

Heart's Metastasis Secondary to Tongue Neoplasia - Case Report

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Introduction

Primary cardiac tumors are rare (incidence of 0.0017% to 0.28%). However, secondary or metastatic tumors are 40 to 100 times more frequent than the primary ones.¹

Cardiac metastasis of tongue squamous cell carcinoma is rare and the incidence ranges from 1.5% to 50%. The pericardium is affected in 64% to 69%; epicardium in 25% to 34%; and myocardium in 29% to 32%. Tumors can affect the heart via the following ways: hematogenously, direct extension, lymph vessels and through the pulmonary veins and the vena cava.²

The purpose of this article is to report a case of a patient with tongue cancer history diagnosed a year before, who developed cardiac metastases assessed by transthoracic echocardiography (TTE) and three-dimensional echocardiography (3D Echo), highlighting the importance of the echocardiographer paying attention to the tumor lesions on all layers of the heart (epicardium, endocardium, myocardium and pericardium).

Case Report

The patient, RMS, 32 years old, female, was admitted to the hospital with syncope after exertion. One week after admission, she presented progressive dyspnea on exertion and developed symptoms at rest associated with chest pain in the left hemithorax. Pathological history: tongue cancer (squamous cell carcinoma) diagnosed a year and six months before, treated with surgical resection and radiotherapy; evolved with tumor recurrence five months before, and was re-treated with a new surgical resection.

On admission, the patient presented tachypnea, tachycardia (120 bpm), cardiac auscultation with regular rhythm and hypophonetic sounds. On lung examination, presence of coarse crackles and rales in the right hemithorax.

Admission electrocardiography revealed sinus tachycardia and low voltage. Chest X-ray showed an enlarged cardiac area and pleural effusion on the right.

Keywords

Heart Neoplasms; Mouth Neoplasms; Carcinoma, Squamous Cell; Echocardiography, Three-Dimensional.

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Echocardiography revealed pericardial effusion with signs of cardiac tamponade. Pericardial drainage (1,000 mL of citrine-yellow pericardial fluid) and pericardial biopsy (negative for neoplastic cell investigation) were performed.

Post-drainage echocardiography revealed preserved left ventricular (LV) systolic function and multiple masses attached to the LV endocardium and myocardial infiltration, with the largest one measuring about 11 x 12 mm, mobile and attached to the endocardium in the LV outflow tract (Figures 1 to 4).

Chest computed tomography scan revealed multiple pleural nodules on the right and pleural effusion on the right.

The patient was referred for cancer follow-up in a specialized hospital, but died one month after the diagnosis of metastases.

Discussion

The incidence of cardiac metastases is 0.7% to 3.5% in the general population and 9.1% in patients with known neoplasm. In 14.2% of patients with multiple distant metastases, there is cardiac involvement. The primary neoplasms that most cause cardiac metastases are: lung (36% to 39%), breast (10% to 12%) and blood cancers (10% to 21%).¹

Mouth cancer is the most common type of head and neck cancer (38%), being more common in men older than 65 (75%), and the most common histological type is squamous cell carcinoma (95%), more frequent in the tongue and on the floor of the mouth (90%).³ Patients present survival shorter than 50% in five years, and recurrence of the neoplasm is greater than distant metastasis, but this tumor type is known to give rise to metastasis with no local occurrence.⁴

Cardiac metastasis of tongue squamous cell carcinoma is rare and in the literature in English, only six cases have been reported.⁵

The incidence of cardiac metastasis of tongue tumors ranges from 1.5% to 50%.²

The pericardium is affected in 64% to 69%; epicardium in 25% to 34%; and myocardium in 29% to 32%. Metastases to the endocardium and the heart chamber are rare (3% to 5%) and have dramatic consequences. Survival is six months for patients with heart metastasis.⁶

Tumors can affect the heart via the following ways: hematogenously, through direct extension, lymphatic vessels and through the pulmonary veins and the vena cava.

Tumors involving the pericardium may result from direct invasion by an intrathoracic or mediastinal tumor and through lymphatic route. Metastases to the myocardium or epicardium occur almost exclusively via the lymphatic system or secondary to pericardial tumor diffusion. Metastases occur

