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CASE REPORTS

Small Cell Lung Cancer in a Young, Non-Smoker Patient

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Abstract

Introduction: A single lung nodule (SPN) is defined as a solitary lung opacification less than 3 cm in size. The diagnostic process for small cell lung cancer (SCLC) is a crucial aspect of patient care, especially for older and heavy smokers. A contrast-enhanced computed tomography of the chest followed by an f-fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) and pathology examinations are the main ones that determine the diagnosis.

Case Report: This case report of a young patient, 33 years old, a non-smoking male mining engineer, presents a significant diagnostic challenge. The patient presented to the clinic with a dry cough that started after a viral situation. No other known comorbidities and family history of lung cancer. A routine chest x-ray was ordered, where an apical round opacity in the apex of the right lung was seen. Sputum for mycobacterium tuberculosis was done and came back negative. A chest scan with contrast showed a solitary pulmonary nodule in the apex of the right lung with well-demarcated contours with dimensions 28 x 22 mm. Given that the dimensions of the nodule were large and not specific for benign pathology, a PET/CT was ordered, which confirmed the nodule resulted in an SUV over that 4.5, which was also not specific for lung TB. The histologic examination of the nodule was done then, and the result, unfortunately, was a small cell lung cancer in the right lung.

Conclusion: SCLC is found to be a mass lesion in the lungs in most cases. The differential diagnosis between lung tuberculosis (TB) and lung cancer in such cases is a complex and crucial task for pulmonologists and radiologists, highlighting the importance of their work.

Keywords: small cell lung cancer, computed tomography, lungs, histologic examination

Introduction

A single lung nodule (SPN) is defined as a solitary lung opacification less than 3 cm in size.

It is usually freestanding and does not attach to the edge of the lung or pleura. Associated lymphadenopathy is generally absent. It is most often discovered accidentally when a chest X-ray or a chest scan is done for lung cancer screening or other reasons. The differential diagnosis of SPN is very different: from inflammatory causes, such as lung abscess and granulomatous; congenital, such as arteriovenous malformation; benign causes, such as lung hamartoma, to malignant ones, where the most frequent are bronchogenic carcinoma and metastatic lymphoma. [1, 2]

Age and smoking history were associated with SPN malignancy as clinical risk factors. In particular, small cell lung cancer (SCLC) affects more patients who are heavy smokers. Other risk factors for lung cancer include passive smoking, exposure to asbestos, radon, and other environmental factors. Although smoking is associated with all types of lung cancer, the strongest associations are with SCLC and squamous cell lung cancer. Men have

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a higher incidence of SCLC. They are centrally located in most cases, arising from the main stem or lobar bronchus, and thus appear as hilar or perihilar masses associated with mediastinal lymph nodes. A contrast-enhanced computed tomography of the chest followed by a f-fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) and the pathology examinations are the main ones that determine the diagnosis. [3, 4]

Case Report

The patient D.A., 33 years old, a non-smoking male, and a mining engineer by profession, was presented to the clinic with a dry cough that started after a viral situation. His profession as a mining engineer may be significant due to potential occupational exposure to certain substances. He said several episodes of the "common cold" have been accompanied by fatigue and light sweating in the past year. These situations were resolved with symptomatic treatment after consulting his family doctor. In his personal history, he has no known chronic diseases. He was born and raised in the northern part of the country as a child in a large family. He denied any chronic severe diseases in his close family members.

