

Case Report

The importance of multimodality cardiac imaging: Echocardiography and cardiovascular magnetic resonance imaging contributions to the diagnosis and management of a right ventricular mass

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ABSTRACT

Cardiac metastases from testicular tumors are rare. We report a case of a 42-year-old man with a cardiac mass incidentally found in a computed tomography-scan included in the workup for lumbago and a suspicious neof ormation in the right testicle. Transthoracic echocardiography showed a large multilobular ill-defined mass infiltrating the right ventricle free wall, protruding to, and partially obstructing the right ventricular outflow tract resulting in considerable outflow obstruction. Cardiac magnetic resonance imaging favored a malignant nature, which was confirmed by marked regression of the tumor mass with chemotherapy and anatomopathologic study.

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Introduction

Although metastatic tumors to the heart are relatively common [1], cardiac metastases from testicular tumors are rare [2]. We report a case of a large asymptomatic right ventricle cardiac metastasis of a nonseminomatous germ cell tumor, found incidentally during the initial diagnostic workup.

Case report

A 42-year-old man with a past history of atopic asthma and a neglected small left testicular nodule found, by self-examination, three years before presentation, was admitted to the Emergency Room complaining of lumbago, progressive weakness, and numbness in the right leg since the previous three months.

Upon hospital admission, the physical examination was notable for the presence of hydrocele, decreased medial foot sensation, and a positive straight-leg raising manoeuvre. A computed tomographic (CT) scan showed a paravertebral mass infiltrating the psoas muscle at L4 level. A testicular ultrasound revealed a suspicious neof ormation in the right testicle. The CT-guided needle biopsy of the paravertebral mass confirmed an embryonic carcinoma metastasis

CD 30 positive and further anatomopathology/histological workup diagnosed a nonseminomatous testicular cancer.

Integrated in the cancer staging, the thoraco-abdomino-pelvic CT-scan revealed, apart from massive pulmonary, bone, and ganglionic metastatic involvement, a large filling defect in the right ventricle and pulmonary trunk which suggested a thrombus. Transthoracic echocardiography was then performed (Figs. 1 and 2) and showed a large multilobular mass infiltrating the right ventricle free wall and insinuating through the outflow tract into the pulmonary trunk causing at that level flow obstruction, with an estimated peak gradient of 28.5 mmHg.

In face of this clinical picture, a right ventricle metastasis was assumed as the most likely diagnosis and the patient was scheduled for urgent chemotherapy and maintained under full anticoagulation. A significant reduction of the cardiac mass size was observed on serial echocardiograms (Fig. 3).

In order to obtain a better morphologic and functional characterization, a cardiac magnetic resonance imaging (MRI) study was performed and revealed a mass infiltrating the right ventricle free wall, with an irregular surface and a pedicle extension which had independent mobility (Fig. 4). No pericardial invasion was seen. The mass had intermediate sign on cine SSFP, TSE T1 and T2 images. After gadolinium contrast agent injection early and late heterogeneous enhancement were seen but no enhancement was noted in the pedicle extension. These aspects suggested a malignant mass but a thrombus component in the pedicle mass could not be excluded (Fig. 5).

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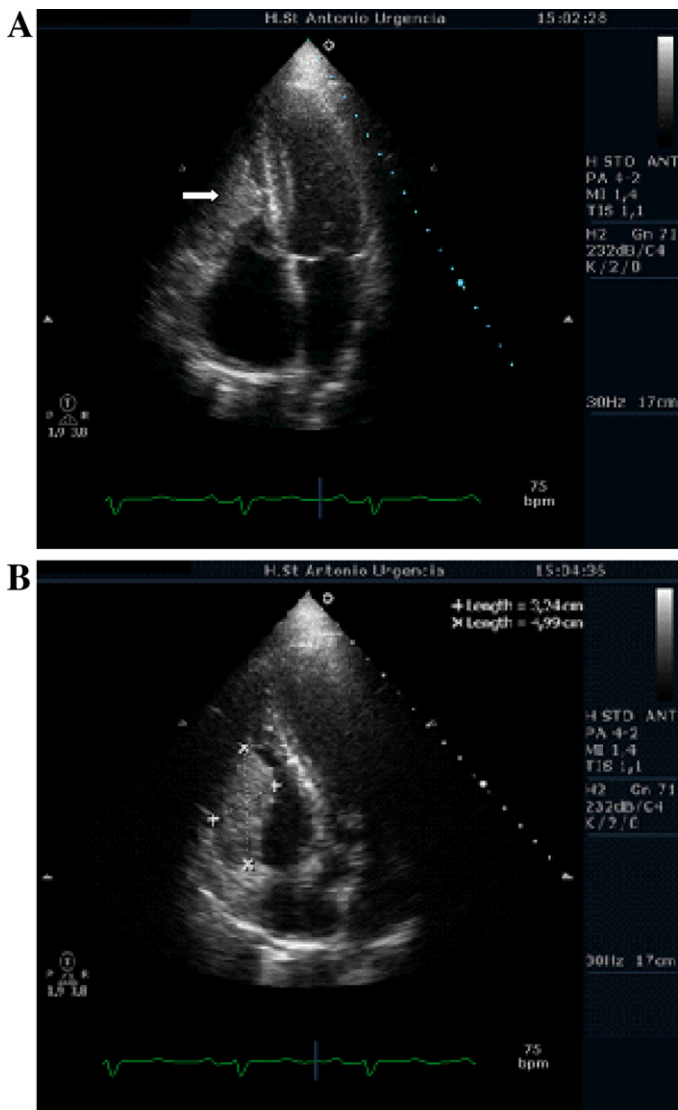


