Clinical Case Report

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Small cell lung cancer mimicking lymphoma in CT and ^{68}Ga-DOTA-NOC PET/CT

A case report

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Abstract

Rationale: Small cell lung cancer accounts for 15-20% of all lung cancers and is the most common pulmonary neuroendocrine neoplasm. Most small cell lung cancers arise from lobar or main bronchi, the most common manifestations of small cell lung cancer is a large mass centrally located within the lung parenchyma or a mediastinal mass involving the hilus. Small cell lung cancer is easily ignored by clinicians without lung parenchyma and hilus involvement. Here, we report a case of small cell lung cancer, which was misdiagnosed as the lymphoma in contrast enhanced CT and ^{68}Ga-DOTA-NOC PET/CT imagings.

Patient concerns: A 49-year-old male with chief complaint of discontinuous cough for 1 month.

Diagnoses: Small cell lung cancer.

Interventions: Radiotherapy and chemotherapy were given thereafter.

Outcomes: The case had multiple enlarged lymph nodes due to tumor progression.

Lessons: Small cell lung cancer is a malignant and progressive disease, and easy to be ignored in clinical. The case of small cell lung cancer without parenchyma and hilus involvement has never been reported before. Here, we report it and hope it provides a differential diagnosis for clinicians in the following similar cases.

Abbreviations: ^{68}Ga-DOTA-NOC = ^{68}Ga-1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid-1-Nal^3 octreotide, CT = computed tomography, PET/CT = positron emission tomography/computed tomography, SCLC = small cell lung cancer, SUV = standardized uptake value.

Keywords: CT, lymphoma, PET/CT, SCLC

1. Introduction

Small cell lung cancer (SCLC) is a high-grade disease located in the mediastinum and hilus of the lungs, with frequent lymph nodes involvement.[1] The primary tumor is usually small but the metastasis is pretty large. Most SCLCs arise from lobar or main bronchi, the most common manifestations of SCLC is a large mass centrally located within the lung parenchyma or a mediastinal mass involving the hilus, but it is rarely located in the anterior mediastinum without any manisfection of hilus.[2] Here, we report a case of SCLC without any tumor in the lung or the hilus, which was misdiagnosed as the lymphoma in CT and ^{68}Ga-DOTA-NOC PET/CT imagings.

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LL and FL contributed equally to this study.

The authors have no conflicts of interest to disclose.

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2. Case report

A 49-year-old man presented with a 1-month history of discontinuous cough. No fever was reported. The patient had no other medical history. There was no bloody or purulent discharge. Contrast enhanced computed tomography (CT) imaging and positron emission tomography (PET)-CT were performed. Chest intravenous contrast material-enhanced CT images showed a lesion in the anterior superior mediastinum. The maximum cross section was approximately 8.96×7.45 cm. The fat line between the thyroid and the mass disappeared. The mass was predominantly solid, with lobulated margins. Slightly heterogeneous enhancement was seen in the mass. Left common carotid artery passed though the mass. And the narrowed trachea was seen (Fig. 1 A–E). There was no plural effusion. ^{68}Ga-DOTA-NOC PET/CT scanning demonstrated a lesion with ill-defined margin. The abnormal increase of glucose metabolism was heterogeneous, and the SUVmax was about 2.83 (Fig. 2 A–D). The immunohistochemical examination of the mass relative to thyroid revealed CK, ema, ttf, syn, and CD56 were positive, Ki-67 was 90% positive (Fig. 3 A and B). SCLC was considered and the mass arising from the lung was suspected. CT-guided biopsy of this lesion was performed and subsequent immunohistochemical examination revealed a SCLC.

