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Unique Cardiac Involvement in a Patient with Squamous Cell Lung Cancer

Ragad Alwakeel[1*], Nora Almutairi[1], Sara Almutairi[2] and Dr. Ihab Sulaimani[3]

[1]*College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia*

[2]*College of medicine, Princess Noura University, Riyadh, Saudi Arabia*

[3]*National Guard Hospital, Adult Cardiology, Riyadh, Saudi Arabia*

*Corresponding Author

Ragad alwakeel College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia, Tel: +966570662000, E-mail: raghad134202@gmail.com

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Abstract

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

Keywords: Cardiac metastasis; Lung cancer

Abbreviations: IC- Intracoronary; LMT- Left Main Trunk; LV- Left Ventricle; RPA- Right Proximal Artery; RV- Right Ventricle

Introduction

Cardiac tumors are uncommon types of tumors; however, they are clinically significant in the field of Oncology. The heart can develop primary or metastatic tumors, with metastatic tumors being the greater one [1,2]. Metastatic cardiac tumors can arise from any primary malignancy in the body, including lungs, kidney, and gastrointestinal tract [1]. A study reported that the right ventricle and 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 patients may present with shortness of breath, hypotension, and tachycardia.

Case Description

A 69-year-old male came to the emergency department at National Guard Hospital in Riyadh on December 24, 2017, complaining of chest pain for one day, along with intermittent mild hemoptysis. 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 ECG was performed immediately, which showed sinus tachycardia and a fixed ST elevation in the inferior leads suggesting an inferior wall infarction (Figure1). It was followed by an echocardiogram that demonstrated a normal ejection fraction with a large mass extending from the mid to apical septum involving both Right and left ventricles, with a preponderance of the RV. It had a consistency similar to that of the septal muscle and caused a mild apical RV/LV flow acceleration (Figure2). The LV and RV, were normal in size and systolic function with no significant valvular dysfunction. A blood test revealed the following values: Trop 1=7.22, CPK=21, BNP=152, and creatinine=581. A cardiac MRI was preformed revealing a mass measuring 4.6X3.8, with no 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 (Figure3A) and right proximal artery stenosis (Figure 3B). The spasm resolved with Intracoronary nitrate (Figure 4) , suggesting spasm-induced plaque disease. The patient was put on calcium channel blockers and long-acting nitrates to prevent further spasms. The PET/ CT scan of the chest revealed a 4.5 x 4.9 x 6.2 cm mass in the right upper paramediastinal region, extending into the precarinal space (Figure 5). A lung biopsy was performed, confirming the diagnosis of a grade II non-keratinizing squamous lung cell carcinoma. The patient remained hemodynamically stable without any intervention needed.

