New-Onset Congestive Heart Failure Secondary to a “Huge” Right Atrial Mass

A Case Report

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Transesophageal echocardiography is a useful adjunct to other diagnostic modalities in uncovering the etiology of congestive heart failure. The authors describe the case of a 75-year-old woman with a 4-week history of progressive congestive heart failure, in whom transesophageal echocardiography played a critical role in the diagnosis of a right atrial mass, accounting for this patient’s constellation of symptoms.

Introduction

Primary neoplasms of the heart can be either benign or malignant. The most common neoplasm affecting the heart is the atrial myxoma. Atrial myxomas are most commonly seen in the left atrium; however, they can occur in all 4 cardiac chambers. Melanoma is the most frequent tumor to invade the endocardium of any cardiac chamber. Tumors that may metastasize to the heart, in order of decreasing frequency, are germ cell tumors, leukemia, lymphoma, and lung cancer. Hepatic tumors rarely metastasize to the heart, and when they do, they have a propensity to affect the right side of the heart. We present the case of a 75-year-old woman with new-onset congestive heart failure (CHF) found to have a large right atrial mass.

Case Report

A 75-year-old woman was admitted for evaluation of progressively worsening exertional dyspnea of 1-month duration. The patient described a worsening of her symptoms over the week before this admission. The patient had no significant history of chest pain or alcohol or drug abuse. She denied any significant travel history or prior parasitic in-
fection. The patient had not been evaluated by echocardiography before this admission. She was taking no medications before admission.

On physical examination the patient had a temperature of 37.0°C with a respiratory rate of 22 breaths/minute, blood pressure of 140/76 mm Hg, and a pulse rate of 110 bpm. Except for 2+ bilateral pedal edema, the remainder of the physical examination was unremarkable. The chest radiograph showed mild cardiomegaly and mild pulmonary vascular congestion. With the exception of sinus tachycardia the results of the 12-lead electrocardiography (ECG) appeared normal. Her serum electrolytes and hematologic profile were within normal limits. The patient had an erythrocyte sedimentation rate of 36 and an alkaline phosphatase of 131 U/L with an aspartate aminotransferase of 96 U/L. Her congestive symptoms worsened throughout the hospital admission and she was scheduled for a coronary angiogram with left- and right-heart catheterization.

The coronary angiogram revealed a high-grade lesion obstructing the midportion of the left circumflex artery and a total occlusion of the right coronary artery with preserved left ventricular systolic function. During right-heart catheterization a gradient was noted between the inferior vena cava and the low right atrium. The Swan-Ganz catheter could not be advanced across the tricuspid valve to the right ventricle. After a second failed attempt at a right-heart catheterization, the patient underwent transesophageal echocardiography (TEE), which revealed a large heterogeneous mass (6 x 3.5 cm) in the right atrium. The tumor was attached to the right interatrial septum (Figure 1). Color flow Doppler confirmed obstruction of blood flow across the tricuspid valve, owing to the intraatrial mass.

One week later the patient was referred for tumor excision and coronary artery bypass surgery (CABG). Following the CABG portion of the surgery an attempt was made to excise the tumor. During digital excision to elicit the borders of the mass it was found to extend from the right atrium to the inferior vena cava. A frozen section revealed a metastatic hepatocellular adenocarcinoma. The surgeons aborted further surgical intervention and the patient was taken off cardiopulmonary bypass. The patient developed asystole and died perioperatively. A postmortem confirmed that the tumor was a hepatocellular carcinoma that had metastasized to both the left and right atrium (Figure 2A, B, and C).

Discussion

Primary tumors of the heart are rare, occurring with a frequency of 0.001% to 0.28%.1 The vast majority of tumors (> 75%) are benign and commonly present as intracavitary lesions with atrial myxomas accounting for 30–50% of these. Among atrial myxomas the majority are found in the left atrium, with the most common site of origin being the interatrial septum. However, atrial myxomas can occur in all 4 cardiac cham-

![Image](https://example.com/image1.png)

**Figure 1.**
Transesophageal echocardiogram revealed a "huge" right atrial mass, attached to the interatrial septum.
Figure 2.  

A. Low-power view of the endomyocardium infiltrated by large nodules and small trabeculae of hepatocellular carcinoma. Focal hemorrhage and cystic degeneration are also seen underneath the endocardial surface.  

B. Compressed and atrophic subendocardial tissue in between 2 areas of hepatocellular carcinoma.  

C. High magnification of hepatocellular carcinoma cells. The carcinoma cells have pleomorphic nuclei and prominent nucleoli. A mitotic figure is present in the field (toward the upper left). A flat layer of endothelial cells lines the trabeculae of carcinoma.

bers. With the exception of malignant melanoma, no other malignant tumor tends to have a specific predilection for the heart. Melanoma is the most frequent tumor to invade the endocardium of the heart. Cardiac metastasis can occur with a variety of primary malignancies, including carcinomas, sarcomas, leukemia, and lymphomas. Tumors that have a propensity to metastasize to the heart, in order of decreasing frequency, include germ cell tumors, leukemia, lymphoma, and lung cancer. Neoplasms originating from the hepatobiliary system rarely metastasize to the heart, accounting for < 1% of all metastatic tumors.

Often, recognition of neoplastic heart disease relies heavily on the physician's awareness of the possibility of its occurrence. The triad of obstruction, embolization, and constitutional symptoms characterizes intracavitary tumors. In this case the patient presented complaining of the new onset and rapid progression of exertional dyspnea. The patient did not complain of weight loss or other constitutional symptoms. As part of the work-up the patient was found to have significant coronary artery disease and as an incidental finding the patient was found to have an intracavitary right atrial mass. The presumed diagnosis was that of a right atrial myxoma and the patient was referred for surgical excision of the mass following CABG.

Much to our surprise the pathologic evaluation of the atrial mass revealed a moderately differentiated hepatocellular carcinoma. Extension of the carcinoma along the inferior vena cava resulted in an obstructive right atrial mass, which at the time of surgery had metastasized to the left atrium.

Interestingly, atrial myxomas are more commonly benign cardiac neoplasms, as compared with secondary cardiac neoplasms associated with constitutional symptoms including fever, malaise, weight loss, and thrombosis. Atrial myxomas are slow-growing tumors and have an indolent onset. In contrast, secondary tumors to the heart are exceedingly unusual, and rarely, patients first complaining of CHF are incidently found to have an intracavitary mass.

Before the widespread use of transthoracic echocardiography (TTE), cardiac neoplasm were diagnosed at autopsy. Since the advance of TTE and TEE technology, cardiac neoplasms are more frequently diagnosed, especially if the clinician strongly suspects their presence.

In this example the patient presented with new-onset CHF with normal left ventricular sys-
toxic function, significant coronary artery disease, and some condition preventing right-heart catheterization. By virtue of enhanced precision afforded by a TEE we were able to identify the source of this patient’s symptoms.

Conclusion

This case is noteworthy because of the extremely low incidence of hepatocellular carcinomas metastasizing to the heart while presenting as an obstructive intracavitary mass. Even less common is that this patient with an aggressive hepatic malignancy presented with CHF, devoid of other constitutional symptoms and with no apparent risk factors for the development of a hepatocellular malignancy.4,5

This case underscores the importance of an echocardiographic evaluation in a patient who presents with CHF. In addition, this case confirms the value of TEE in the diagnosis of an intracavitary mass and further supports the use of TEE in diagnosing the presence and anatomical location of a cardiac mass.

REFERENCES