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Cardiac Metastasis of Bronchopulmonary Squamous Cell Carcinoma in the Right Ventricle

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A B S T R A C T

Bronchial cancer is the first cancer by incidence and mortality in the world, whose the secondary locations are frequent but the cardiac location is rare, with a poor prognosis. Symptoms of cardiac metastasis are often late, but the diagnosis has benefited greatly from advances in cardiovascular imaging.

We report the case of a 72-year-old patient, chronic massive smoker, with bronchial squamous cell carcinoma and in whom the extension assessment reveals a secondary right intraventricular location.

Keywords: bronchial squamous cell carcinoma, cardiac metastasis, cardiac imaging.

INTRODUCTION

Cardiac tumors are rare, but 25% of them are malignant. Among these malignant tumors, secondary locations are 20 to 40 times more common than primary tumors and are generally clinically undetected. In the literature, the frequency of cardiac metastases found during autopsy of patients treated for malignant conditions varies between 2.3% and 18.3% [1].

We report the case of a 72-year-old patient admitted for investigation of a pulmonary tumor process, which was identified as squamous cell carcinoma, and whose extension workup revealed secondary intracardiac involvement at the level of the right ventricle.

CLINICAL CASE

This is a 72-year-old male patient with no significant medical history, an active chronic smoker with a 40 pack-year history, who had been experiencing stage II dyspnea according to the New York Heart Association (NYHA) for the past four months, accompanied by left-sided basal thoracic pain, in a context of general health deterioration and weight loss of 10 kg.

The clinical examination found a patient in relatively good general condition, afebrile, eupneic at rest, without cyanosis or digital clubbing. The pleuropulmonary examination was normal, as were the rest of the physical exam findings, and no lymphadenopathy was present. The electrocardiogram showed a regular sinus rhythm with a heart rate of 82 bpm, an incomplete right bundle branch block without repolarization abnormalities.
The chest X-ray revealed a left basal opacity along with slight cardiomegaly (CTI at 0.55). A thoracic CT scan confirmed the presence of a suspicious peripheral left basal consolidation with mediastinal lymphadenopathy and revealed hypodense material in the right ventricle (Figure 1). The CT-guided biopsy of this pulmonary process revealed a moderately differentiated and invasive squamous cell carcinoma. Bone scintigraphy showed a moderate and heterogeneous pathological uptake in the left iliac wing. The rest of the extension workup was negative. The tumor was thus classified as stage IV.

Given the hypodense image in the right ventricle detected on the thoracic CT scan, a transthoracic echocardiogram was performed, revealing a well-defined echogenic mass measuring 34 x 36 mm, filling the apical portion of the right ventricle (figure 2). The workup was completed with cardiac magnetic resonance imaging (MRI), which confirmed the presence of a large tumor mass measuring 56 x 39 mm, filling two-thirds of the apical region of the right ventricle ; The enhancement dynamics were not suggestive of an angioma or myxoma but were more in favor of a cardiac metastasis (figure 3).

FIGURES

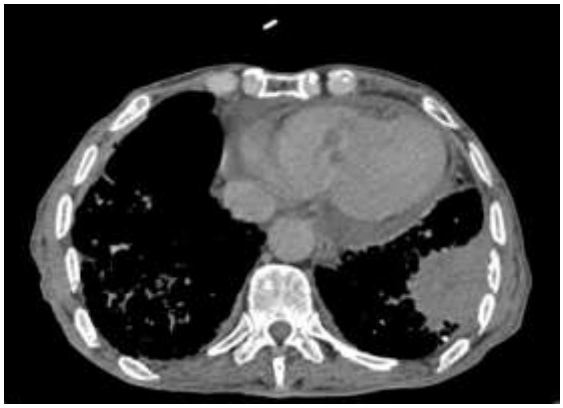

Figure1 : CT scan image suspicious peripheral left basal consolidation and hypodense material in the right ventricle

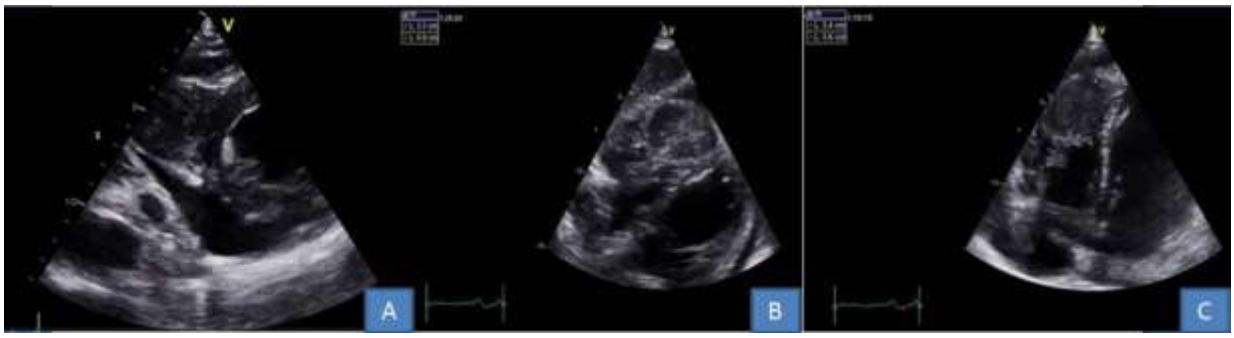

Figure 2 : (TTE) echogenic mass measuring 34 x 36 mm, filling the apical portion of the right ventricle With a pericardial effusion, on a parasternal short-axis view (A), a subcostal view (B), and a four-chamber view (C).

