Large Pericardial Effusion and Breast Neoplasia — Case Report

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Introduction

Metastatic heart tumors are more common than primary tumors. They may result from contiguous invasion, lymphatic dissemination or hematogenous dissemination. Metastases to the heart tend to involve the pericardium and the myocardium more often than the endocardium and the valves. Metastases most frequently originate from the lung, breast, lymphoma, leukemia and melanoma.[1,2] The most common sign of cardiac involvement by metastasis is pericardial effusion, usually with echocardiographic demonstration of cauliflower-looking vegetative lesions adhered to the pericardial walls protruding into the pericardial cavity.[1] Breast carcinoma accounts for about 7% of cardiac metastases and can invade the heart by contiguity through the anterior chest wall and often produces pericardial thickening with effusion.[2]

This case is about a patient diagnosed with advanced breast cancer with multiple metastases (lung, liver, spine) that evolved into large pericardial effusion with echocardiographic signs of cardiac tamponade.

Case Report

MRST, a 45-year-old female born in Bahia, coming from São Paulo, was admitted to the Emergency Room complaining of dyspnea for two days, with progressive worsening of minimal admission efforts and abdominal pain, jaundice and coluria for one month. The patient was submitted to liver biopsy due to an abnormality found in computed axial tomography of the abdomen compatible with liver metastasis. History of left breast neoplasia treated 10 years previous with partial mastectomy, radiotherapy and chemotherapy. On the physical examination, the patient had a normal general condition, +/4+ dyspnea, discolored +/4+, hydrated, acyanotic, icteric, afebrile, blood pressure (BP): 110X80 mmHg, heart rate (HR): 69 bpm, respiratory rate (RR): 24 irpm. Heart auscultation: rhythmic crackles, 2-stroke hypophonetic sounds with no murmurs. Lung auscultation: vesicular murmur reduced in the right hemithorax with crackles in the lung bases. Abdomen: distended with reduced bowel sounds. Lower limbs: no edema. Electrocardiography showed sinus rhythm, diffuse alteration of ventricular repolarization. Chest x-ray revealed cardiomegaly 3+/4+ (Figure 1), nodular images in the lungs. Echocardiography showed preserved cavity diameters, myocardial thickness and systolic performance, mitral leak, thickened pericardium with severe effusion: 20 mm separation from the pericardial leaflets (Figure 2), with signs of diastolic restraint: Doppler test showing right atrial diastolic collapse (Figure 3) and decreased mitral flow velocities on inspiration. (Figure 4). Computed tomography of the abdomen and pelvis showed enlarged liver with nodular images of secondary aspect, perihilar lymphadenopathy. Osteoblastic lesions in vertebral bodies of T11, T12, L1, L3, L4, as well as in the basin and sacrum bones. Pericardial effusion on thoracic sections. Multiple non-calcified 0.5 mm micronodules in pulmonary bases, probably of secondary nature.

Liver biopsy revealed moderately differentiated carcinoma metastasis infiltrating the liver tissue. Histogenesis of the lesion was compatible with breast carcinoma. Advanced stage breast cancer was considered and palliative treatment was chosen. Pericardiocentesis has not been performed. The patient got clinically worse and died.

Discussion

Pericardial effusion is the most common sign of neoplastic involvement of the heart. Long-duration severe pericardial effusion may be of malignant etiology. Butany J et al.,[3] in an analysis of malignant neoplasia of the heart on autopsy observed that almost all cases were of metastatic origin, being more frequent in the pericardium. Hemorrhagic pericardial effusion is associated with high probability of being pericardial metastasis.[4] Diagnosis of pericardial effusion is suspected in simple complementary tests such as electrocardiography and chest X-ray confirmed by echocardiography, computerized tomography of the chest and magnetic resonance imaging.

Patients with neoplasia and pericardial disease do not only present neoplastic pericardial involvement. At least half of these patients have non-malignant pericardial disease, with irradiation pericarditis, chemotherapy-induced pericarditis (adriamycin, cyclophosphamide), infection, hypothyroidism, autoimmune disease and idiopathic chronic pericardial effusion.[5]

The most frequent metastatic neoplasms of the pericardium are lung neoplasia, breast neoplasia, lymphoma, leukemia and melanoma.[6] The diagnosis that confirms that the pericardial involvement is neoplastic is done by pericardiocentesis with a cytological study of the pericardial fluid and pericardial biopsy. Pericardiocentesis guided by echocardiography or radioscopy is safe and efficient with initial treatment of pericardial effusion with tamponade.[7]

Neoplastic pericardial disease may lead to cardiac tamponade in up to 46% of patients in some cases, which

Keywords

Pericardial Effusion; Breast Neoplasms; Neoplasm Metastasis; Cardiac Tamponade.

