcinoma, colorectal carcinoma, lung carcinoma, breast carcinoma, sarcoma, and melanoma [1-3].

Collision tumors are described as a rare occurrence when two distinct histologic neoplasms are found in the same organ. Collision tumors account for less than 1% of all thyroid tumors. It is currently unclear if there is a mechanism by which one tumor influences the presence of another in the thyroid [4, 5].

Thyroid lesions are common and are often found incidentally on imaging. Only approximately 7-15% of these thyroid nodules are malignant, leading to the recommendation that they should only be investigated when they are suspicious for malignancy. In a clinical setting, physicians can utilize factors that may indicate malignancy such as family history, prior cancer history, rapid growth, irradiation history to the neck, concerning physical exam findings, and measurements such as Thyroid Stimulating Hormone (TSH). Staging of SCLC is based on the two-stage classification system from the Veterans Administration Lung Study group with categories consisting of limited stage and extensive stage. Limited stage disease is confined to one hemithorax with or without lymph nodes that can be encompassed by a radiation port. Extensive stage disease is any disease spread outside of the requirements for limited stage disease. Typical treatment course for Extensive Stage Small Cell Lung Carcinoma (ES-SCLC) versus Limited Stage-Small Cell Lung Carcinoma (LS-SCLC) differs. Patients with LS-SCLC are typically treated with chemotherapy, and radiation therapy, but ES-SCLC additionally requires targeting with immunotherapy. Recognition of metastasis in the thyroid could indicate restaging and alterations in a patient's treatment course. In this study, we report a rare case of metastasis of SCLC to the thyroid incidentally discovered on a progress PET-CT scan.

CASE PRESENTATION

We present a case of a 57-year-old white female diagnosed in February of 2022 with limited stage small cell lung carcinoma with bulky pre-tracheal mediastinal lymphadenopathy. She initially presented with a 6-month history of greater than 30 lb weight loss prior to an abnormal chest Computed Tomography (CT) scan. Magnetic Resonance Imaging (MRI) of the brain was found to be negative. Biopsy showed SCLC. Her initial treatment course consisted of chemo radiation and prophylactic cranial irradiation. A progress Positron Emission Tomography (PET) scan showed reduction in pre-tracheal lymphadenopathy, but a faint hypo dense right thyroid nodule was noted. Shortly after, a repeated PET scan demonstrated a hypo dense right thyroid nodule measuring 1.9 x 1.2 cm, which was a new finding compared to a prior study. A thyroid ultrasound was performed and showed two irregular nodules. Nodule 1, located at the mid/upper pole of the right lobe, showed an almost or completely solid, hypoechoic lesion measuring 3.8 x 3.0 x 2.4 cm measuring 4 on the TI-RADS scale. This nodule correlated to the lesion noted on the previous PET-CT. Nodule 2, located in the lower pole showed an almost/completely solid, hypoechoic lesion measuring 0.5 x 0.4 x 0.3 cm measuring 4 on the TI-RADS scale.

Biopsy of Nodule 1 reported atypia of undetermined significance, leading to a thyroidectomy. Nodule 1 was determined to be high grade small cell carcinoma through gross morphology and immunohistochemistry results. Nodule 2 was confirmed to be papillary thyroid carcinoma based on immunohistochemistry results. The patient's new staging for small cell carcinoma is recurrent extensive small cell lung Carcinoma, and she is currently undergoing chemo immunotherapy.

DISCUSSION

Small cell lung carcinoma is commonly metastatic to the brain, adrenal glands, liver, and bone. The frequency of metastasis to the thyroid from a malignant tumor is a rare occurrence. Tang et al., [2] reports that only 36% of malignant tumors metastasize to the thyroid. Some theories suggest that the low rate of metastasis to the thyroid is due to its high rate of blood flow and elevated iodine and oxygen concentrations. In autopsy studies, up to 24% of patients had thyroid metastasis. The rates of metastasis to the thyroid appear low in clinical settings, but in autopsy studies, it is more frequent, showing it is commonly missed. Additionally, clinically the most common type of primary tumor is renal cell carcinoma, but in autopsy studies, it is lung carcinomas. In thyroid nodule investigation, it is important to consider the entire clinical picture. Thyroid nodules are common, are often benign, and can be found incidentally on imaging. This case and similar cases are an indication to investigate further into the thyroid nodule because the patient's primary cancer, lung cancer, is the second most common cause of thyroid metastasis [6-8].

It is important to note that initially, thyroid lesions may appear to be a primary thyroid tumor, but we encourage investigation of all lesions that appear on progress PET scans of patients with current or previous malignancies. In the case of the patient we present, there were two thyroid lesions. After FNA biopsy was inconclusive, a thyroidectomy was performed which revealed the patient had collision tumors, two histologically and morphologically distinct tumors occurring in one organ. This complicated the course of this patient because it was not suspected that either of these tumors would be lung metastasis. This discovery of thyroid metastasis changed her staging status from LS-SCLC to ES-SCLC, thus changing the approach to her treatment.

Promptly identifying metastasis in a timely manner can change outcomes of carcinoma. In staging of SCLC, extent of metastasis plays a pivotal role in treatment choices and prognosis, further illustrating the importance of promptly recognizing thyroid metastasis. In the case of this patient, the discovery of the thyroid metastasis changed her staging from LS-SCLC to ES-SCLC and altered her treatment course.

CONCLUSION

In conclusion, this case highlights the importance of thorough evaluation of thyroid nodules, particularly in patients with Small Cell Lung Carcinoma (SCLC). Despite the rarity of thyroid metastasis, its discovery can significantly impact staging and treatment decisions, as evidenced by the shift from limited to extensive stage SCLC in this patient. The occurrence of collision tumors further underscores the complexity of managing concurrent histologically distinct tumors within the same organ. Prompt identification of thyroid metastasis is crucial for optimizing treatment approaches and improving patient outcomes. By leveraging advanced imaging techniques and maintaining a high index of suspicion, clinicians can better tailor therapeutic strategies and potentially enhance the prognosis for individuals with SCLC and similar metastatic patterns. This case emphasizes the importance of interdisciplinary collaboration and comprehensive evaluation in the management of patients with SCLC and suspected thyroid involvement.

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