

Sick Sinus Syndrome as the Initial Manifestation of Cardiac Metastasis in Squamous Cell Lung Cancer: A Case Report

Mohammad Thawabi¹, Hamid Shaaban^{2*}, Ashraf Jmeian³, Fayez Shamoon³

¹Department of Internal Medicine, St Michael's Medical Center, Newark, NJ 07102, USA, ²Department of Internal Medicine, Hematology and Oncology, St Michael's Medical Center, Newark, NJ 07102, USA, ³Department of Cardiology, St Michael's Medical Center, Newark, NJ 07102, USA

ABSTRACT

We describe the first case report of a patient with cardiac metastasis from squamous cell cancer of the lung that manifested as a symptomatic tachy-bradyarrhythmia suggestive of a sick sinus syndrome. This condition generally follows a silent course. We hypothesize that the arrhythmias were attributed to the nodular metastatic lesions directly and extensively invading the right atrium and other parts of the heart.

Keywords: Cardiac metastases, lung, sick sinus syndrome, squamous cell cancer

INTRODUCTION

The heart is a common site of metastasis in patients with cancer. However, cardiac metastases are not commonly diagnosed prior to death and are rarely detected on the initial presentation of the malignancy due to the indolent course and other overwhelming manifestations of the primary cancer. This rare diagnosis significantly alters prognosis and management; thus, mandating high suspicion and vigorous attempts for early recognition. Sick sinus syndrome (SSS) is usually an outcome of senescence of the node and surrounding atrial myocardium; however, it can also be a rare manifestation of cardiac metastases. This is, to our knowledge, the first case report of cardiac metastases secondary to squamous cell lung carcinoma with an initial presentation of SSS.

CASE REPORT

An 85-year-old woman with a past medical history of hypertension and history of 30 pack year cigarette smoking; who presented to our service with persistent palpitations.

*Corresponding address:

Dr. Hamid Shaaban, Department of Internal Medicine, Hematology and Oncology, St Michael's Medical Center, Newark, NJ 07102, USA.
E-mail: hamidshaaban@gmail.com

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She was in her normal health up to 2 months prior to admission, when she started complaining of pleuritic chest pain, cough, dyspnea, and weight loss of 20 pounds. Outpatient radiologic workup revealed a left lower lung mass and left lower bronchus obstruction associated with mediastinal and subcarinal lymphadenopathy. There was no evidence of any distant organ metastases. Subsequently, she underwent a computed tomography (CT)-guided biopsy and histopathologic examination was consistent with squamous cell carcinoma (SCC). Prior to the diagnosis of lung cancer, the patient had no history of arrhythmias in the past. On physical exam, she had a heart rate of 150, respiratory rate of 18, afebrile, and oxygen saturation of 95% on room air. Cardiac auscultation revealed tachycardia with an irregular rhythm. Lung auscultation revealed decreased breath sounds on the left side. Electrocardiogram (ECG) showed atrial flutter with variable conduction initially. Continuous ECG monitoring during the admission period showed alternating rhythms of bradycardia and atrial tachyarrhythmias. There were also frequent episodes of inappropriate bradycardia with sinus pauses suggestive of SSS (Figure 1). Drugs associated with sinus node dysfunction were excluded. Laboratory workup; including cardiac markers and thyroid function; were within normal limits except for a hemoglobin level of 9.8 g/dL. Trans-thoracic echocardiogram revealed multiple areas of well-circumscribed echogenic masses in the pericardium and inferior vena cava suggestive of cardiac metastases with preserved left ventricular function (Figure 2). No associated valvular abnormality was observed,

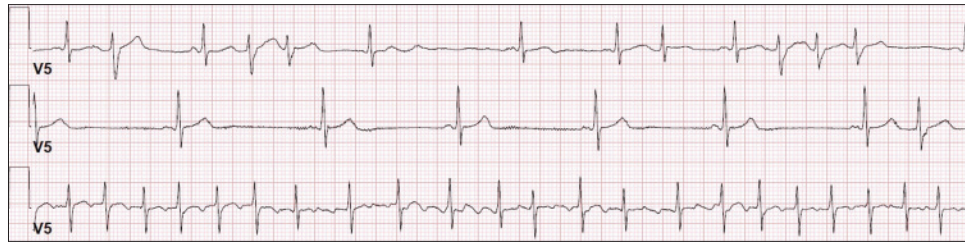


Figure 1. A 24-h Holter device showed alternation between nodal and sinus rhythm and frequent episodes of self-limiting brad-tachyarrhythmia.