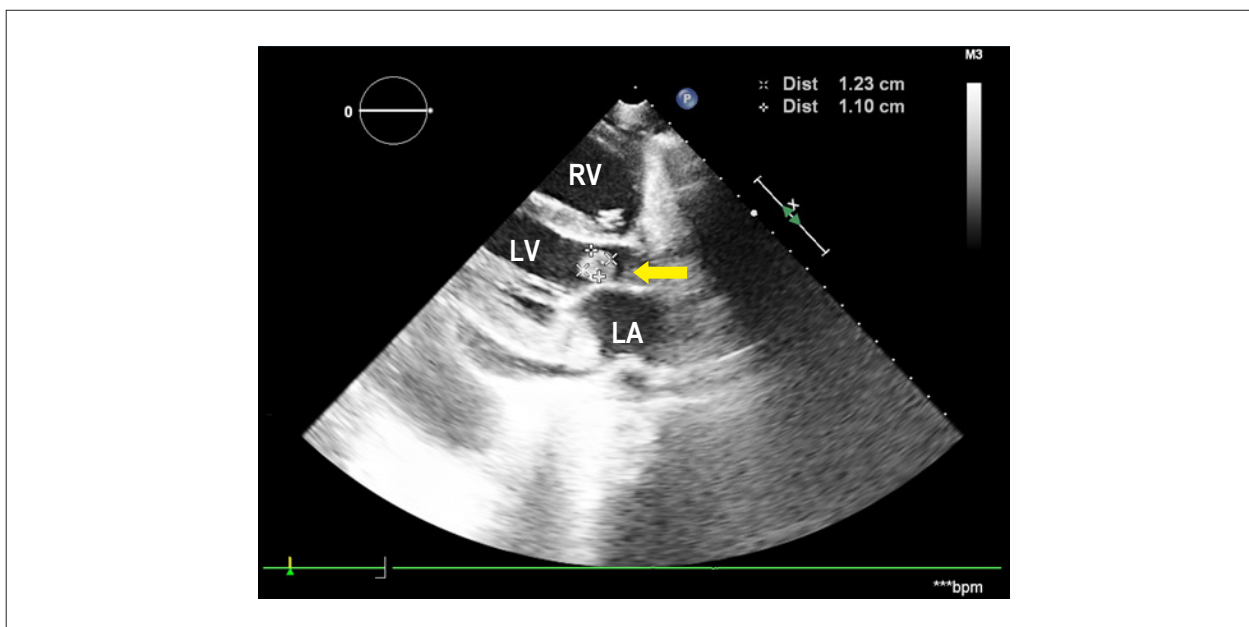


Figure 1 – TTE: longitudinal parasternal window. LVOT mass is observed (arrow). LV: left ventricle; RV: right ventricle; LVEF: left ventricular ejection fraction; LVOT: left ventricular outflow tract.

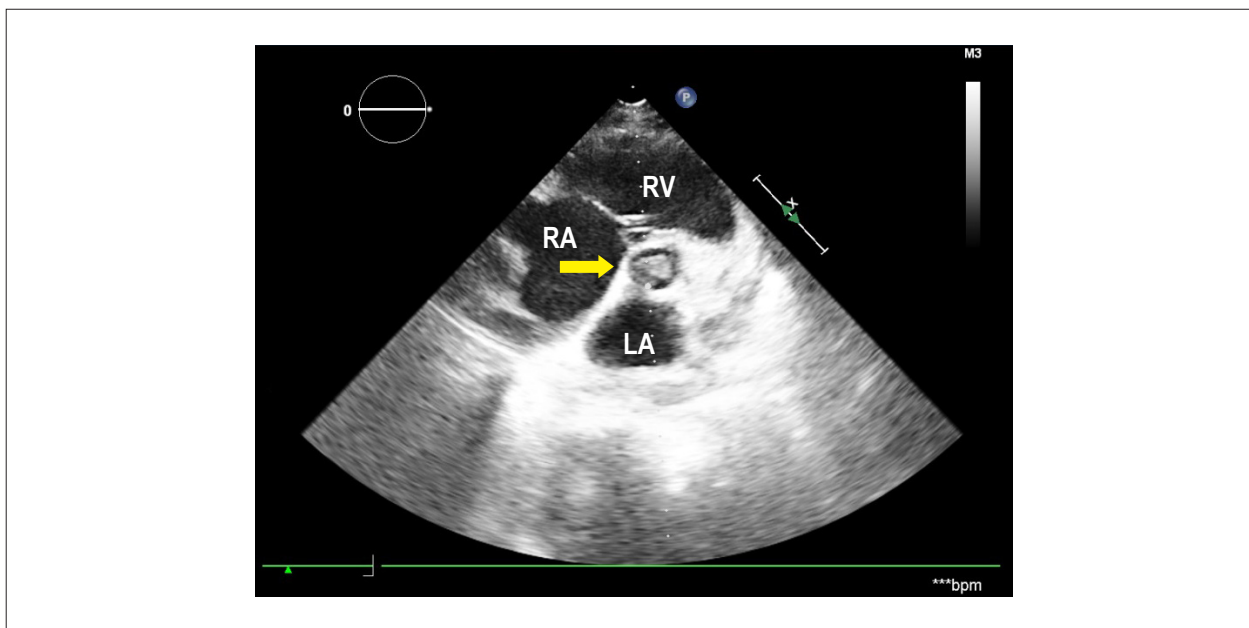


Figure 2 – TTE: parasternal short axis window. LVOT mass is observed (arrow). LA: left atrium; RA: right atrium; RV: right ventricle; LVOT: left ventricular outflow tract.

