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Case Report

Unique cardiac involvement in a patient with squamous cell lung cancer

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ABSTRACT

Cardiac metastasis from lung tumors is rare, and often asymptomatic, making diagnosis challenging. Herein this report presents a case of a 69-year-old male with squamous cell carcinoma of the lung with cardiac metastasis to the left ventricle. Two days post chemotherapy, he developed symptoms of chest pain and mild hemoptysis. An electrocardiogram revealed ST-segment elevation in the inferior leads, suggesting a possible inferior ST-segment elevation myocardial infarction (STEMI). His symptoms improved with Nitroglycerin, and prescribed calcium channel blockers, and long-acting nitrates. The symptoms were confirmed to be attributed to an atherosclerotic plaque. This case highlights the challenge of differentiating between coronary artery disease and cardiac symptoms, and emphasizes the necessity of thorough investigation in cancer patients with cardiac symptoms.

Keywords: Lung metastatis, Cardiac tumor, ST-segment elevation myocardial infarction

INTRODUCTION

Cardiac tumors are considered one of the uncommon types of tumors that occur; however, they are clinically significant in the field of oncology. Just like other organs, the heart can develop primary or metastatic tumors, with metastatic tumors found to be the greater one.[2,3] Metastatic cardiac tumors can arise from any primary malignancy in the body, these can include the lung, kidney, and gastrointestinal tract.[1]

In one study, it was reported that the right ventricle and the pericardium were the most affected sites in cardiac metastasis.[2] Clinical presentations of cardiac metastasis often vary, many have gone unnoticed until after death, other times the patients may present with shortness of breath, hypotension, and tachycardia.

CASE REPORT

A 69-year-old male came to the emergency department at National Guard Hospital in Riyadh on 24 December 2017, complaining of on-and-off chest pain for one day, along with intermittent mild hemoptysis for the same duration. He was recently diagnosed as a primary case of squamous cell carcinoma of the lung. The patient was a heavy smoker with a history of hypertension and hyperlipidemia. Two days prior to his ER visit, he had started chemotherapy as part of his cancer treatment.

An electrocardiography (ECG) was performed immediately, which showed sinus tachycardia and a fixed ST elevation in the inferior leads (Figure 1) suggesting an inferior wall infarction due to an acute occlusion of the right coronary artery. It was followed by an echocardiogram that demonstrated an ejection fraction equal to 55 (normal EF ≥55) (Figure 2).

The echo also revealed a large mass extending from the mid to apical septum involving both the left and right ventricles, with a preponderance of the right ventricle. It had a consistency similar to that of the septal muscle and caused a mild apical RV/LV flow acceleration (Figure 2).

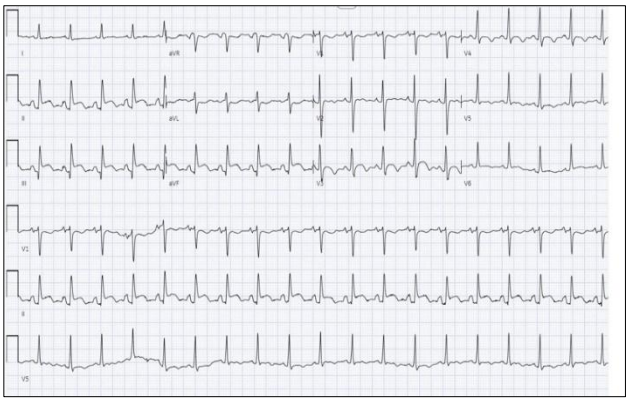

Figure 1: Initial ECG showing sinus tachycardia with ST elevation in the inferior leads (lead II, aVF, and III), suggesting an acute myocardial infarction.

Figure 2: Echocardiogram revealing the mass on both the left and right ventricle.

The left ventricle, as well as the right, were normal in size and systolic function with no significant valvular dysfunction or pleural effusion. A blood test was performed, revealing the following values: Trop 1=7.22, CPK=21, CKMB=0.2, BNP=152, and creatinine=58. The patient was also given a blood transfusion. A cardiac magnetic resonance imaging (MRI) was then performed, it revealed a large mass measuring 4.6×3.8, however, it didn't have a hemodynamic effect on either the inflow or outflow of both ventricles. The patient underwent emergent cardiac catheterization that detected signs of coronary artery spasms at the origin of left main trunk and right proximal artery stenosis (Figure 3). The spasm resolved with intracoronary (IC) nitrate, suggesting spasm-induced plaque disease (Figure 4). The patient was put on calcium channel blockers and long-acting nitrates to prevent further coronary artery spasms. Immunohistochemical staining of the patient's lung tumor was positive for P40 and negative for TTF-1, suggesting that the tumor was likely squamous cell carcinoma. The positron emission tomography-computed tomography (PET/CT) scan of the chest revealed a 4.5×4.9×6.2 cm mass in the right upper paramediastinal region, extending into the precarinal space (Figure 5). A lung biopsy was performed, consisting of three small pieces of grayish-white needle core biopsy, the largest measuring 1.5×0.1×0.1 cm and the smallest measuring 1.0×0.1×0.1 cm. The biopsy confirmed the diagnosis of a grade II non-keratinizing squamous lung cell carcinoma. Finally, a brain MRI was done showing no evidence of brain metastases, and the patient remained hemodynamically stable without any intervention needed.