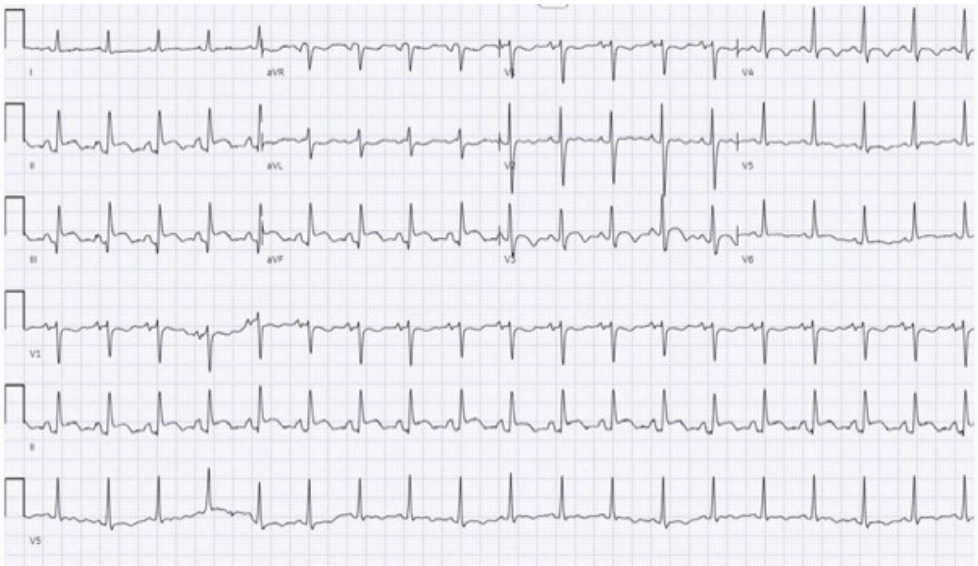

Figure 1: ECG showing tachycardia and ST elevationInitial ECG showing sinus tachycardia with ST elevation in the inferior leads (Leads II, aVF, and III), suggesting acute myocardial infarction.

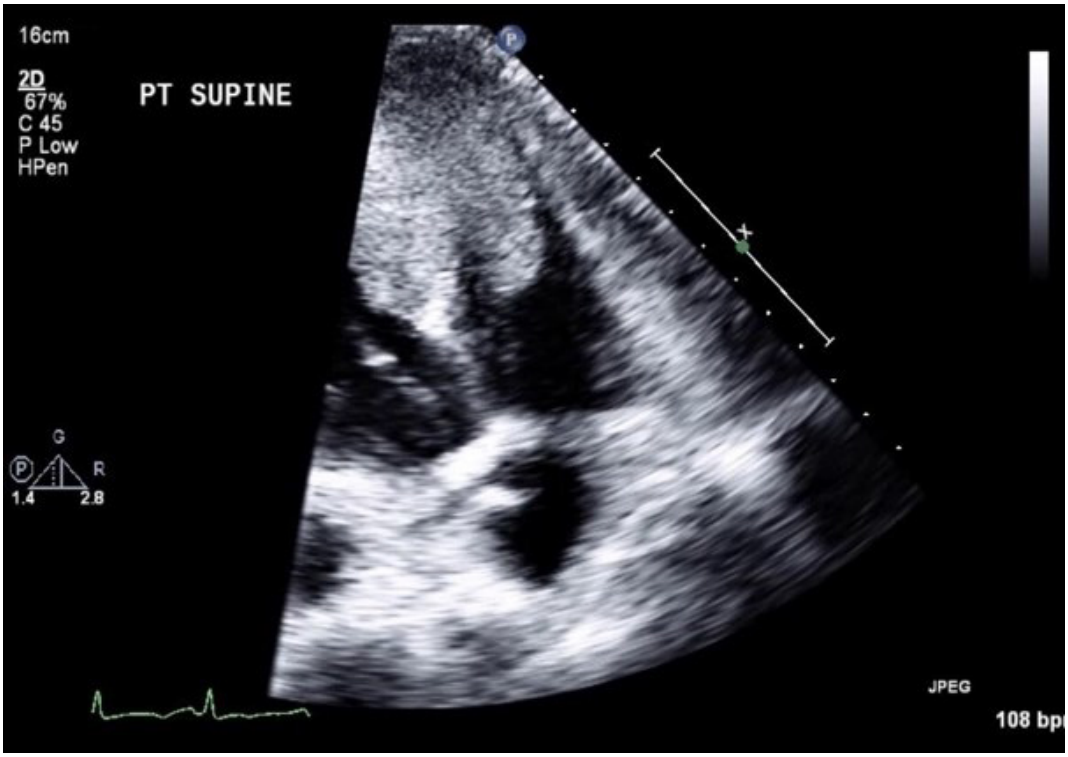

Figure 2: Two-dimensional Transthoracic EchocardiogramThe echocardiogram revealed a mass in both the RV and LV.

Figure 3A: Coronary Angiography showing Right Coronary ArteryThe cardiac angiogram revealed RPA stenosis.