to the endocardium through the bloodstream. There may also be metastasis from the myocardium to the endocardium by contiguity. The lymphatic system is responsible for most cardiac metastases.⁷

The clinical manifestations will depend on the topography and size of the lesion. In general, patients present signs and symptoms of heart failure, valvular abnormalities or heart rhythm disorders.⁶

Diagnosis of a metastatic lesion of the heart is often performed at an advanced stage of the disease when metastatic lesions start to produce symptoms. Imaging tests (echocardiography, computed tomography scan and magnetic resonance imaging) have high sensitivity and specificity, allowing early diagnosis of cardiac involvement.⁸ The main differential diagnosis of intracardiac masses are vegetation and thrombus.⁹

Case Report

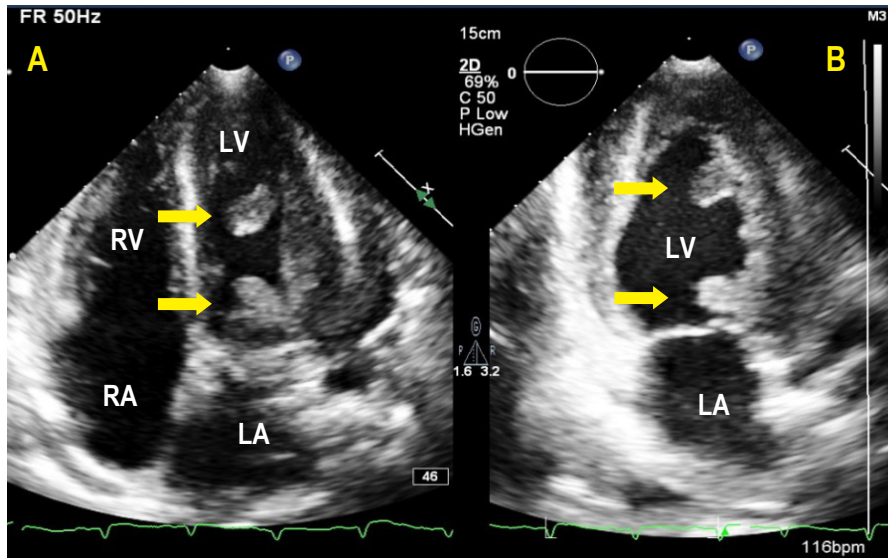


Figure 3 – TTE: A - apical four-chamber window; B - apical two-chamber window. Masses attached to the LV anterolateral wall (arrows in A) and anterior wall (arrows in B). LV: left ventricle; RV: right ventricle; LV: left ventricle; RV: right ventricle.

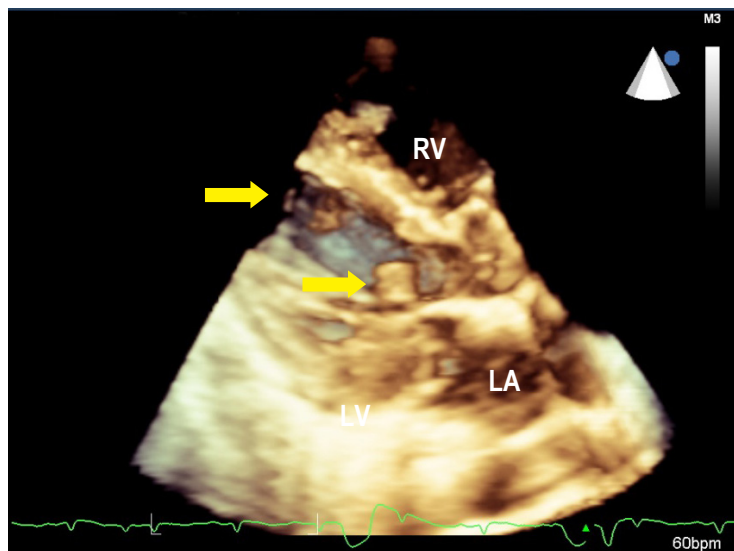


Figure 4 – 3D Echo: longitudinal parasternal window. Masses attached to the LVOT and the LV anteroseptal wall (arrows). LVOT: left ventricular outflow tract; LA: left atrium; RV: right ventricle.

Electrocardiographic abnormalities are common in cardiac metastases but are unspecific: arrhythmias, changes in the ST segment, low voltage (QRS reduction).

