

# Heart metastases from gastric sarcoma. A case report

Giorgio Locci, Andrea Pili, Mirko Pais, Emiliano Cirio\*, Antonio Sanna

Division of Cardiology, \*Division of Cardiac Surgery, Hospital G. Brotzu, Cagliari, Italy

*Key words:*

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Cardiac involvement by metastatic gastric sarcoma is a rare event. We describe an unusual case of gastric sarcoma involving the heart in a 29-year-old man who presented with heart failure. The diagnosis was made at two-dimensional echocardiography. Heart metastases prolapsing into and obstructing the mitral valve orifice were located in the left atrium. In an attempt to excise the left atrial mass, the patient underwent heart surgery twice. The resections were non-curative. The patient died of refractory heart failure 9 months after the onset of symptoms. This case report is an example of a secondary intracavitary tumor that causes obstruction of the mitral valve orifice. Two-dimensional echocardiography has been confirmed as the examination of choice for the early diagnosis of cardiac tumors.

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*Address:*

Dr. Giorgio Locci

Divisione di Cardiologia  
Azienda Ospedaliera  
G. Brotzu  
Via Peretti, 2  
09134 Cagliari

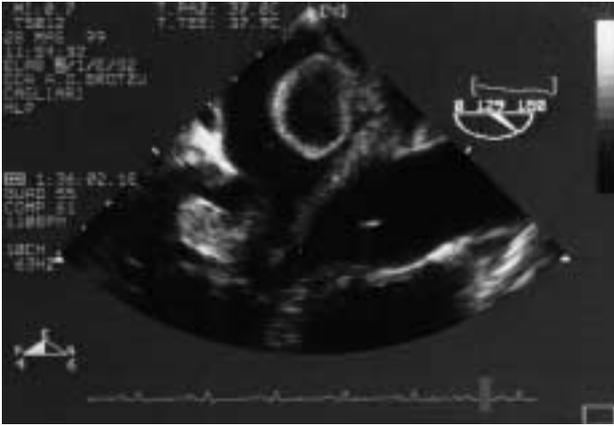
## Introduction

Primary cardiac tumors are rare, with an incidence ranging from 0.0017 to 0.28% in reported autopsy series<sup>1</sup>. According to these series three quarters of tumors are benign whereas one quarter are malignant<sup>1</sup>. On the other hand, secondary involvement is more common and may arise virtually from any malignant neoplasm with the sole exception of primary tumors of the central nervous system<sup>2,3</sup>. Two-dimensional echocardiography has become the technique of choice for the detection of intracardiac tumors. Transesophageal echocardiography not only enables one to make the right diagnosis when images obtained at transthoracic echocardiography are inadequate, but provides in all cases more detailed information concerning the tumor and its relationship to cardiac structures<sup>4,5</sup>. Recently ECG-gated magnetic resonance imaging has been shown to provide multiaxial images, better tissue characterization of the mass and information which may be useful for surgical management<sup>6,7</sup>. In this report we describe the clinical, electrocardiographic and echocardiographic findings in a patient with heart metastases from gastric sarcoma detected at two-dimensional echocardiography.

## Case report

A 29-year-old male patient was diagnosed as having a gastric sarcoma in March

1999. Initial examination showed no evidence of the involvement of any other organ. A total gastrectomy was performed and afterwards the patient was submitted to chemotherapy. In May 1999, the patient presented with dyspnea, and at the end of the month he developed acute pulmonary edema necessitating admission to our hospital. A two-dimensional echocardiography was performed and suggested the presence of a large mobile mass in the left atrium. Transesophageal echocardiography documented that the single mass seen in the left atrium at two-dimensional echocardiography, actually consisted of two masses: the first attached to the basal area of the interatrial septum and the second attached to the anterior mitral leaflet. The latter, with a diameter of 5 × 3.5 cm, was mobile, pedunculated and prolapsed into and obstructed the mitral valve orifice (Fig. 1). Magnetic resonance imaging showed no evidence of extracardiac involvement of the atrial mass. Afterwards the patient continued chemotherapy. In October 1999, the patient was readmitted to the hospital because of the recurrence of acute pulmonary edema. Transesophageal echocardiography documented the presence of three masses in the left atrium: the first, 6 cm in diameter, was attached to the superior and lateral wall; the second was attached to the basal area of the interatrial septum; the third, 4.9 × 2.5 cm in size, was attached to the anterior mitral leaflet. The latter was mobile, pedunculated, and prolapsed



**Figure 1.** Transesophageal two-dimensional echocardiography performed preoperatively in May 1999, showing a solid, pedunculated mass prolapsing into and obstructing the mitral valve orifice (quantitative measurements of atrial tumor  $5 \times 3.5$  cm), and a cystic mass with its solid part attached to the interatrial septum.