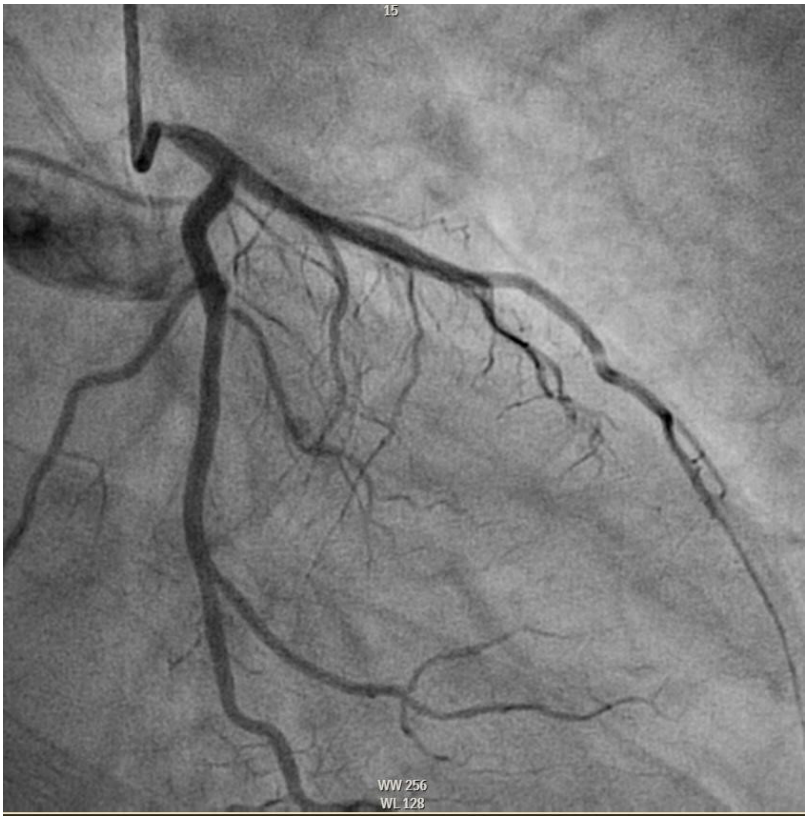

Figure 3B: Coronary Angiography showing Left Coronary ArteryThe cardiac angiogram showed spasm at the LMT origin.