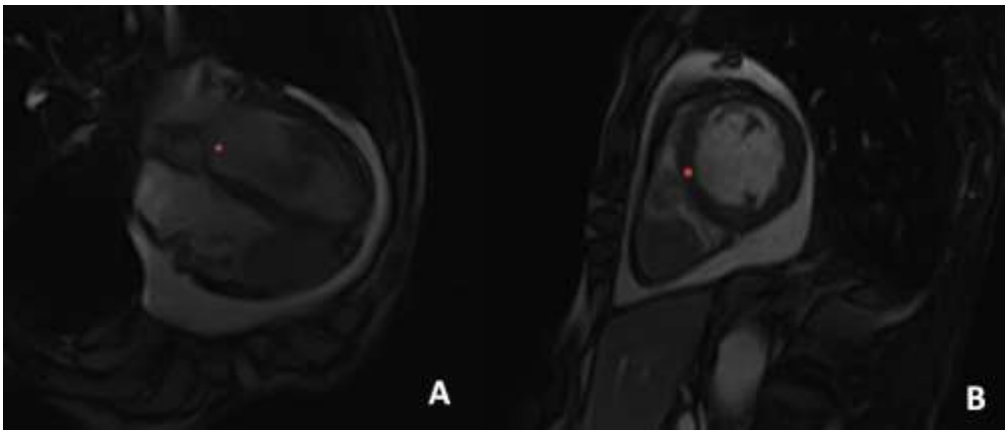

Figure 3: cardiac MRI confirmed the presence of a large tumor mass measuring 56 x 39 mm, filling two-thirds of the apical region of the right ventricle.

DISCUSSION

Bronchial cancer represents a major global public health issue, being the leading cancer in terms of incidence and mortality [2].

Squamous cell carcinoma of the lung is the second most common non-small cell lung cancer, with a frequency between 20% and 35%, according to the WHO in 2015. It is a malignant epithelial tumor with foci of keratinized cells and/or intercellular bridges, or an undifferentiated carcinoma morphology expressing immunohistochemical markers of squamous differentiation (P63/P40/CK5/6) [3]. Its location is usually proximal, but in our patient, the pulmonary tumor process was peripheral.

It is known that melanoma has the highest tendency to metastasize to the heart (71%) [1]. In the series by Butany et al. [4], bronchopulmonary cancer was the most common origin of metastatic cardiac tumors (27%).

The extension of these bronchial cancers to the heart can occur either directly by contiguity or via the lymphatic system, especially hilar lymph nodes, affecting the right cavities, which seem to be more frequently involved [5]. Cardiac dissemination can also occur hematogenously, as in the case of distant cancers (e.g., head and neck cancers), or through venous spread via the inferior vena cava (as seen in hepatocellular carcinomas or renal tumors) [6].

All cardiac structures can be affected, but myocardial involvement is the most common (42%), followed by epicardial (30%), pericardial (19%), and endocardial (6%) involvement [7]. These metastases are more often intramural than intracavitary and are more likely to be metastases from carcinomas than sarcomas, meaning that the affected population is generally older, usually over 50 years of age.

The clinical manifestations of cardiac tumors vary greatly and depend on their location and size. Generally, symptoms appear late, but diagnostic capabilities have significantly improved with advances in cardiovascular imaging.

Echocardiography remains the key examination for identifying the location, shape, size, mobility, and site of attachment of a cardiac tumor or mass. It also allows for the evaluation of potential hemodynamic repercussions [8].

Computed tomography (CT) allows for the assessment of the tumor's spontaneous density, the detection of calcifications, and characterization of recent hemorrhage, necrosis, or fat. The use of contrast agents helps delineate the tumor and analyze its relationship with cardiac structures. In addition to analyzing the tumor lesion, CT plays a crucial role in staging the disease during the same examination [9].

Magnetic resonance imaging (MRI) has established itself as the reference imaging modality due to its multiple functionalities, including topographic diagnosis, dynamic study, and tissue characterization. It enables the distinction of boundaries between adjacent tissues, such as epicardial and pericardial fat, pericardial fibrous tissue, and tumor infiltrates.

In certain cases of intramyocardial tumors, a tagging sequence is needed to confirm the absence of contractile activity within the tumor to differentiate it from an asymmetric focus of hypertrophic cardiomyopathy.

Several criteria favor the malignancy of a cardiac tumor observed on MRI: invasive nature, involvement of the right heart and pericardium, tissue heterogeneity, diameter greater than 5 cm, enhancement after gadolinium, and the presence of pleural and/or pericardial effusion [10].

Cardiac metastases are characterized on MRI by their lobulated, variable morphology and are often small, generally intramyocardial, with a high signal on T2-weighted images, low signal on T1-weighted images, and significant late enhancement [11].

CONCLUSION

Cardiac metastases are rare, have a poor prognosis, and remain the least known. Their treatment is controversial, but early diagnosis with multidisciplinary management is crucial to improving patient survival.

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