into and obstructed the mitral valve orifice. On November 12, 1999, the patient underwent heart surgery to remove the left atrial masses. Histologic examination confirmed the presence of sarcomatous and thrombotic tissue. The postoperative course was regular. The ECG was suggestive of sinus rhythm and of non-specific ST-T changes in the lateral leads. Computed tomography showed no evidence of metastatic involvement in any other organ. On December 2, 1999, transesophageal echocardiography was repeated and revealed the presence of two new masses in the left atrium. These were attached to the basal area of the interatrial septum and to the superior area of the left atrial appendage respectively. These masses were interpreted as thrombi and oral anticoagulant treatment was started. The patient was discharged from hospital after 43 days and continued chemotherapy. On March 12, 2000, the patient was readmitted to our hospital because of the recurrence of dyspnea. Cardiovascular evaluation and ECG were within normal limits. The chest X-ray was suggestive of

central interstitial pulmonary edema. The erythrocyte sedimentation rate and the serum levels of aspartate transaminase, alanine transaminase and lactic dehydrogenase were increased. Two-dimensional echocardiography revealed the presence of two new masses in the left atrium: a large, pedunculated and mobile mass  $6 \times 4$  cm in size was attached to the free wall of the left atrium and prolapsed into and obstructed the mitral valve orifice; a smaller mass, 2.5 cm in diameter, was attached to the superior wall of the left atrium. Moreover, two-dimensional echocardiography showed mild mitral and tricuspid regurgitation associated with slight pericardial effusion. The clinical course was rapid and patient's conditions progressively deteriorated despite full medical treatment. On March 20, 2000, after having explained to the patient the palliative nature of the operation, he again consented to heart surgery for removal of the atrial tumor. The histologic diagnosis confirmed the presence of heart metastases from a gastrointestinal sarcoma. Immunohistochemical analysis revealed that the stromal elements were positive for Vimentin. The postoperative course was complicated by hemostatic disorders, fever and extensive bilateral pleural effusion. When, 32 days later, the patient was discharged he had no cardiac symptoms. Four months later, on July 15, 2000, the patient was referred to our hospital because of the recurrence of dyspnea. Two-dimensional echocardiography showed the presence of a single large left atrial mass prolapsing into and obstructing the mitral valve orifice and  $6.6 \times 4$  cm in size (Fig. 2). The patient refused hospitalization. On July 21, 2000, the patient was admitted to our hospital with pulmonary edema. His clinical course rapidly deteriorated and he died of refractory heart failure the following day.

## Discussion

Compared to other organs, the heart is an unusual site of metastases by the hematic or lymphatic route. This



**Figure 2.** Parasternal long-axis, transthoracic echocardiographic view during systole (A) and diastole (B), obtained 4 months after surgery and showing the left atrial tumor prolapsing into and obstructing the mitral valve orifice (quantitative measurements of atrial tumor  $6.6 \times 4$  cm).

fact may be attributed to the metabolic peculiarities of the heart muscle, the rapid intracardiac blood flow, the restricted cardiac lymphatic connections, and the strong kneading action of the heart<sup>4</sup>. There is a variety of reports concerning the frequency (or rarity) of neoplastic invasion of the heart. The incidence of such an occurrence ranges from 0.53 to 37.1% in reported autopsy series<sup>1,8-12</sup>. The most common adult tumors which metastasize to the heart are carcinomas (lung, breast, pancreas, kidney, gastrointestinal tract, ovary and testes), followed by malignant melanoma, non-Hodgkin's lymphoma, and various soft tissue and bone sarcomas<sup>3,11-13</sup>. In childhood, a completely different pattern is seen. Non-Hodgkin's lymphomas are the most frequent cause of distant metastases to the heart, followed by neuroblastoma, Wilms' tumor, and soft tissue and bone sarcomas<sup>14,15</sup>. Sarcomas do not commonly metastasize to the heart<sup>16-18</sup> and account for only about 5.5% of secondary heart tumors<sup>1</sup>. About one third of leiomyosarcomas of the gastrointestinal tract develops metastases and about 90% of the metastases are intra-abdominal. The liver is the most common site of metastases, followed by the peritoneum, local recurrence or extension and rarely the regional lymph nodes<sup>19</sup>. The clinical features of heart metastases are variable and related to the involved cardiac component. They include congestive heart failure, valvular heart disease, ventricular and supraventricular arrhythmias, conduction defects, syncope, arterial and pulmonary embolism, pericardial effusion and cardiac tamponade. Furthermore, they can mimic an infective or immunologic disease<sup>20</sup>. The present case report is an example of a secondary intracavitary tumor that obstructed the mitral valve orifice. Resection was not curative. In fact, accurate prediction of the biologic behavior of this gastric cancer is difficult<sup>21</sup>. The originality of this case lies in the rarity and in the biologic behavior of this tumor. The literature concerning heart metastases from gastric sarcoma is rather scarce and restricted to autopsy series. This case illustrates the decisive contribution of multiplane transesophageal echocardiography to the preoperative investigation. In such cases, transesophageal echocardiography is indicated because the atrial mass is not completely defined by transthoracic echocardiography. The excellent resolution afforded by transesophageal echocardiography and the proximity of the probe to the posterior structures of the heart are extremely useful in the delineation of left atrial masses. In this case, the sites of origin and of attachment of the tumor, the existence of other smaller lesions, the malignant character of the masses and hemodynamic judgment were defined better by transesophageal echocardiography. Equally important, in this case, was the fact that transesophageal echocardiography was used to guide surgical therapy perioperatively, and also to differentiate thrombi and artifacts from tumor recurrences postoperatively. Thus, two-di-

mensional echocardiography has proved to be the best technique for the early diagnosis of cardiac tumors, and transesophageal echocardiography, employed for the evaluation of cardiac tumors, has a superior specificity and sensitivity.

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