

CARDIOVASCULAR IMAGES

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Thrombus or Tumor?

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Clinical History

A 67 year-old woman presented with mild shortness of breath, fatigue, a 20-pound weight loss, and a right breast mass with associated axillary lymphadenopathy. An ultrasound-guided biopsy revealed invasive ductal carcinoma. She subsequently underwent a CT evaluation of her chest, abdomen and pelvis for staging purposes.

Findings

Contrast enhanced chest CT revealed a soft tissue mass in the left main-stem bronchus with a collapsed left lung. There was also a left atrial filling defect which could represent thrombus or tumor (Figure 1). A transthoracic cardiac echocardiogram (TTE) confirmed the presence of a large echogenic mass in the left atrium (Figure 2). Post-gadolinium MRI (Figure 3) showed enhancement of this mass, consistent with tumor, and coronal steady-state free precession (SSFP) MRI (not shown) revealed that the mass extended from the left upper lobe, via the left superior pulmonary vein, into the left atrium. FDG-PET (Figure 4) demonstrated intense uptake of fluorodeoxyglucose in the large left lung mass as well as the left atrial mass, further confirming the mass as tumor (left lung bronchogenic carcinoma metastasis) rather than thrombus.

Discussion

Cardiac masses are uncommon, and the most common cardiac mass is a thrombus. The most common cardiac tumors are metastatic, which are 40 times more common than primary cardiac tumors. Cancers that commonly metastasize to the heart include bronchogenic carcinoma, lymphoma, breast, and esophageal. Associated features may include a pericardial effusion with or without tamponade, and heart failure. Spread can be via lymphatic, hematogenous, and direct extension; or, as in our patient, transvenously via the pulmonary vein.

Differentiating intra-cardiac thrombus from tumor can be challenging, and cardiac MRI is a valuable tool since thrombus does not enhance following the administration of gadolinium. In addition, cardiac MRI allows for multi-planar visualization, which enables optimal anatomical characterization and assessment of invasion into surrounding structures in the case of malignancy.

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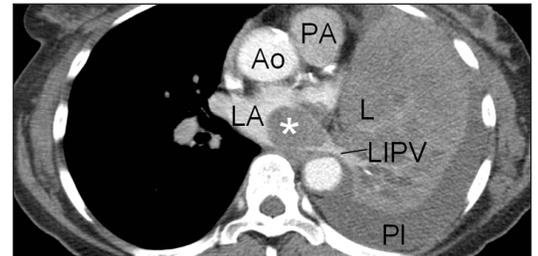


Figure 1. Axial contrast enhanced CT of the chest demonstrates a filling defect in the left atrium (*), left lung mass, left lung collapse, left pleural effusion, right breast mass (LA = Left Atrium; Ao = Ascending Aorta; PA = Pulmonary Artery; L = Left lung bronchogenic carcinoma; PI = Pleural effusion; LIPV = Left Inferior Pulmonary Vein; LV = Left Ventricle).



Figure 2. TTE demonstrates an echogenic mass (*) in the left atrium.

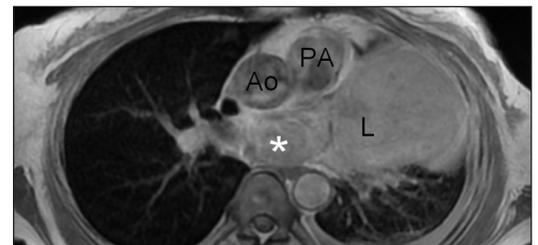


Figure 3. Axial T1 post-gadolinium MRI images of the heart demonstrates enhancement in the left atrial mass (*), a finding that is consistent with tumor rather than thrombus. Also seen in the left lung mass, left lung collapse, left pleural effusion.

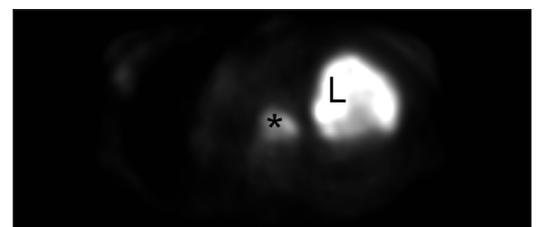


Figure 4. FDG-PET demonstrates intense uptake of the left atrial mass (*).