



Large Right Ventricle Metastasis of Melanoma Disclosed by Tamponade

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ABSTRACT

Metastatic malignancies involving the heart occur more frequently than primary ones. Melanoma is the most common neoplasm that metastasize to the heart. The diagnosis is however usually made after the patient's death as clinical signs are discrete, non-specific or masked by other visceral metastases. We report a case of a 24-year-old patient diagnosed for metastatic malignant melanoma disclosed by cardiac tamponade. This case underlines the importance of using multimodality imaging approach to enable a quick and accurate diagnosis which can be followed by appropriate treatment.

KEYWORDS: Malignant melanoma; cardiac metastases; transthoracic echocardiography; cardiac magnetic resonance imaging.

Introduction

Malignant melanoma is one of the most aggressive tumors, it is characterized by a high affinity for heart's tissue and metastasizes to the heart in nearly 64% of cases[1]. Most patients are at an advanced stage of the disease at the time of diagnosis of cardiac metastases, in some cases, a faster diagnosis may allow surgical resection to prevent heart failure or tumor reduction before chemotherapy [2]. However, metastatic melanoma, typically refractory to chemotherapy, carries a poor prognosis, especially with cardiac involvement.

Case Report

A 24-year-old patient with a history of a malignant neck melanoma surgically removed 2 years ago, regular follow-up had been negative for disease recurrence. Currently, she was admitted in the emergency room of our hospital because of breath shortness,

Bilateral lower extremity edema, and frequent episodes of palpitations during the last month. On examination, patient was a febrile with a heart rate of 135 bpm, blood pressure of 100/65 mm Hg, respiratory rate of 21 breaths/min, and O₂ saturation of 95% on room air. Heart sounds were muffled. Neck palpation noticed multiple cervical lymph nodes. The chest was clear to auscultation .the electrocardiogram showed sinus tachycardia with low voltages, while chest radiography revealed an enlarged cardiac silhouette. Our patient was anemic with hemoglobin level of 10 with no leukocytes is. All electrolytes were within normal limits.

Due to high clinical suspicion for cardiac tamponade, a bedside transthoracic echocardiography (TTE) showed a large pericardial effusion with diastolic compression of the

right ventricle, Moreover ,it pointed out the presence of an irregular myocardial mass measuring 48×28 cm occupying large percentage of right ventricle, growing from the apex to just above the tricuspid valve, which seemed to infiltrate free wall of right ventricle with normal systolic function and an acceleration of the flow without obstruction (Fig.1). Immediate pericardiocentesis is evacuated 1500 ml of hematic pericardial fluid, its analysis was suggestive of an exudative effusion and cytological examination showed more lymphocytes than neutrophils. Immunohistochemistry revealed the presence of macrophages but did not detect tumor cells.

ECG-triggered magnetic resonance imaging (MRI) of the heart was performed to characterize the cardiac mass. Steady state free precession (SSFP) cine vertical long axis and horizontal short axis showed heterogeneous and irregular mass that infiltrate myocardial wall of right ventricle (Fig.2,3), after the injection of gadolinium contrast agent, the mass showed intense and inhomogeneous enhancement, There still was residual pericardial effusion (Fig.4). Contrast-enhanced CT demonstrated mediastinal lymphadenopathy and numerous nodular pulmonary lesions, moderate ascites, pleural and pericardial effusion, findings that suggested the presence of metastases.

Ultrasound guided biopsy of the mass was performed and confirms melanocytic nature of cells.

After a multidisciplinary discussion, surgery was not achievable due to the severe and worsening condition of this patient. She started chemotherapy and succumbed 2 months later because of cardiorespiratory arrest, most likely due to cardiac arrhythmia.

Discussion

Malignant melanoma is the type of tumor with greatest affinity for heart tissue during metastatic dissemination. Some studies of autopsy cases describe its presence in up to 40% of the patients with disseminated disease[3]. Cardiac metastasis of melanoma generally follow silent course, and occurs in advanced neoplastic disease.

The four pathways of cardiac invasion are retrograde lymphatic extension, hematogenous spread, direct contiguous extension, and transvenous extension [4]. Generally, a melanoma is disseminated by means of hematogenous spread to the myocardium and epicardium via the coronary arteries or, less frequently, from the vena cavae[5]. Because microcirculation in the lungs and liver filters out most of the cancerous cells, these cells rarely reach the coronary arteries. Thus, hematogenous metastases to the heart and pericardium are often associated with hematogenous metastases to other organs [6].