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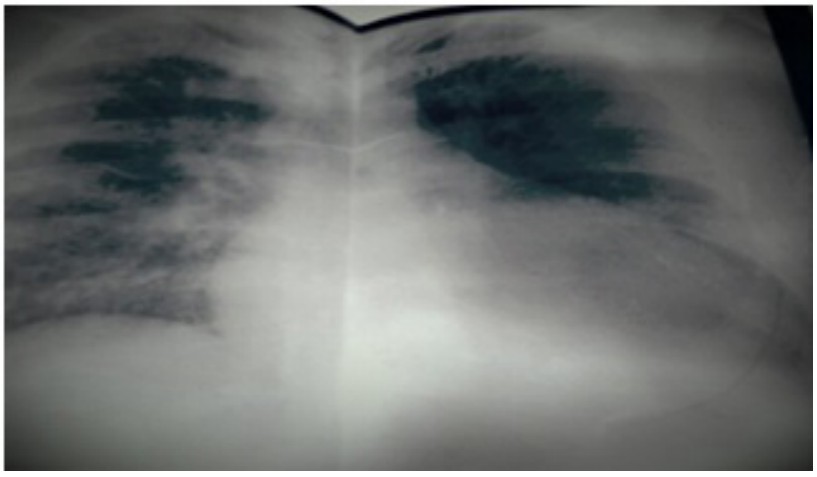

Figure 1 – *Posterior Anterior chest X-ray: Cardiomegaly 3/4+.*

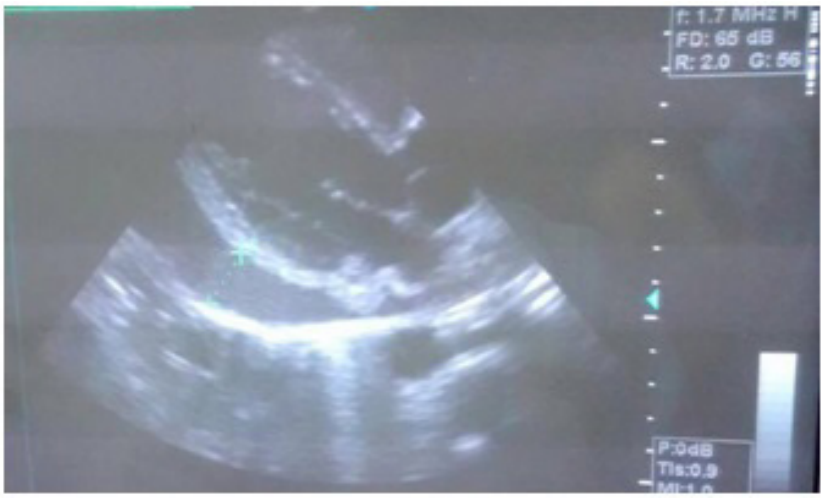

Figure 2 – *Left ventricle. Longitudinal parasternal section. Severe pericardial effusion (20 mm separation of the leaflets from the pericardium).*

places it among the main causes of cardiac tamponade. In 34 to 50% of the cases, cardiac tamponade may be the initial clinical picture of neoplasia.[4] Petcu et al.[7] found malignant pericardial effusion with 40.7% tamponade in the studied case.

Pericardial effusion with acute cardiac tamponade presents signs of low cardiac output and venous congestion: dyspnea, high venous pressure, Kusmaul's signal, paradoxical pulse, hypotension, with or without associated chest pain. Electrocardiography presents low voltage and electrical alternation, chest X-ray shows "water bottle heart" cardiomegaly, and the diagnostic certainty is done by computed tomography angiography and echocardiography showing the generally severe pericardial effusion with signs of cardiac tamponade, that is, signs of diastolic restriction: right atrial and/or right ventricular diastolic collapse and decreased mitral flow during inspiration of more than 40% in the Doppler test. The confirmation that the cause is neoplastic is given by pericardiocentesis with cytological study and pericardial biopsy. The dosage of serum tumor markers, such as CEA, CA 19-9, CA 72-4, SCC and NSE, support the diagnosis of metastatic breast tumors to the pericardium.[8,9]

