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A Case of Intracardiac Extension of Small Cell Carcinoma Demonstrated on F-18 FDG PET/CT

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Abstract

A 64 year-old male patient with 40 pack year history of smoking presented with hemoptysis and shortness of breath. CT demonstrated perihilar right upper lobe soft tissue mass with tumor invasion into the right mainstem bronchus, and invasion into the right superior pulmonary vein with tumor thrombus extending into the left atrium. Subsequent F-18 FDG PET/CT showed a large hypermetabolic right upper lobe mass invading into the right mainstem bronchus and the right superior pulmonary vein with tumor thrombus extending into the left atrium. The patient underwent bronchoscopy, and biopsies of the right upper lobe revealed small cell carcinoma.

Keywords: Small cell carcinoma; Tumor thrombus; Pulmonary vein; Cardiac invasion; FDG PET/CT.

Introduction

Intravenous extension of primary lung cancer is relatively rare, and it is even rare to metastasize to the left atrium (LA). A retrospective analysis of 4668 patients who had lung cancer and underwent surgery provided pathological evidence of pulmonary vein and LA invasion in 34 (0.7%) and 25 (0.5%) subjects, respectively[1]. Left atrium invasion was consistent with T4 of the TNM classification, and representing locally advanced disease and associated with a poor prognosis. Here, we present a rare case of small cell carcinoma invasion into the left atrium.

Case Presentation

A 64 year-old male patient with 40 pack year history of smoking presented with hemoptysis and shortness of breath. CTA of the chest with contrast demonstrated a large perihilar right upper lobe soft tissue mass (Figure 1). It measured approximately 7.4 x 10.4 x 9.0 cm (AP x transverse x CC). This tumor invaded into the right mainstem bronchus (+ in A in Figure 1), with complete occlusion of the proximal right upper lobe bronchus (+ in B in Figure 1). The distal bronchi of the right upper lobe were bronchiectatic. There was segmental right upper lobe postobstructive atelectasis, and nodular airspace opacities surrounding the mass. There was tumor invasion into the right superior pulmonary vein, with tumor thrombus extending into the left atrium (* in C and D in Figure 1). There was no CT evidence of pulmonary embolism to the level of the segmental vessels.

Staging F-18 FDG PET/CT demonstrated a large hypermetabolic heterogeneous solid perihilar mass in the right upper lobe, the maximum standard uptake value (SUV) was 20.6, with some area of necrosis

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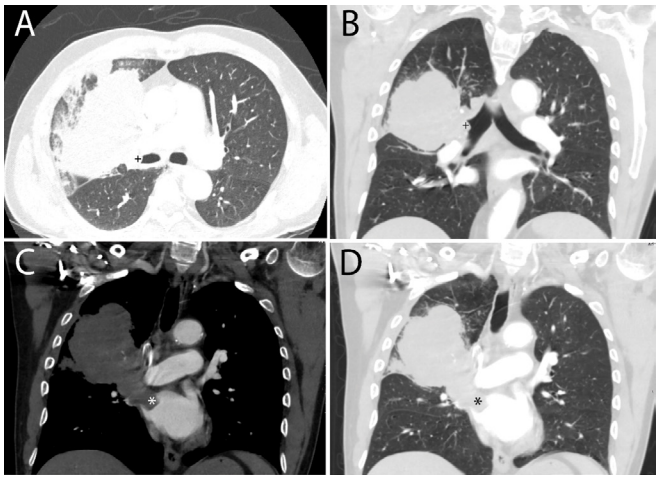

Figure 1: CTA of the chest with contrast demonstrated a large perihilar right upper lobe soft tissue mass with invasion into the right superior pulmonary vein, and tumor thrombus extending into the left atrium.

(Figure 2). This mass was abutting the mediastinum. Again this hypermetabolic mass was seen invading into the right mainstem bronchus, and invading into the right superior pulmonary vein with hypermetabolic tumor thrombus (SUV 5.7) extending into the left atrium (Figure 2). There was no evidence of distant metastasis.

The patient underwent bronchoscopy, and the biopsy of the right upper lobe revealed small cell carcinoma. Immunohistochemical stain showed positive staining for Chromogranin, synaptophysin and TTF-1. Focal staining was noted with CAM5.2. Ki-67 was approximately 35%, consistent with poorly differentiated neuroendocrine carcinoma, small cell carcinoma.

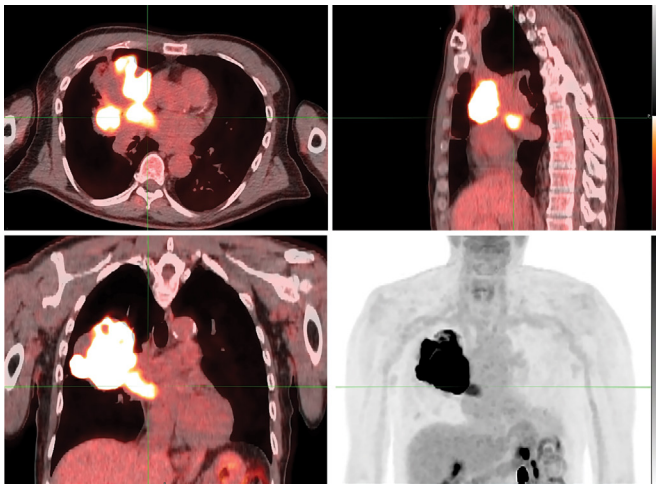

Figure 2: F-18 FDG PET/CT demonstrated a large hypermetabolic heterogeneous solid perihilar mass in the right upper lobe, invading into the right superior pulmonary vein, with hypermetabolic tumor thrombus extending into the left atrium.

Discussion

Cardiac metastases are often asymptomatic and diagnosed in the late stage of disease and associated with a poor prognosis. Left atrium invasion by lung cancer usually happens by two main mechanisms, including direct cardiac infiltration by nearby lung cancer [2-4] and extension into the left atrium via the lymphatics and/or the pulmonary veins [5-12]. Different types of lung cancer have been reported to invade the left atrium, including adenocarcinoma, bronchogenic carcinoma, non-small cell lung carcinoma and large cell neuroendocrine carcinoma [8, 9, 13 and 14]. Small cell lung cancer (SCLC) comprises about 15% of lung cancer. SCLC typically occurs in the central airways and characterized by rapid tumor progression [15]. It was previously only reported once that SCLC invaded the pulmonary vein and left atrium as imaged by PET/CT [5]. Our current case similarly showed SCLC extend along the right superior pulmonary vein with tumor extending into the LA. The hypermetabolic activity in the current case of thrombus on PET/CT indicated the tumor nature of the thrombus, which was different from and greater than the FDG activity in pulmonary embolism which was reported a mean SUV of 2.31 +/- 0.41 [16]. The tumor invasion of the LA was consistent with T4 of the TNM classification, and representing locally advanced disease, suggesting that the tumor is inoperable and with poor long-term survival.

Conflicts of Interest

The author declares no conflicts of interest.

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