Fig. 1. Transthoracic echocardiography apical views (A and B) of the mass (white arrow) mass infiltrating the right ventricle free wall.

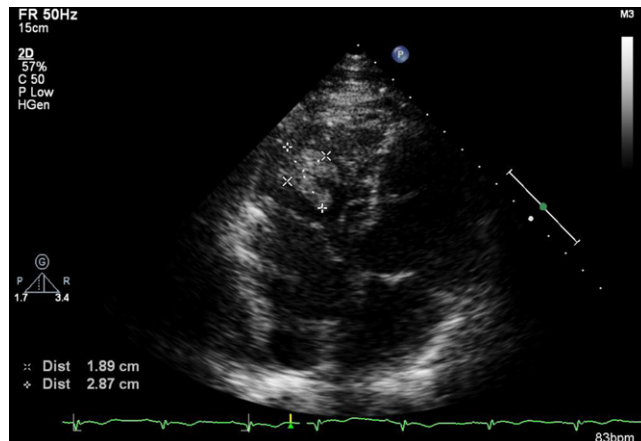


Fig. 3. Transthoracic echocardiography apical view depicting reduction of the mass size after chemotherapy.

Due to the presumed thromboembolic risk associated, further increased by a methicillin sensitive *Staphylococcus aureus* bacteremia, the patient was scheduled for surgical excision of the cardiac mass after being started with full spectrum antibiotics.

The anatomopathologic and microbiologic workup confirmed some tumor cells and predominantly necrotic sterile tissue. The patient followed a clinical course which was with a favorable response to chemotherapy achieving complete remission of the disease with a high Karnofsky performance status at the 12 month follow-up.

Discussion

The incidence of metastatic involvement of the heart varies from study to study and has increased during recent decades due to better diagnostic tools and longer survival of cancer patients [3,4]. In the majority of patients, cardiac metastases are clinically silent, mostly due to their small size, and the clinical course is dominated by the generalized tumor spread [5].

Although testicular neoplasms represent only about 1% of all cancers in men, they are the most common solid malignancy affecting males aged from 15 to 35 [4]. Nonseminomatous germ cell tumors (NSGCT) are a rare group of testicular tumors,

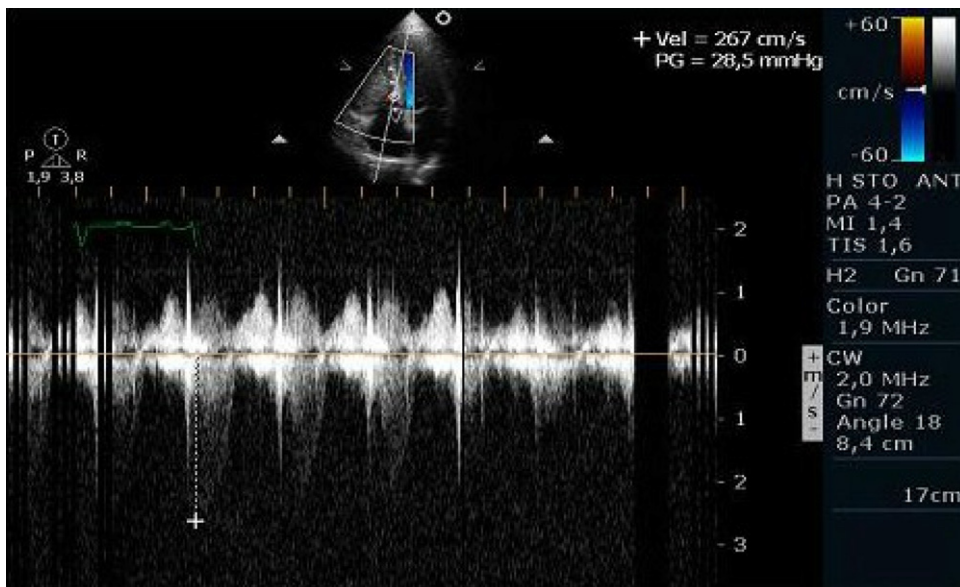


Fig. 2. Apical view of the right intraventricular gradient.