We found no specific findings on objectively examining the entire body and respiratory system. Vital parameters were within normal limits. Almost all clinical and biochemical laboratory tests were within normal limits, except a positive interferon-gamma value and a PPD test of 11 mm. These tests were conducted to assess the patient's immune response and the presence of tuberculosis, which can be relevant in the diagnosis of SPN. A chest x-ray was ordered, where an apical round opacity in the apex of the

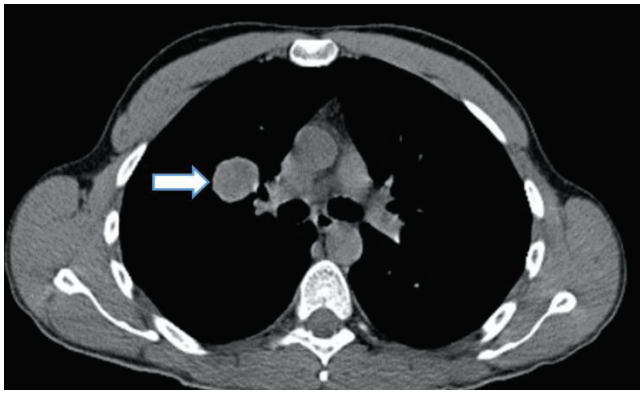

Figure 1. Chest scan of the lungs. There is a regular shape nodule

right lung was seen. As a result, a high-resolution chest scan with intravenous contrast was done to evaluate the lesion (figure 1).

There was a solitary pulmonary nodule in the apex of the right lung with well-demarcated contours with dimensions 28 x 22 mm with no other pathologic findings in the other part of the right lung and the left lung. Based on these data, a direct examination of sputum for mycobacterium tuberculosis was done, and the results were negative. It's important to note that a negative result in a sputum examination does not completely rule out the possibility of tuberculosis, as the bacteria may not be present in the sputum sample.

When we sent the sputum for the culture of Mycobacterium tuberculosis, we discussed the nodules' characteristics, density, and contours with the radiologist. The size of the nodule was more significant than expected for tuberculosis origin. As a result, an all-body