Cardiac metastases from melanoma are rarely diagnosed because most patients (90%) are asymptomatic [7]. When present, the clinical signs and symptoms of cardiac metastases are nonspecific and include fatigue, superior vena cava syndrome or congestive heart failure, cardiac arrhythmia, pericardial effusion, obstructed right ventricular inflow or outflow, and transient ischemic attack [8]. Arrhythmia remains the most common clinical sign of cardiac metastases [9], and its sudden appearance raises the possibility of cardiac metastatic involvement. Tumor involvement and its consequences (cardiac tamponade, congestive heart failure, coronary artery invasion, sinoatrial node invasion) are the cause of death in one-third of patients with cardiac metastases [10].

When diagnosed by imaging, metastatic melanoma of the heart is typically a lobular mass that may be intracavitary or may involve the myocardium or pericardium. The right heart is more commonly involved, compared to the left heart, possibly because the pulmonary microcirculation filters hematogenous spread of tumor [11].

Because of its high sensitivity and widespread availability, transthoracic echocardiography is often the first imaging test performed when cardiac metastases are suspected, or when non specific cardiac findings are present on physical examination. Magnetic resonance imaging (MRI) is advantageous because of its superior contrast resolution. MRI provides high-resolution anatomic detail and may clarify anatomic relationships better than ultrasound [12]. It differentiates between cardiac tumor and other space-occupying lesions such as intracardiac thrombus, the most encountered lesion. Tumor extent may better be determined because melanin is a natural paramagnetic substance and causes T1 shortening, melanoma is classically T1 hyperintense and T2 hypointense [13]. However, only a minority of melanoma metastases demonstrate these classic findings [14,15]. In our case, mass have a very heterogeneous signal in T1w and T2w images.

A total body computed tomography (CT) was performed for cancer staging. The overall sensitivity of CT for metastatic melanoma is 58% and the specificity is nearly 70% [16].

The pathologic diagnosis of metastatic melanoma to the heart may be problematic. Cytologic examination of pericardial fluid may be performed, however, this is frequently nondiagnosed, as cytology is positive in only 44%-65% of suspected malignant pericardial effusions [17]. Histologic diagnosis may be obtained by ultrasound-guided biopsy of cardiac masses to confirm pathological diagnosis.

There are few therapeutic options for most patients with cardiac metastases because of the diffuse metastatic involvement and the limited benefit of chemotherapy. For a minority of patients, surgical resection may be an option, typically employed to prevent rapid cardiac decompensation in case of isolated cardiac involvement or compromised tumor. In our case, prognosis of patient was poor due the advanced stage of his disease, consequently, chemotherapy was unsuccessful.

Conclusion

If patients with history of malignant melanoma present with cardiac symptoms, clinicians should always consider the possibility of cardiac metastasis and perform further investigations, such as echocardiography or ideally MRI. Early diagnosis and prompt treatment can at least be palliative if not curative.

Consent:

A written informed consent was obtained from patient for the publication of this paper

Conflict of interest:

The authors declare that they have no competing interest

List of abbreviations:

TTE: Transthoracic echocardiography

MRI: Magnetic resonance imaging

SSFP: Steady state free precession

CT: Computed tomography

T1w: T1 weighted image

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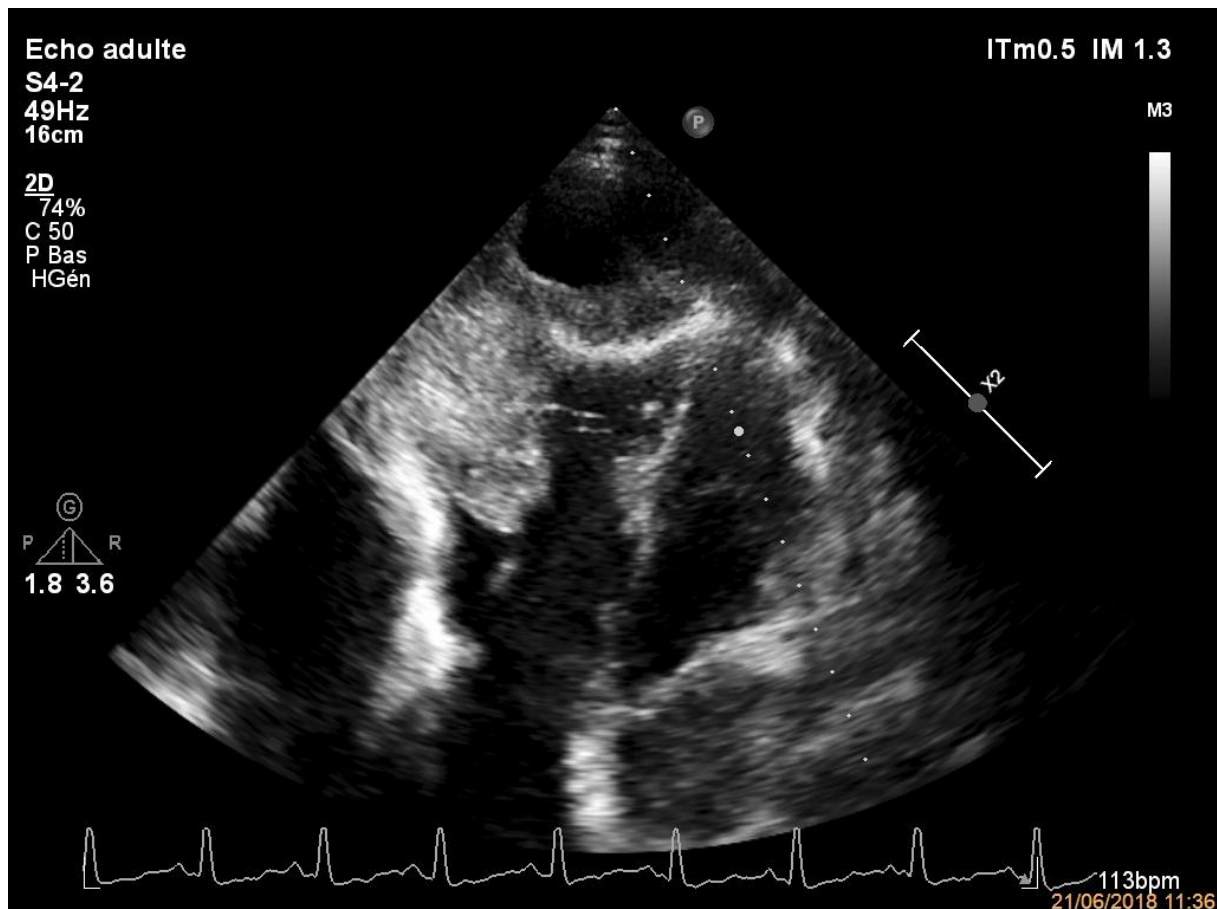


