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RESEARCH ARTICLE

RIGHT VENTRICULAR OBSTRUCTION SECONDARY TO METASTATIC OSTEOSARCOMA: CASE REPORT AND REVIEW OF THE LITERATURE

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ABSTRACT

Metastatic cardiac tumors are more frequent than primary tumors. Osteosarcomas very rarely metastasizes to the heart and to our knowledge, no cases have been reported to occur in the whole right cavity. We report a case of cardiac metastasis in a 77 year old patient with osteosarcoma of the humerus, presenting after more than one year of surgical treatment of primary lesion with signs of right heart failure and severe respiratory distress. Diagnosis was made on echocardiogram and chest CT scan: The patient had a large tumor within the right ventricle and atrium. It totally occluded the right ventricle outflow. Calcification was observed. No other metastatic site was detected. Intra cardiac metastasis from osteosarcoma rarely gain clinical attention. However patients should be followed up for cardiac involvement for long years.

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INTRODUCTION

Metastatic cardiac tumors are morefrequent than primary tumors. Osteosarcomas very rarely metastasizes to the heart and to our knowledge, no cases have been reported to occur in the whole right cavity.We report an unusual case of a large uniquemetastatic osteosarcoma to the right ventricle and atrium.

Case Report

We report the case of a 70 year old patient who was diagnosed one year previously as having osteosarcoma of the left humerus discovered after a pathological fracture of the arm. Histopathological examination concluded to a common form of osteosarcoma with invasion of soft tissues. The rest of the staging was negative. The patient had an amputation of the entire upper arm. Adjuvant treatment was refused by the patient. He was admitted to our department one year later because of shortness of breathing and chest pain. On examination, the patient was in severe respiratory distress without crepitation, he had arterial hypotension 80 mmhg /60mmhg and signs of right heart failure.

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The electrocardiogram detected tachyarrhythmia at 110beats per minute, incomplete right bundle block with inverted T waves in right precordial leads.(Figure1) There was not cardiomegaly neither signs of pulmonary venous hypertension on the chest X –Ray. No pulmonary nodule was detected. The diagnosis of high risk pulmonary embolism was strongly suspected. And an urgent transthoracic echocardiography was done. Transthoracic echocardiography demonstrated a large echogenic mass (6*13 cm) expanding throughout the right ventricle, the right atrium and tricuspid valve with signs of obstruction (Figure 2). Pulmonary artery was free of any suspected mass. There was not left ventricular cavity obstruction. The differential diagnosis was a thrombosis. However, the mass was thought to be a result of metastatic tumor due to its rate of growth. The CT scan detected Invasion of the right heart with themass and demonstrated calcification within the lesion (Figure 3) andan extension to the vena cava. The mass was similar to thrombosis but contrast enhancement suggested it was a neoplasm. No pulmonary embolism neither metastases was detected. Magnetic resonance imaging examination was not performed because of the hemodynamics of the patient. Endomyocardialbiopsy was judged unnecessary to establish the diagnosis, and it carried a risk of cardiac perforation. Surgical intervention at this stage of the disease was considered impossible. The patient died 24 hours after the discovery of the cardiac involvement. Autopsy was declined by the family.

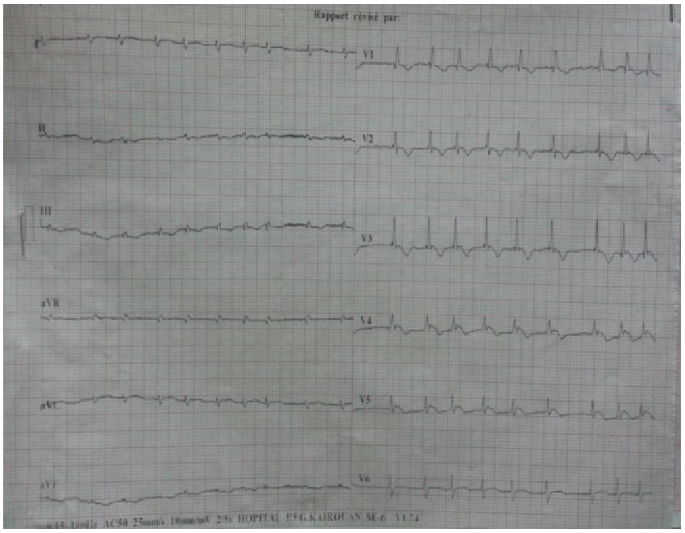

Figure 1. ECG detected tachyarrhythmia at 110 beats per minute, incomplete right bundle block with inverted T waves in right precordial leads

The tumors showing the highest rate of heart metastasis include cancers of the lung and breast, melanoma, and lymphoma (Thurber, 1962; MacGee *et al*., 1991). The invasion of the heart can be hematogenous, lymphatic, transvenous and by direct extension (Aburto *et al.,* 2009). Cardiac metastasis occurs with approximately 15% of all sarcomas (1997), Osteosarcoma is the most common bone cancer in most children and adults, his invasion of the heart is extremely uncommonand is rarely seen as the first site of metastases. It usually occurs at the terminal phase of a prolonged disease courseand may go unrecognized until autopsy.Pericardial invasion is the most common type of cardiac metastasis, followed by epicardial and myocardial metastasis. Intracavitary growth however, is unusual. This case illustrates an unusual presentation of osteosarcoma metastasis with intracardiac obstruction in an elderly patient without other metastatic sites. The unique features in our case was alsothe very largesizeof the mass. The right side of the heart is more commonly involved (Abdelfatah Elasfar *et al.,* 2013).