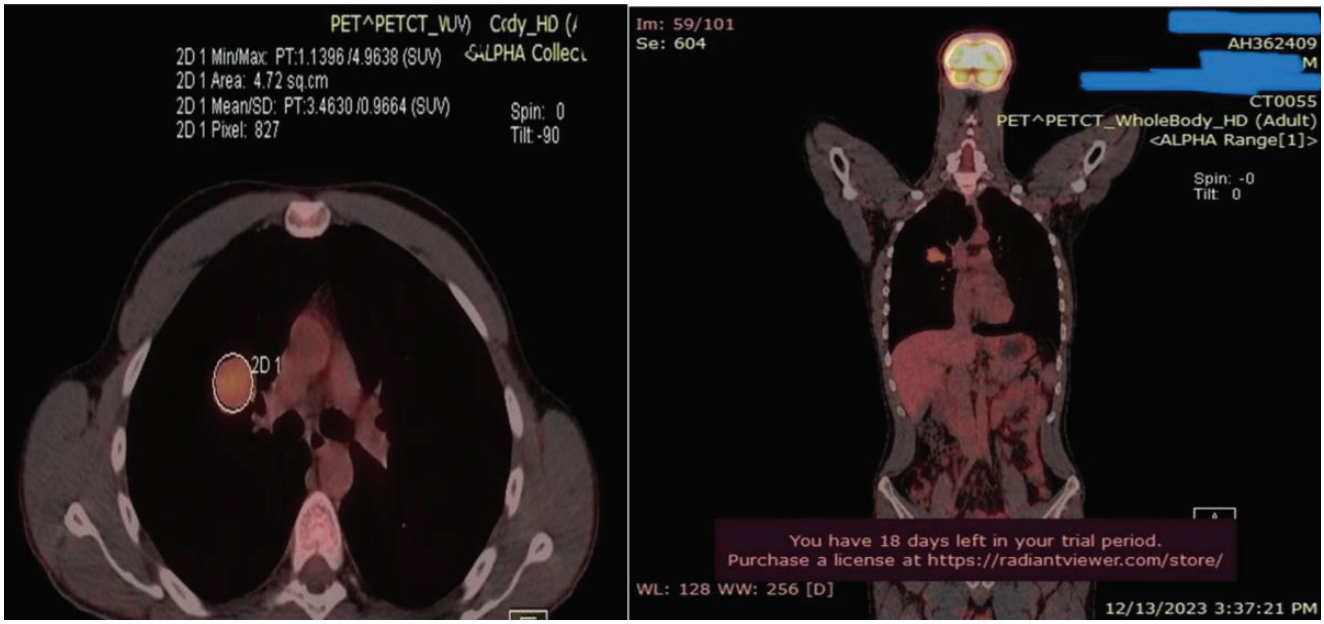

Figure 2: PET/CT all-body. A solitary right nodule LSD 28x22mm, SUVmax 4.9 (Cut off SUVmax in tumors over 2.0). There are no pathological hilar, mediastinal, and supraclavicular lymph nodules. There is no data on pathological fixation of 18F-FDG in the liver, bone, or spleen.

f-fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) was ordered. The node result of an SUV over that 4.5 was also not specific for lung TB (figure 2).

Then, a transbronchial nodule biopsy was performed with a flexible bronchoscopy and a bronchial lavage (BAL). BAL was negative for malignant cells, mycobacterium tuberculosis, and other bacteria and fungi. The biopsy resulted in atypical cellular infiltrations (figure 3).

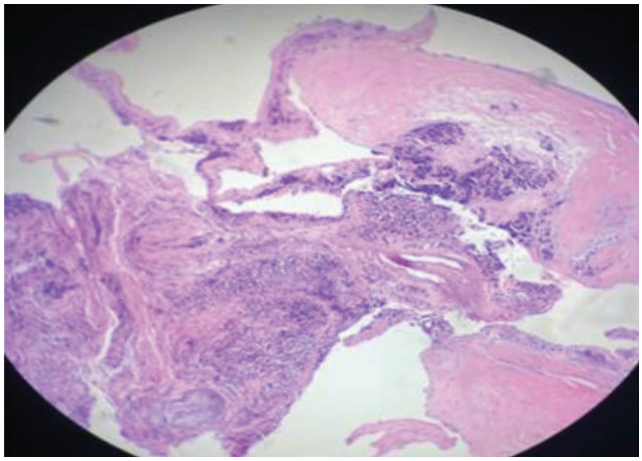

Figure 3: Hematoxylin and Eosin stain x 4 magnification

The immunohistochemical (IHC) specimens result showed a positive neural cell adhesion molecule (CD 56 +) (figure 4), Chromogranin + (figure 5), Synaptophysin + (figure 6), a negative thyroid transcription factor 1 (TTF 1 -) findings suggestive of small cell carcinoma.

After consultation with an oncologist, the patient began treatment with chemotherapy and radiation therapy. He is closely monitored and will be followed up according to lung cancer guidelines.

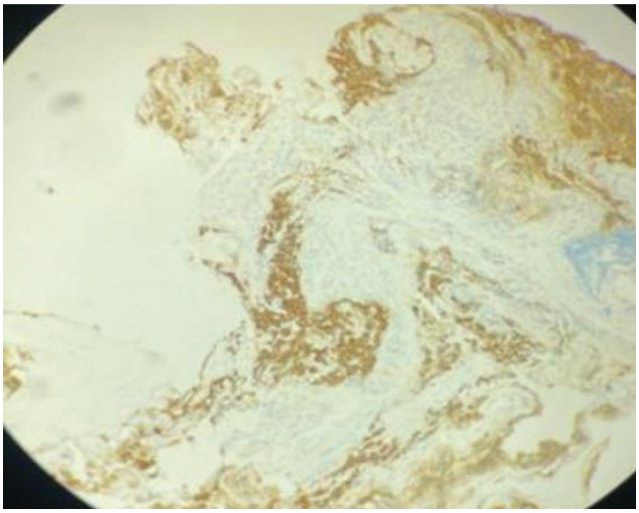

Figure 4: A positive neural cell adhesion molecule (CD 56 +)