TTE is an excellent test to start the assessment of cardiovascular disease in patients with cancer before, during or after treatment, as it evaluates the LV, pericardial and valvar functions. Using the Doppler, cardiovascular hemodynamics is accessed. New techniques, such as 3D Echo and Strain, allow a detailed

diagnosis of masses and early diagnosis of cardiomyopathy induced by chemotherapy, respectively. Daher et al.⁸ evaluated, in a tertiary cancer center, 3,924 echocardiography scans and observed significant abnormalities in 19.9% in the group of patients with cancer ($p < 0.001$). Of 1,519 patients analyzed in the cancer group, 38.8% had normal results; 41.3% had minor abnormalities. Among those with abnormalities, the cardiac masses were found in 13.9% ($p < 0.002$).⁸

While TTE is the first choice for the diagnosis of cardiac metastasis, other modalities such as transesophageal echocardiography, 3D Echo, computed tomography and magnetic resonance imaging also assist in the diagnosis of this disease.¹⁰

3D Echo has an incremental value in the diagnosis of cardiac metastases, as it characterizes the masses, the dimensions and the relationship with adjacent structures, adding value to the two-dimensional echocardiography.¹¹

The treatment of cardiac metastases depends on the clinical presentation: in cases of tamponade, pericardiocentesis is quickly carried out. When patients have arrhythmias, antiarrhythmic agents are administered or, in cases of difficult control, ablation is administered. Tumor resection can be performed; however, in many cases, treatment is chemotherapy, radiotherapy or palliation.

There is no protocol for investigation of cardiac metastases in patients with malignant neoplasms. However, some authors suggest that echocardiography should be performed in patients with lung and liver cancer, who have cardiac arrhythmias, for screening purposes.

Prognosis of malignant cardiac tumors secondary to metastases is reserved, considering that patients, at diagnosis, are at an advanced stage of the underlying disease.

Conclusion

This report illustrates a case of metastatic tongue tumor with multiple cardiac involvement. The detailed observation of

cardiac structures (pericardium, epicardium, myocardium and endocardium) must be performed by the echocardiographer in the investigation of metastasis.

Echocardiography in its various forms allows early diagnosis of cardiac involvements and a protocol should be developed with the inclusion of an echocardiographic evaluation at various stages of cancer involvement.

Authors' contributions

Research creation and design: Falcão SNRS, Fauth S; Data acquisition: Gouveia GNM, Fauth S, Lima CJM, Gonçalves BKB; Data analysis and interpretation: Gouveia GNM, Falcão SNRS, Fauth S, Gomes CAM; Manuscript writing: Gouveia GNM; Critical revision of the manuscript as for important intellectual content: Falcão SNRS, Fauth S, Gomes CAM.

Potential Conflicts of Interest

There are no relevant conflicts of interest.

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Academic Association

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References

1. Goldberg A, Blankstein R, Padera RF. Tumors metastatic to the heart. *Circulation*. 2013;128(16):1790-4.
2. Kavanagh MM, Janjanin S, Prgomet D. Cardiac metastasis and sudden death as a complication of advanced stage of head and neck squamous cell carcinoma. *Coll Antropol*. 2012;36(Suppl 2):19-21.
3. Noguti J, De Moura CF, De Jesus GP, Da Silva VH, Hossaka TA, Oshima CT, et al. Metastasis from oral cancer: an overview. *Cancer Genomics Proteomics*. 2012;9(5):329-35.
4. Makhija Z, Deshpande R, Desai J. Unusual tumours of the heart: diagnostic and prognostic implications. *J cardiothorac Surg*. 2009;4:4 doi:10.1186/1749-8090-4-4.
5. Onwuchekwa J, Banchs J. Early cardiac metastasis from squamous cell carcinoma of the Tongue in 2 patients. *Tex Heart Inst J*. 2012;39(4):565-7.
6. Hudzik B, Miszalski-Jamka K, Glowacki J, Lekston A, Gierlotka M, Zembala M et al. Malignant tumors of the heart. *Cancer Epidemiol*. 2015; 39(5):665-72.
7. Bussani R, De-Giorgio F, Abbate A, Silvestri F. Cardiac metastases. *J Clin Pathol*. 2007;60(1):27-34.
8. Daher IN, Kim C, Saleh RR, Plana JC, Yusuf SW, Banchs J. Prevalence of abnormal echocardiographic findings in cancer patients: a retrospective evaluation of echocardiography for identifying cardiac abnormalities in cancer patients. *Echocardiography*. 2011;28(10):1061-7.
9. Srinivas SK, Subramanyam K, Ramalingam R, Bhat S, Kalpana SR, Manjunath CN. A rare case of left ventricular outflow tract mass. *Echocardiography*. 2013;30(9):E274-7.
10. Shah R, John E, Fan TM, Ruff G, Rehan Khan M, et al. A patient with metastatic small-cell lung cancer and giant right ventricular mass. *Echocardiography*. 2015;33(3):491-3.
11. Zaragoza-Macias E, Chen MA, Gill EA. Real time three-dimensional echocardiography evaluation of intracardiac masses. *Echocardiography*. 2012;29(2):207-19.