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Pulmonary Sarcomatoid Carcinoma with Left Atrial Extension and Atrial Fibrillation

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Abstract

Cardiac involvement is a relatively common finding, occurring in up to 14% in cancer patients. However, cardiac extension through the pulmonary veins is a very infrequent finding in this population. Sarcomatoid carcinoma of the lung is a rare cancer, more likely found in male smokers. We present the case of a female non-smoker with bilateral sarcomatoid carcinoma of the lungs, and left atrial extension through the pulmonary vein. Atrial fibrillation was one of the initial manifestations.

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Introduction

Atrial fibrillation is commonly seen in atrial dilation and fibrosis of the atrium. As cancer patients live longer, cardiac metastasis is an increasingly common finding in this population, occurring in up to 14% of cancer patients. This problem holds significance in relation to operability and type of treatment. Cardiac invasion through the pulmonary veins is a rare occurrence, as is sarcomatoid carcinoma of the lung especially in non-smoking women. We present, to our knowledge, the first case report of a female non-smoker with bilateral sarcomatoid carcinoma of the lung with atrial invasion through the pulmonary vein, which had atrial fibrillation as one of her presenting findings.

Case Report

A 71 year-old non-smoking female initially presented with a purulent cough and rhino-sinusitis that persisted after a course of oral antibiotics. Later, she reported an episode of hemoptysis that prompted a chest X-ray which revealed bilateral lung opacities. A computed tomography (CT) scan of the chest revealed a mass in the left lower lobe (6 cm × 7 cm) with tumor extension through the left inferior pulmonary vein into the left atrium, and a smaller mass in the right lower lobe (4.2 cm × 3.9 cm) – **Figure 1A and 1B**. The patient was admitted to the hospital for a bronchoscopy and biopsy, and during this admission she developed new-onset atrial fibrillation with rapid ventricular response, which was treated with diltiazem and amiodarone **(Figure 2A)**. An echocardiogram showed normal left ventricular function with normal left atrial size. It also showed the left atrial mass extension **(Figure 2B)**. Pathology on a subsequent trans-bronchial biopsy reported a sarcomatoid carcinoma. MRI of the brain and PET/CT showed no metastasis. She was referred to cardio-oncology clinic where on further inquiry, she recalled that she had transient lower extremity weakness and abnormal sensations. She was therefore initiated on low molecular weight heparin therapy for suspected transient ischemic attack given her cancer history, in addition to the fact that her CHA2DS2-VASc score was 3. She received palliative chemotherapy with carboplatin/etoposide, and radiation therapy to decrease the tumor burden. A repeat CT scan 6 months later showed significant reduction in the lobar masses **(Figure 3A)**. The cardiac mass was no longer present **(Figure 3B)**.

Discussion

Sarcomatoid carcinoma accounts for only 0.1% of all lung carcinomas [1], is 9 times less commonly seen in women, and

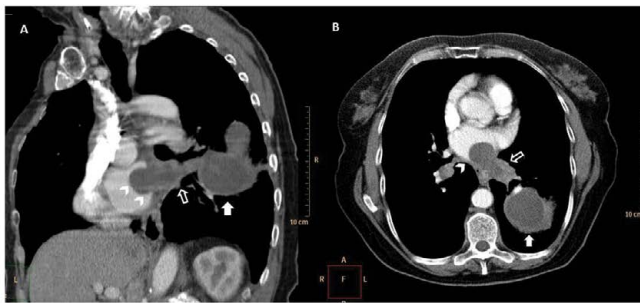

Figure 1A and 1B (1A) CT chest, right posterior oblique section showing the lung mass (solid arrow) invading the left atrium (arrow head) through the pulmonary vein (white arrow); **(1B)** CT chest, oblique transverse section showing the pulmonary mass invading through the left upper pulmonary vein.

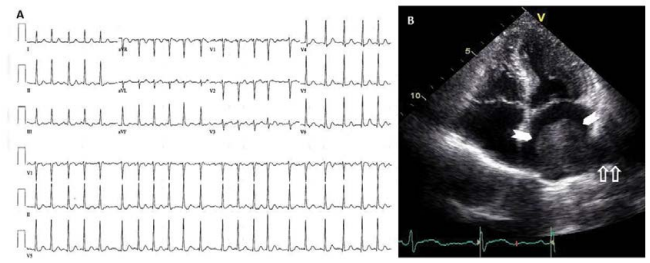

Figure 2A and 2B (2A) Electrocardiogram showing atrial fibrillation with rapid ventricular response; (2B) Four chamber echocardiogram showing the lung mass (arrow head) invading the left atrium through the left upper pulmonary vein (arrow).

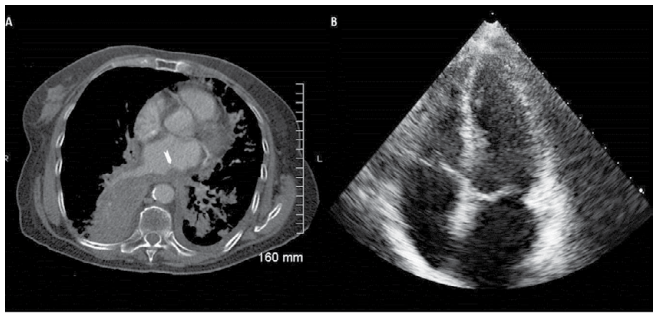

Figure 3A and 3B (3A) CT chest, transverse section showing post radiation changes and significant reduction in the intra cardiac mass (arrow head); (3B) Four chamber echocardiogram showing the left atrium without a visible mass.

is rarely seen in non-smokers [2]; all of which are contrary to findings in our patient.

Most studies on the incidence of cardiac metastases are derived from post-mortem studies as no symptoms are usually noted for these patients. Cardiac metastases are present in 2.3% of all autopsies, and in up to 14% of autopsies in cancer patients. Lung carcinomas are the most common primary tumors that metastasize to the heart (incidence of 31%) [3]. The mechanism of spread is usually through the lymphatics, with the pericardium being the most common site of metastasis [4]. Direct tumor extension to the heart is very rare and only mentioned as case reports. There are two cases in the published literature of sarcomatoid carcinoma extending into the atrium. One is a renal carcinoma with sarcomatoid features described in Germany, and the other is a lung adenocarcinoma with sarcomatoid elements described in Japan. Both manifested as cardiac arrhythmias, and underwent surgical resection [5,6].

Tamura et al. studied cardiac metastases and arrhythmias, and reported a significantly higher incidence of supraventricular arrhythmias in patients with cardiac metastasis than in those without [7]. A case of leiomyosarcoma with atrial fibrillation reported good response to anti-arrhythmic medication [8] as shown in our patient. Complete surgical resection was noted to be an independent predictor of survival in patients with sarcomatoid carcinomas [9]. Other studies have reported use of radiotherapy and chemotherapy with Cisplatin and Etoposide followed by surgery to be associated with good outcomes [10]. Our case is unique in that our patient did not have cardiac metastases, but rather had direct pulmonary tumor extension into her heart through her pulmonary veins. Our patient was not deemed a surgical candidate due to the bilaterality of her disease.

In conclusion, sarcomatous carcinoma of the lung can directly extend into the heart through the pulmonary veins into the left atrium. Atrial fibrillation appears to be a cardiac presentation, and likely a marker of this process. Cardiac involvement should be considered and evaluated in cancer patients with supraventricular arrhythmias, particularly atrial fibrillation.

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