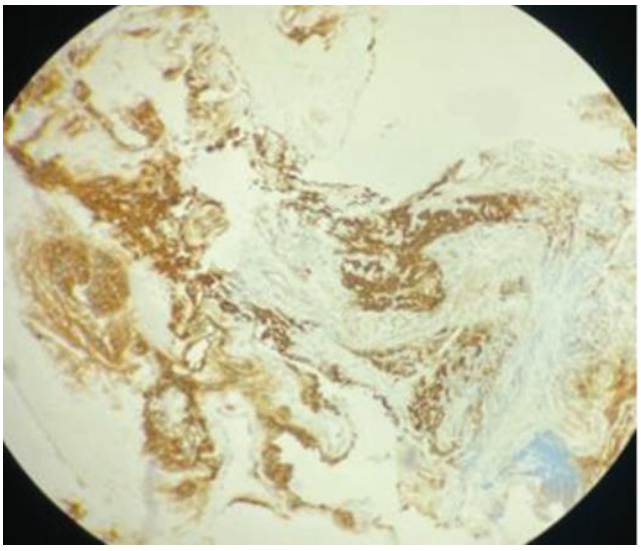

Figure 5: Chromogranin +

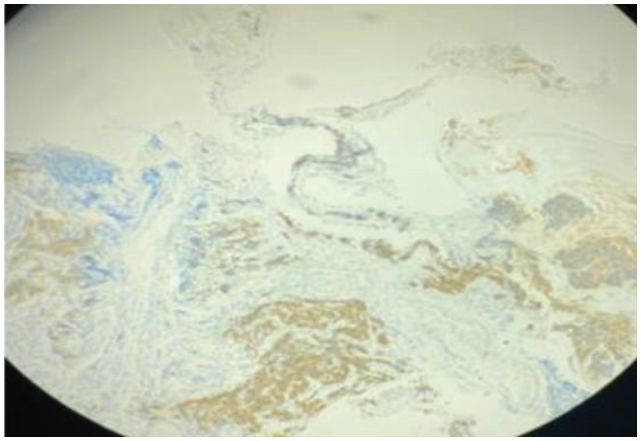

Figure 6: Synaptophysin +

Discussion

SCLC is found as a mass lesion in the lungs in most cases. A solitary pulmonary nodule is not such a common finding, especially in young and non-smoker patients. In our daily practice in the clinic, the patients with SCLC are older age heavy smokers or ex-smokers with a compromised general situation. At the first presentation of this patient, based on the history and radiological data, we thought that pulmonary tuberculosis was more likely.

Differential diagnosis between lung tuberculosis (TB) and lung cancer depends on several features, such as the location, size, shape of the mass and its lobes, edges, density, and enhancement characteristics. A chest scan with contrast is the most critical examination to distinguish them. Therefore, the exact diagnosis depends on the pathology of the biopsy [5-7]

Another aspect that should be discussed is the risk factors that should be considered in this case. We looked through the literature, and as it has already been confirmed, the main risk factors for SCLC are active and passive smoking, radiation or environmental pollution, and lung

cancer in the family history. In our case, the patient had no history of tobacco or known lung cancer. We speculate that environmental factors may be a possible cause, but we cannot prove this for sure [8, 9].

Another controversial issue is whether any newly discovered lung nodule in a young patient without risk factors for lung cancer, especially if the nodule does not radiologically show specific signs of neoplasia, should be immediately biopsied, or should we wait and follow up according to guideline recommendations? This is a significant dilemma that pulmonologists and radiologists face daily.

We believe that lung cancer in young, non-smoking patients has been increasing recently; further investigations are needed to determine the causes and to diagnose the early stages of the disease. The fact that these patients do not have essential comorbidities allows them to have better survival after diagnosis [10, 11]

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Conflict of Interest Statement: The authors declare no conflict of interest.

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