Figure1: Transthoracic echocardiography (TTE),4-chamber view reveals irregular myocardial mass measuring 48× 28 cm, occupying large percentage of right ventricle with a large amount of circumferential pericardial effusion.

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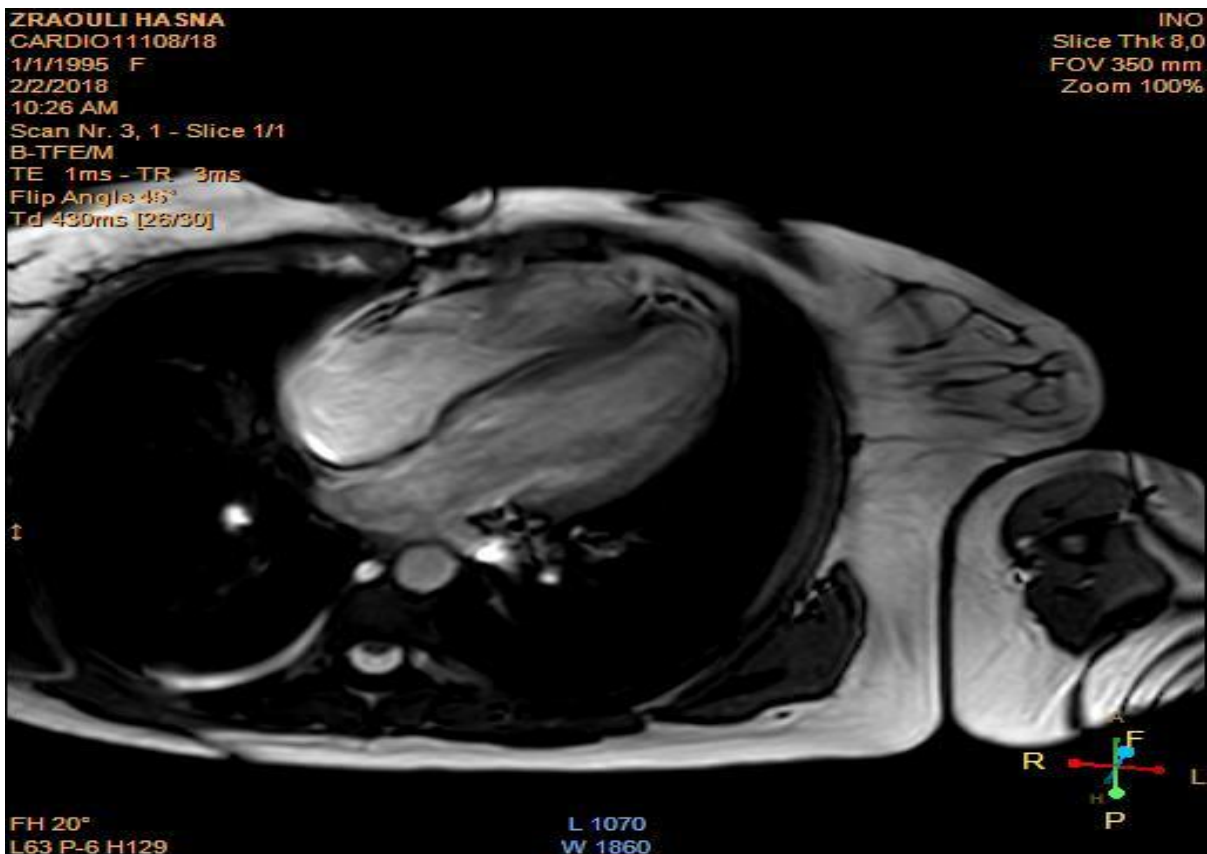


Figure 2: 4-chamber view cine image showing irregular and heterogeneous mass infiltrating free wall of right ventricle and extends to right apex.

