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IMAGES IN INTERVENTION

Percutaneous Palliation of Right Ventricular Outflow Tract Obstruction Caused by Metastatic Malignancy

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A 52-year-old man was evaluated for dry cough, progressive breathlessness, and exertional syncope. He had distended neck veins, bilateral leg edema, and a grade 3/6 ejection systolic murmur in the left parasternal region. Transthoracic echocardiography (**Figure 1A**) and cardiac magnetic resonance imaging (**Figure 1B**) revealed an obstructive intracavitary mass in the right ventricular outflow tract (RVOT) and pulmonary artery producing a peak systolic pressure gradient of 75 mm Hg. The mass did not infiltrate adjacent structures, but multiple subcentimeter nodules were present in both lungs consistent with metastases. Positron emission tomography (**Figures 1C to 1E**) showed the mass and metastatic nodules to be metabolically active, but an active primary focus could not be detected. Fluoroscopy-guided transjugular endomyocardial biopsy of the lesion was performed. Histopathologic findings obtained from the biopsy specimens, including spindle cell morphology and positive staining for pancytokeratin and vimentin (**Figures 1F to 1H**), and the immunohistochemical profile, were suggestive of a metastatic sarcomatoid carcinoma.

Because the patient's clinical condition was deteriorating rapidly, a palliative stenting procedure (**Figures 1I and 1J**) was performed. A 22 × 45 mm self-expanding stent (Wallstent, Boston Scientific, Natick, Massachusetts) was deployed across the RVOT extending into the right pulmonary artery. This improved flow through the RVOT significantly and produced dramatic resolution of the patient's symptoms. He was discharged from hospital after receiving 3 cycles of palliative chemotherapy. However, the symptoms recurred after 3 months, at which time he expired. The primary focus remained undetected because an autopsy was not performed.

Most cardiac tumors are metastatic and the right heart is more often involved than the left because it receives the systemic venous and lymphatic drainage (1). Metastatic RVOT obstruction is rare, and may occur in the absence of widespread malignancy; new-onset right heart failure and left parasternal systolic murmur should arouse clinical suspicion (1). The prognosis is generally poor. Palliative RVOT stenting (2) is useful for symptomatic relief.

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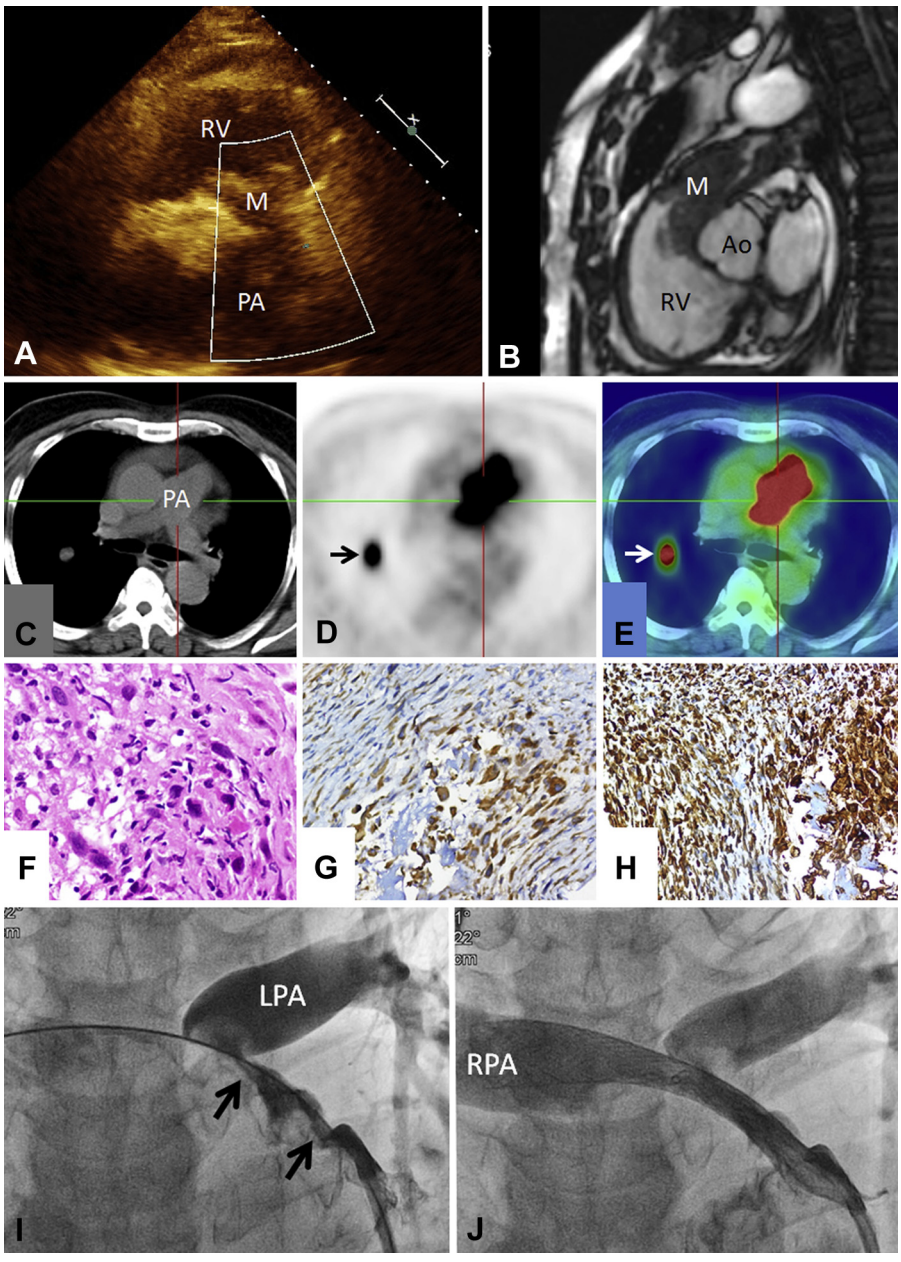
FIGURE 1 Malignant Right Ventricular Outflow Tract Obstruction



(A) Transthoracic echocardiogram in parasternal short-axis view shows dilatation of the right ventricle (RV) and an obstructive mass (M) in the RV outflow tract (RVOT) and pulmonary artery (PA). **(B)** Cardiac magnetic resonance imaging in sagittal section shows the RVOT mass to be large, hypodense, and almost occlusive. Computed tomography **(C)**, positron emission tomography **(D)**, and fusion of both modalities **(E)** shows increased fluorodeoxyglucose uptake **(black and red areas in D and E, respectively)** in the RVOT mass and lung nodules **(black and white arrows, respectively)**. Histopathologic sections of endomyocardial biopsy specimens obtained from the RVOT mass stained with hematoxylin and eosin **(F)**, pancytokeratin **(G)**, and vimentin **(H)** suggestive of a metastatic sarcomatoid carcinoma. **(I)** Conventional RV angiogram shows severe luminal narrowing **(arrows)** of the RVOT and main PA caused by the intracavitary tumor and preferential flow into the left PA (LPA). **(J)** Post-stenting RV angiogram shows luminal widening of the RVOT and improved flow into the right PA (RPA). Ao = aortic root.