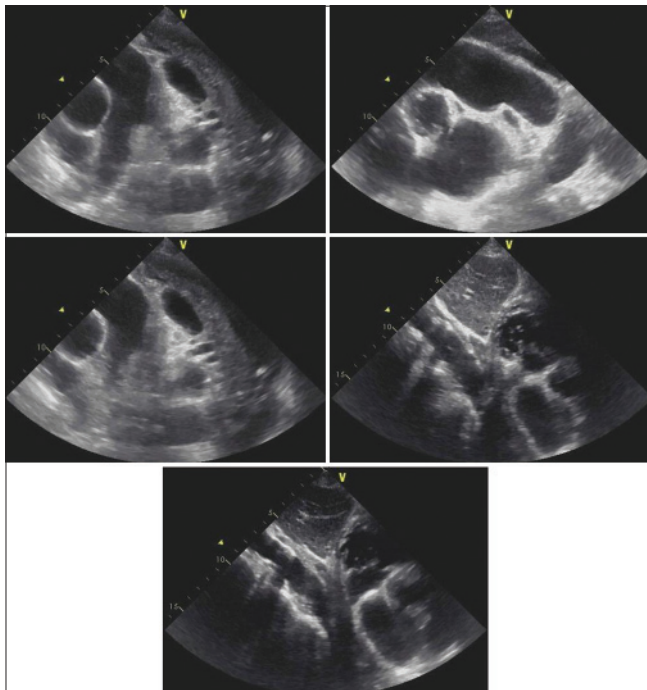


Figure 2. Trans-thoracic echocardiogram revealed multiple areas of well-circumscribed echogenic masses in the pericardium and inferior vena cava suggestive of cardiac metastases with preserved left ventricular function.

and no intracardiac shunt was detected by contrast study. A positron emission tomography (PET)-CT showed an increase in glucose metabolism at the level of cardiac focuses in the pericardium and in the inferior vena cava consistent with cardiac metastases. In light of the poor prognosis due to advanced age and stage of lung cancer, no biopsy of the masses was performed, since the echo and PET images were all very suggestive of metastases. The patient refused any further treatment and decided to opt for hospice care. The family refused getting an autopsy when the patient died.

DISCUSSION

Primary cardiac tumors are considered rare, with incidence of around 0.02% in pooled autopsy series. Most of them are benign, intracavitary, and preferentially develop in the left atrium.¹ Cardiac metastases on the other hand are more

common. Their exact incidence is unknown, but estimated to be at least 100 times more common than primary tumors. However, they rarely gain any clinical attention and are often overlooked.²

Cardiac metastases occur mostly in patients in their sixth or seventh decade, with no sex preference. They are rarely found as a solitary metastasis and rarely diagnosed on primary tumor presentation.³ They are more commonly seen in patients with extensive disease with poor tumor differentiation.⁴ Lung, breast, esophagus, malignant lymphoma, leukemia, and malignant melanoma are the most common tumors that metastasize to the heart. Of them, malignant melanomas have the highest rate of cardiac metastases. However, cardiac metastases of lung and breast carcinomas are more frequently encountered owing to their prevalence and topography.³

Cardiac metastases are usually small and multiple. Pericardium is most commonly involved, followed by the myocardium and endocardium, respectively. Metastases can occur through lymphatic or hematogenous spread, or by direct or transvenous extension. Lymphatic spread usually gives rise to pericardial metastases, where hematogenous spread usually gives rise to myocardial metastases.³ Lung metastases to the heart occur majorly through lymphatics, with the pericardium being mostly involved.⁴ Lung adenocarcinomas have the highest potential for cardiac metastases followed by SCC, undifferentiated carcinoma and bronchioloalveolar carcinoma, respectively.⁵

Cardiac metastases usually remain silent and not found until post mortem examination. Clinical manifestations are variable, and can include a rapid increase in heart size by effusion, signs of heart failure or valvular disease, conduction defects and heart rhythm disturbances.

ECG might document ventricular or supraventricular arrhythmias, conduction defects, ST-segment deviation or pathological Q-waves. ECG changes are thought to be secondary to conduction system invasion, or involvement of supplying coronary arteries by invading tumor cells. Low

voltage and electrical alternans can also be seen secondary to pericardial effusion.³

SSS resulting from cardiac metastases has been described in few case reports, mostly secondary to lymphomas. None of them was secondary to lung metastases to the heart.⁶⁻¹⁸ However, SSS has been described in few patients with small cell lung cancer without cardiac metastasis. It has been hypothesized that it might be secondary to a paraneoplastic phenomenon or possible mechanical stimulation of the afferent vagal nerve at the level of the hilum.¹⁹ To our knowledge, this is the first case of SSS secondary to cardiac metastases from SCC of the lung. The possibility that (SSS) observed in the patient was simply due to senescence is unlikely because he never developed arrhythmias prior to the diagnosis of lung cancer.

Two-dimensional echocardiography is among the best and least invasive ways to detect cardiac involvement. It can show pericardial bands that represent pericardial thickening by inflammation or tumor infiltration. Furthermore, it detects pericardial effusions and possible cauliflower-like projections into the pericardial space. Cardiac magnetic resonance and CT can provide further information about the size and extension of cardiac metastasis.

Identifying cardiac metastases on primary cancer diagnosis has extreme importance in prognosis and management. However, in most cases, cardiac metastases present in patients with advanced tumor disease as a part of generalized tumor spread. Cardiac treatment is mostly confined to palliative measures that might improve the quality of life of affected person.³

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