3. Discussion

Imaging findings showed an occupying solid mass extending to the left thyroid without any distant lesion. The margin of the mass was lobulated with fused lymph nodes. There was no plural effusion and hilus of lung involvement. Since the enlarged lymph nodes were noted and fused, the left common carotid artery floated

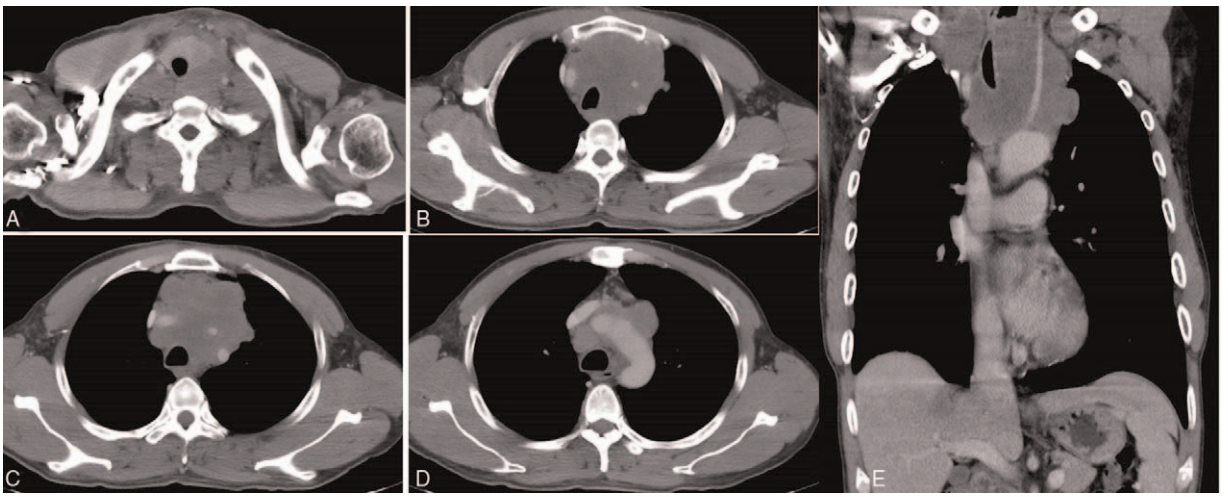

Figure 1. Contrast enhanced CT images showed the lesion was related to thyroid (A) (arrow head), heterogeneous enhancement (B and C) (arrow head), and enlarged lymph nodes (D) (arrow head). The left common carotid artery passed though the mass (E) (arrow head).

in the huge mass, In previous pilot study, more than half of lymphomas showed uptake of ^{68}Ga-DOTA-NOC,[3] which is in line with this case. So the lymphoma was our first diagnosis. Meanwhile, the thyroid was involved, the differential diagnosis included thyroid carcinoma and thymicarcinoma.[4] Several studies have reported that mediastinum is commonly involved by lymphoma and lymphoma was the most frequent diagnosis.[5–7] SCLC was not our first diagnosis, because the mass did not fit the typical appearance of SCLC. In this patient, although the first clinical symptom was cough which was a sign of lung disease, the age is younger than the average age of SCLC which usually occurs in older men (60–70 years old).[1,2,8] All pulmonary neuroendocrine neoplasm include typical carcinoid, which is a low-grade malignancy, atypical carcinoid, which is a medium-grade malignancy, and large cell neuroendocrine carcinoma and SCLC, which are high-grade malignancies.[2,9] SCLC accounts for 15% to 20% of all lung cancers and is the most common pulmonary neuroendocrine neoplasm.[8] SCLC is well known to be closely associated with smoking and is more aggressive than nonsmall cell lung carcinoma (NSCLC) due to a rapid doubling time, high growth fraction (the ratio of proliferating cells to total cells), and greater propensity for early development of widespread metastases.[2]

Because 90% to 95% of SCLCs arise from lobar or main bronchi, the most common manifestations of SCLC is a large mass centrally located within the lung parenchyma or a mediastinal mass involving the hilum.[9,10] However, SCLC may occasionally arise as a relatively small bronchial tumor. Contrast-enhanced CT scans can be useful for the diagnosis and revealing the extent of mediastinal invasion. However, only a few studies have reported CT findings of SCLC. Lee et al[9] reported distribution of lymph node enlargement and classified the SCLC types according to tumor location and meditational extension on CT scans and identified recognizable CT features for predicting SCLC. SCLC was classified into 4 types. Type I, which was only a hilar mass; type II, which was hilar mass with ipsilateral mediastinal extension; type III, which was a hilar mass with contralateral mediastinal extension; and type IV, which was a peripheral mass with or without mediastinal lymphadenopathy. It is obvious that our case does not belong to any typical type.