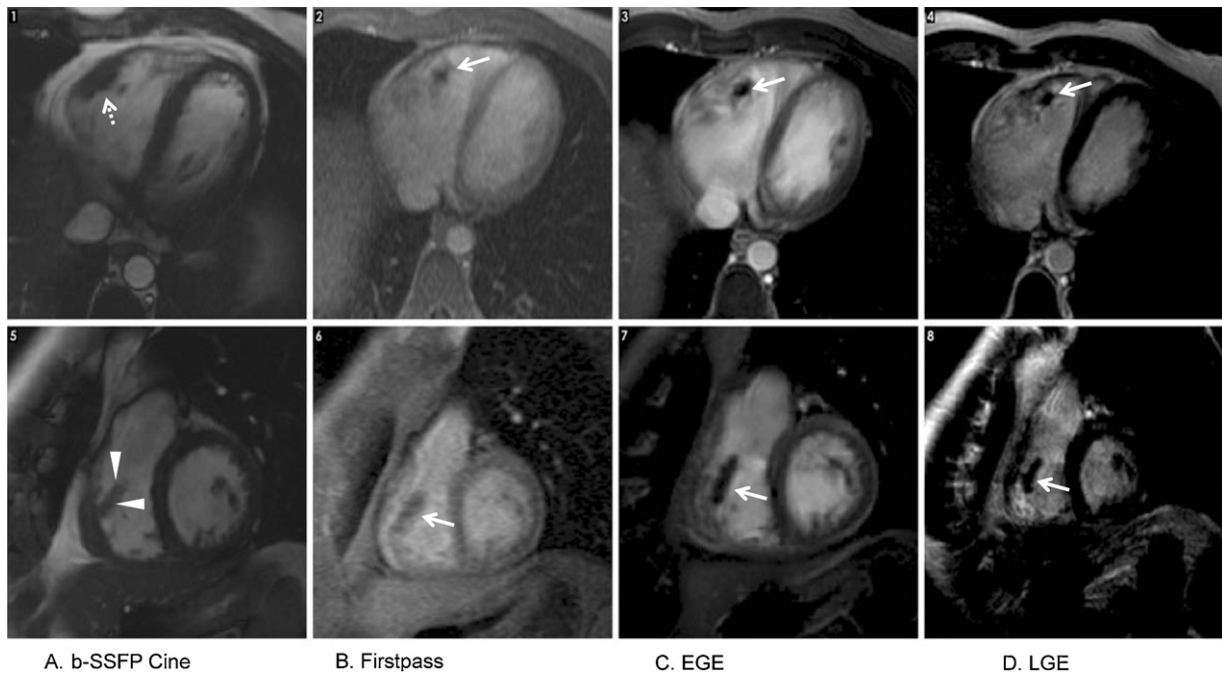


Fig. 4. Cardiovascular magnetic resonance imaging. Top row axial cut. Bottom row sagittal cut. A mass (white dash arrow) is seen invading the right ventricle free wall (1 and 5) with a very mobile pedicle extension (white arrowheads). Heterogeneous signal is seen after gadolinium administration except for the pedicle structure (white arrows) suggesting the presence of thrombus or necrotic tissue (2, 3, 4, 6, 7 and 8). EGE, early gadolinium enhancement. LGE, late gadolinium enhancement.

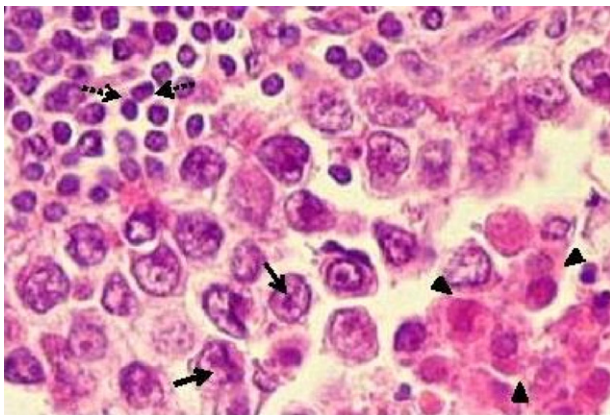


Fig. 5. Stained section of the excised cardiac mass. Testicular tumor cells (arrows) with nuclear atypia, coagulation necrosis (arrow heads) and intermixed lymphocytes (dashed arrows) are seen.

often composed of several histological forms and are characterized by rapid and bulky growth and spread via lymphatic and hematogenous routes to distant viscera (e.g. lungs, liver). More than 60% of patients have metastasis at the time of presentation.

We present an unusual case of a large metastatic spread to the right ventricle found incidentally and illustrate the importance of multi-modality imaging data integration in the diagnostic workup of cardiac masses. In a revision of the literature published in 2007 [2] only seven cases presented with a right ventricle mass and none was asymptomatic, complete remission is achieved. This underlies the importance of a prompt diagnosis of germ cell tumor in young men with metastatic cancer, since systemic chemotherapy with or without surgery can lead to cure. In spite of this, the presence of non-pulmonary visceral metastasis is usually regarded as a poor prognostic finding [6].

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