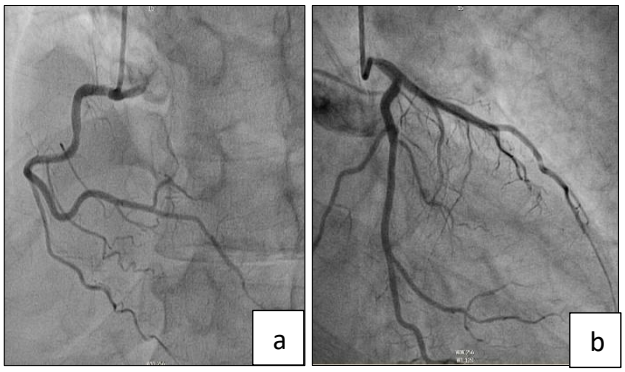

Figure 3 (a and b): The cardiac angiogram showing spasms at the origin of the left main trunk and right proximal artery stenosis.

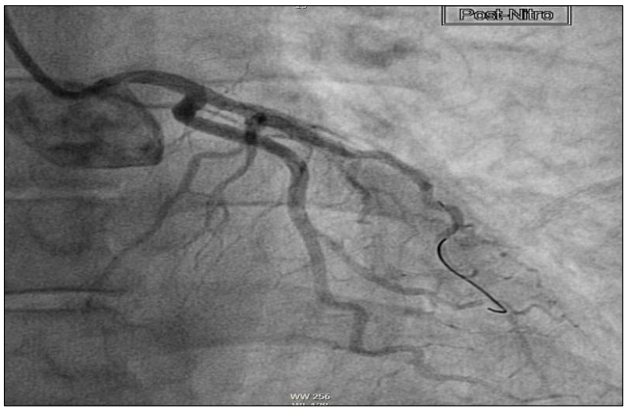

Figure 4: Coronary angiogram after IC nitrate showing improvement of the spasm.

Figure 5: CT scan of the chest showing the mass in the right upper paramediastinal region extending into the precarinal space.

DISCUSSION

As previously mentioned, primary lung cancer can lead to the development of metastatic cardiac tumors. In one study, it was revealed that primary lung cancer was responsible for 36-39% of secondary cardiac metastases, this was followed by breast and hematologic malignancies.[3] Although this case report discussed a secondary cardiac tumor in a male patient, there is no significance in gender. However, cardiac tumors tend to be diagnosed at an earlier stage in men and can present more aggressively.[4] Like our patient, the majority of elderly patients with cancer suffer from other comorbidities, with cardiovascular diseases being the most common.[5] Therefore, long-term management, such as nutritional management, should be considered to decrease mortality rates in cancer patients. The patient was advised to adhere to a low salt and cholesterol diet. He was also prescribed long-term calcium channel blockers and long-acting nitrates which have been proven to decrease the risk of cardiovascular death.[6]

One study reported that cancer patients presenting with STEMI received suboptimal management and care in comparison to other non-cancerous cardiac patients.[7] This leads to an increase in the mortality of cancer patients as healthcare providers attribute their symptoms to their cancer diagnosis without further investigations.

Another study proved that the risk of coronary artery disease increases in the first 6 months after cancer diagnosis and metastasis.[8] Thus, patients may benefit from simple therapy such as aspirin and beta-blockers, which can consequently improve their survival rate.[9] This highlights the importance of considering cancer patients for all forms of therapy when presenting with any abnormalities in their ECGs, such as ST elevation. However; other conditions that can cause an ST elevation should always be considered before starting any aggressive therapy.[10]

CONCLUSION

In this present case, the patient's primary tumor was in the lungs, after presenting with symptoms of MI and having an ECG with abnormalities, an echo was performed revealing a secondary cardiac tumor. This tumor had metastasized invading both the right and left ventricle. After undergoing cardiac catheterization and receiving IC nitrate, his ECG abnormalities were normalized. This case demonstrates the importance of managing each cardiac patient with guideline-directed therapy regardless of their oncological history.

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