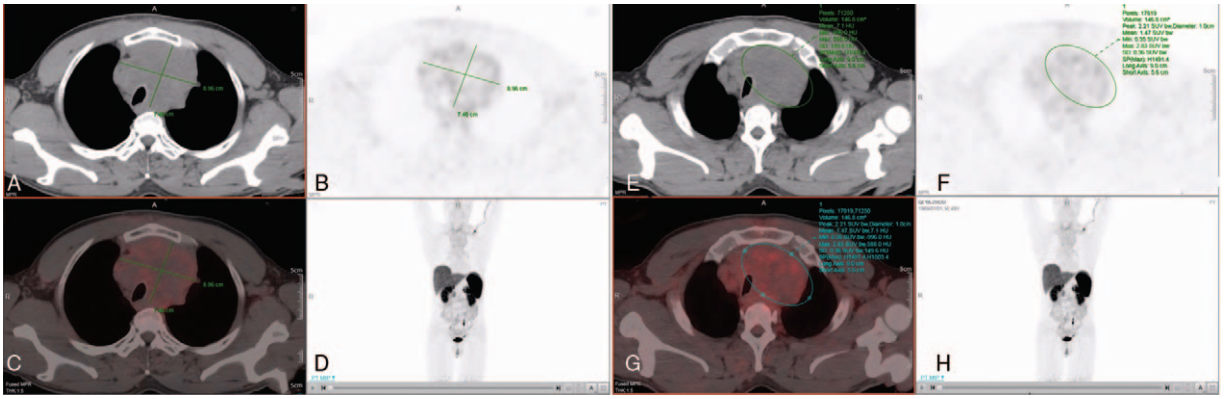

Figure 2. ^{68}Ga-DOTA-NOC PET/CT scanning demonstrated a low density lesion in the anterior mediastinum, the maximum cross section was approximately 8.96 × 7.45 cm and the SUVmax was about 2.83. The lesion: transverse CT (A and E) (arrow head), corresponding PET (B and F), fusion images (C and G) (arrow head), and the maximum intensity projection PET image (D and H).

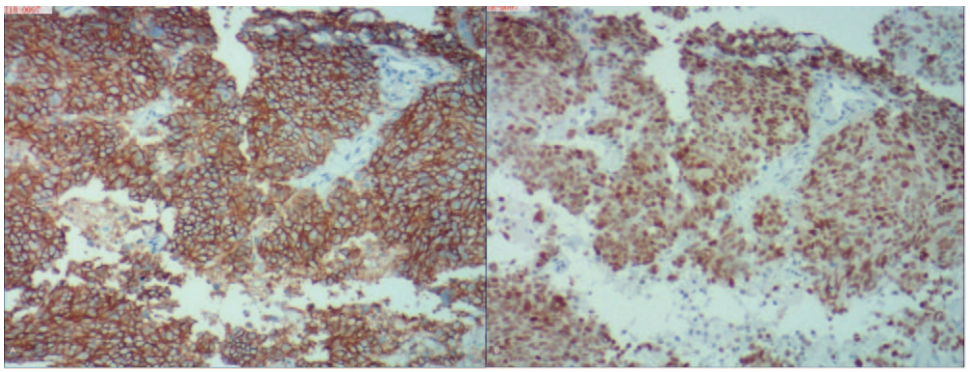

Figure 3. The immunochemical examination of the mass relative to thyroid revealed CK, ema, ttf, syn, and CD56 were positive, Ki-67 was 90% positive. The study involves patient consent, and the informed consent was given.

This may enrich imaging findings of SCLC, and hope our case provides a differential diagnosis for clinicians in the following similar cases.

Author contributions

Data curation: Yamei Zhang.
Software: Peng Wang.
Supervision: Xindao Yin, Wenbin Li.
Writing – original draft: Liyan Lu.
Writing – review & editing: Fengfang Li.

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