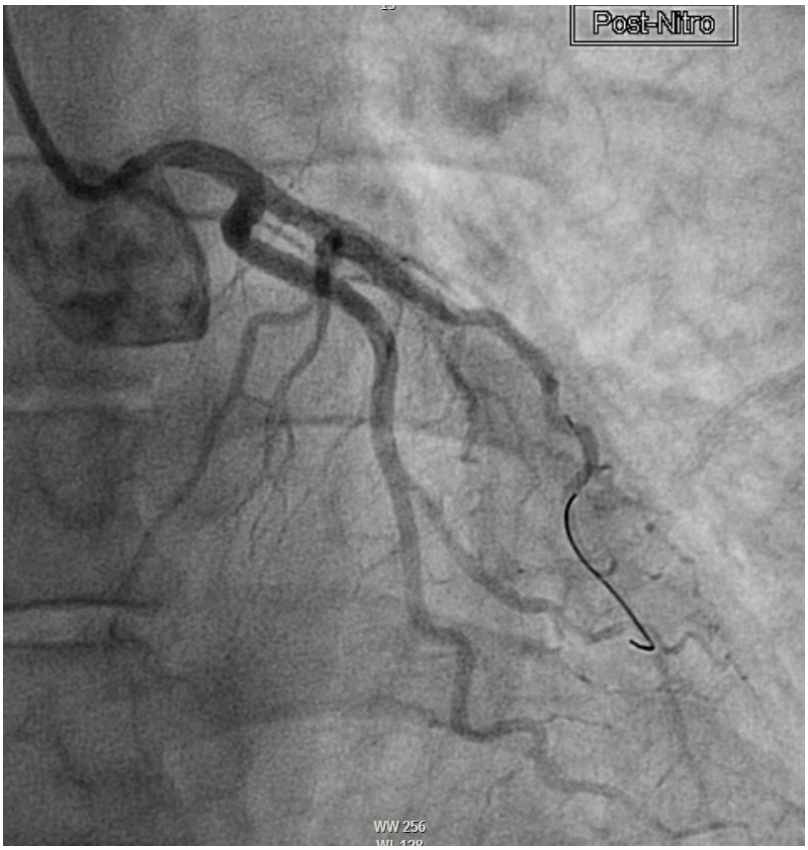

Figure 4: Coronary Angiogram after IC NitrateThere was immediate improvement of the spasm after administration of IC nitrate.

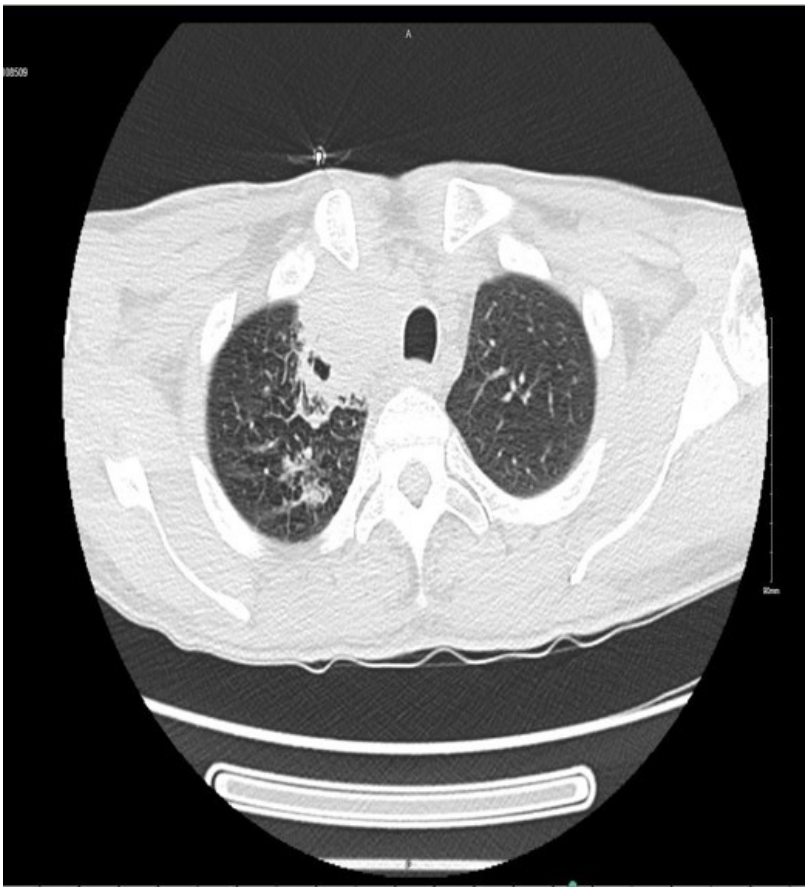

Figure 5: CT scan of the Chest Showing the MassThe CT scan revealed a mass in the right upper paramediastinal region extending into the precarinal space.

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 the mortality. 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 [9]. This highlights the importance of considering cancer patients for all forms of therapy when presenting with abnormalities in their ECGs. However; other conditions that can cause an ST elevation should always be considered before starting any aggressive therapy [10].

Conclusion

In this 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 RV and LV. After undergoing cardiac catheterization and receiving IC nitrate, his ECG abnormalities were normalized. This case demonstrates the importance of managing each car-

diac patient with guideline-directed therapy regardless of their oncological history.

Disclosure of Funding

No funding was received for this study.

Conflict of Interest

The authors declare no conflict of interest.

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