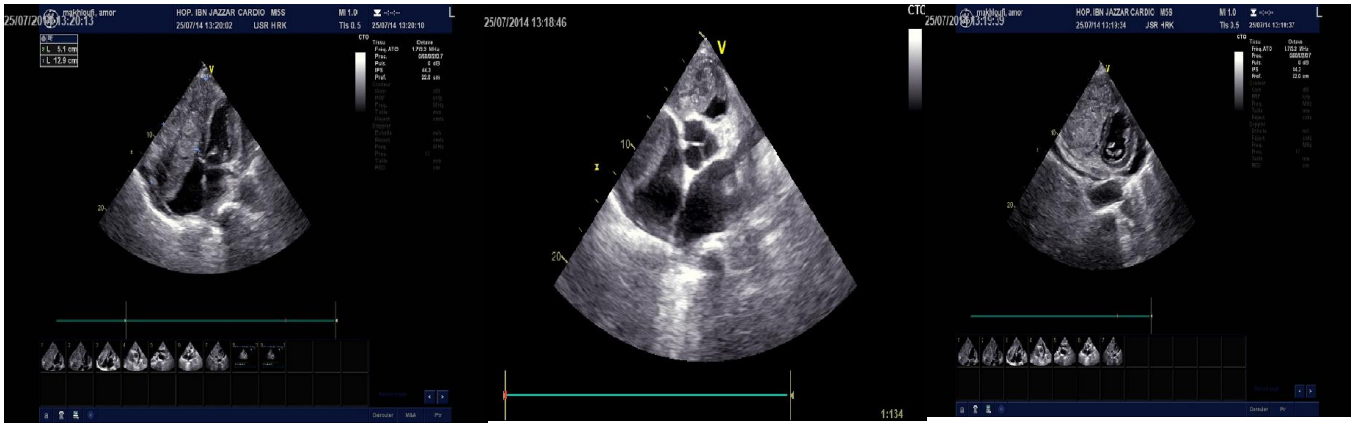

Figure 2. Echocardiographic evaluation. 2-Dimensional transthoracic echocardiogram shows a large echogenic mass (6*13 cm) expanding throughout the right ventricle, the right atrium and tricuspid valve with signs of obstruction

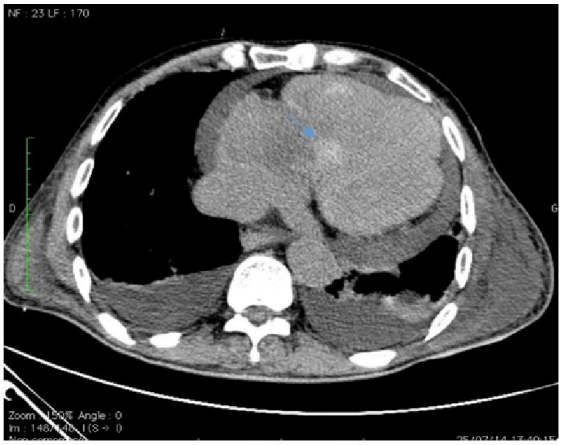

Figure 3. Thoracic CT scan detected Invasion of the right heart with the mass and demonstrated calcification within the lesion

DISCUSSION

Metastases to the heart are much more common than primary cardiac neoplasms (Lam *et al.,* 1993), approximately 30 times more frequent and theyare discovered at autopsy in 10%–18% of all patients with malignancies (Abraham *et al.,* 1990; Klatt *et al.,* 1990; Butany *et al*., 2005).

Clinical presentation may vary from sudden death, cardiac arrhythmias, and cardiac failure to embolization or can be asymptomatic; it depends on the location and extent of myocardial involvement. ECG can be a useful, but nonspecifictool; the most common abnormalities are ST-T–wave changes and new atrial arrhythmias (Cates *et al.,* 1986).

Imaging iscrucial for the diagnosis:in fact osteosarcomas are unique in that both the primary tumor and distant metastases produce osteoid tissue thus lesions are clearly visible on radiology (Butany *et al.,* 2005). A chest X-ray is the first step to determine, calcific masses. However it may be missed because of mediastinal superposition as in our case. The echocardiogram made it possible the diagnosis. It is recommended that an echocardiographic study is performed routinely in patients affected by osteosarcoma (Ohnishi *et al*., 1990; Buckley *et al*., 2011). Poor acoustic windowsis a major limitation and it can be difficult to distinguish between neoplasm and thrombus. Thoracic CT examination is suitable for differential diagnosis; lateenhancement techniques can be helpful in the identification of thrombus. In fact,tumor is more likely to enhance. Imaging is also necessary to determine tumor resectability and allow planning for surgery. Endomyocardial biopsy has been described however it was rarely useful for the diagnosis because of failure to pick up enough samples from the tumor mass (Leone *et al.,* 2011). The prognosis is very poor with an average survival period of 5.5 months after the diagnosis of cardiac metastases (Catton *et al.,* 2008). Therapyis limited to palliative treatment of symptoms and chemotherapy. In some cases, surgery is used to relieve symptoms.

Conclusion

During the follow-up of all cancer patients, any cardiac symptom may be a harbinger of acardiac metastasis and even without symptoms the possibility of cardiac involvement should be considered in any patient with a malignancy.

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