Neoplastic pericardial effusion therapy depends on acute, clinical or echocardiographic tamponade data. In the absence of clinical or echocardiographic picture of cardiac tamponade, the therapy is conservative,[9] with fluid replacement, analgesic drugs for chest pain and corticoid to reduce pericardial effusion. In cases of pericardial tamponade, the options include pericardiocentesis, percutaneous balloon or surgical pericardial window, and partial pericardiectomy, that is indicated in cases of recurrent neoplasm or in cases of pericardial constriction. Treatment of malignant pericardial effusion should be individualized,

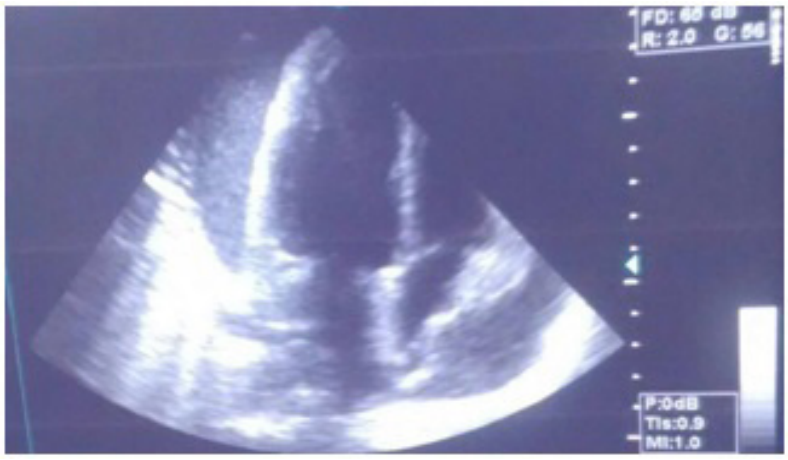

Figure 3 – *4-chamber apical image. Diastolic right atrial collapse.*

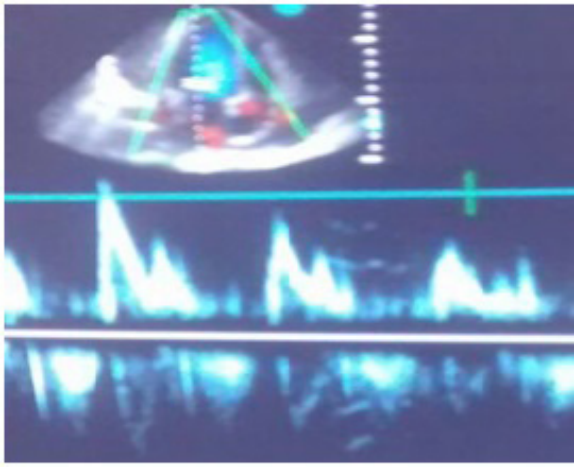

Figure 4 – *Doppler. Decreased mitral flow velocities on inspiration.*

considering the patient's clinical status, the tumor type, success rates and availability and risks of the therapy types.[9]

In the case reported, the patient had advanced stage neoplasia with multiple metastases and a large pericardial effusion of probable metastatic origin. Palliative therapy was chosen. Pericardiocentesis has not been performed.

Pericardiocentesis can confirm the neoplastic etiology and even contribute to increase the survival, since the neoplastic involvement of the pericardium, especially in cases of effusion with tamponade, worsens the prognosis even more, with increases in terms of morbidity and mortality.[6]

Therefore, it is concluded that in patients with neoplasia with signs and/or symptoms of heart failure and/or cardiomegaly in chest X-ray, neoplastic involvement of the pericardium should be suspected.

Echocardiography can diagnose pericardial effusion and support the clinical decision of therapeutic procedures such as pericardiocentesis with cytological study and pericardial biopsy, which may clarify the neoplastic etiology and improve the survival of these patients.

Authors' contributions

Research creation and design: Miranda MJL, Muniz PG, Moraes RF; Data acquisition: Miranda MJL, Muniz PG, Moraes RF; Data analysis and interpretation: Miranda MJL; Manuscript drafting: Miranda MJL; Critical revision of the manuscript as for important intellectual content: Miranda MJL.

Potential Conflicts of Interest

There are no relevant conflicts of interest.

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Academic Association

This study is not associated with any graduate program.

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