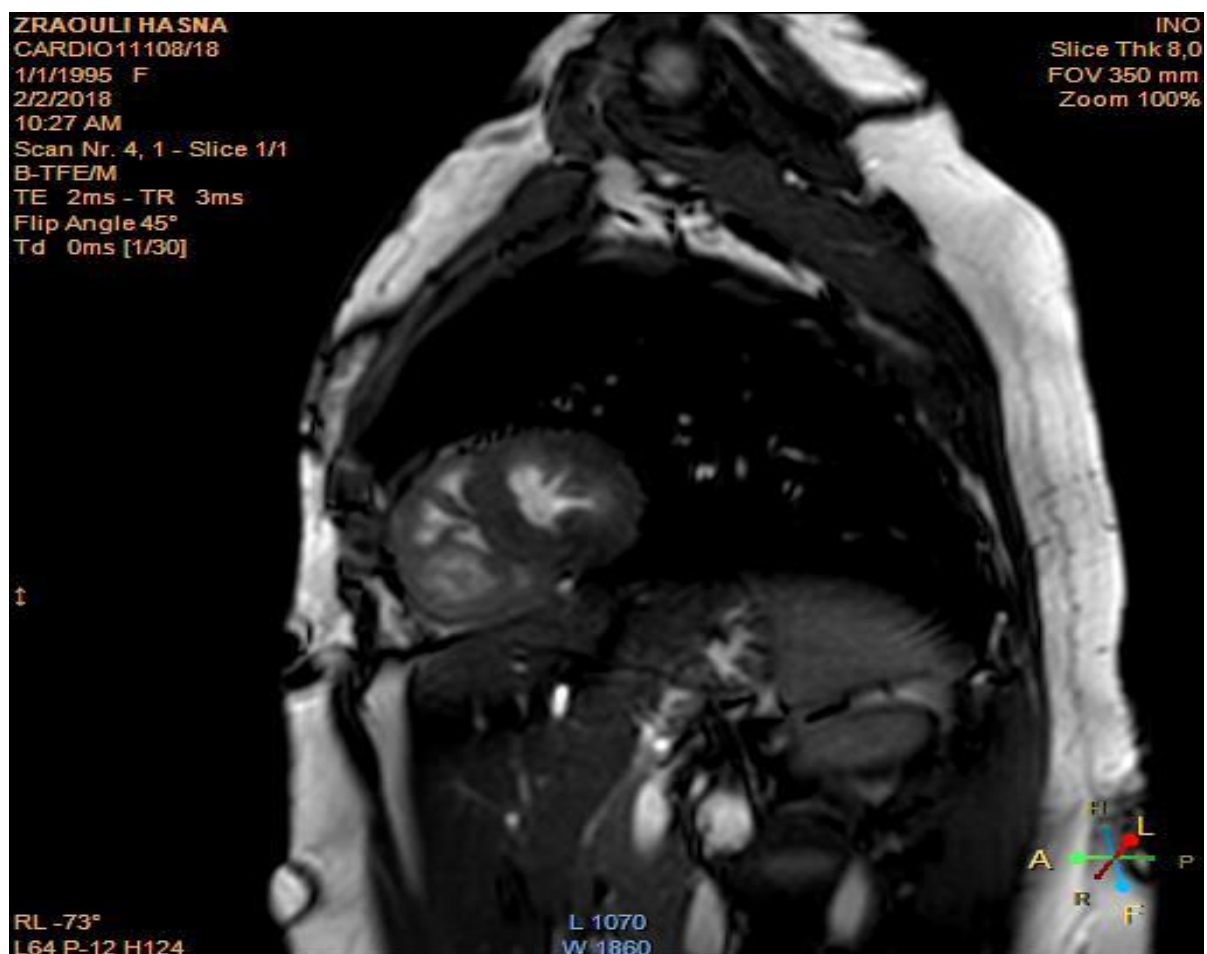


Figure 3: short axis view cine image showing the mass that nearly fill the right ventricle

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Figure 4: MRI after the injection of gadolinium on 4-chamber view shows an inhomogeneously hyperintense contrast enhancement of the pathologic mass predominantly peripheral.