



## Advanced Lung Adenocarcinoma with Multiple Cardiac Masses

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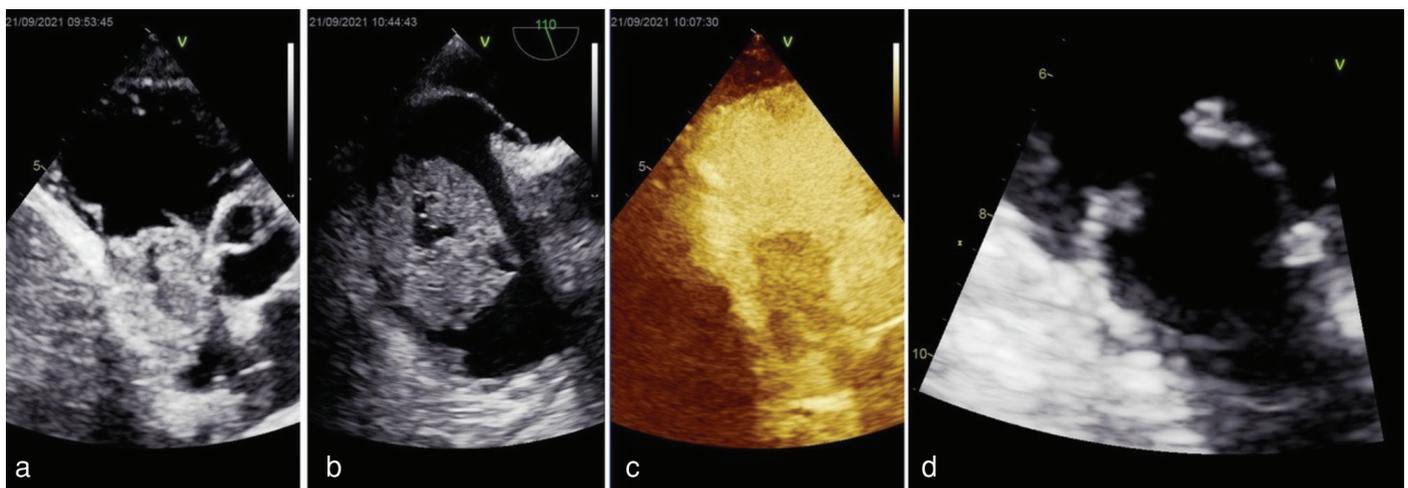
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A 51-year-old female patient presented to the emergency department (ED) with worsening shortness of breath and fatigue over the past two weeks. However, she denied experiencing palpitations and chest pain. The patient has been diagnosed with stage IV anaplastic lymphoma kinase-positive non-small-cell lung cancer (NSCLC) with multiple metastatic deposits in the liver, bone, and central nervous system. Furthermore, she was receiving lorlatinib for the neoplasm, along with rivaroxaban for deep vein thrombosis (DVT) and pulmonary embolism (PE), diagnosed two months before this admission. At that time, a small mobile mass measuring 2.7x2.3 cm in the right atrium (RA) was identified by chest computed tomography (CT) and transthoracic echocardiogram (TTE). It was designated and treated as a thrombus.

Upon arrival at the ED, her blood pressure measured 100/70 mmHg, with a heart rate of 110 beats per minute. Her oxygen saturation was 92% on room air. Scattered crackles were detected on lung auscultation, along with a mid-diastolic murmur at the left lower

sternal edge during cardiac auscultation. A new chest CT revealed extensive bilateral PE. A new TTE (Figure 1a) and transesophageal echocardiogram (TOE) (Figure 1b) depicted the previously described mass originating from the roof of the RA, exhibiting significantly increased dimensions (3.5x4.5 cm) and partial prolapse through the tricuspid valve, resulting in severe valvular stenosis. It exhibited heterogeneous echogenicity and an irregular, multilobulated surface. Contrast echocardiography accurately defined the mass, assessed its perfusion, and aided in ruling out thrombus or vegetations, thus indicating metastasis (Figure 1c). TTE identified two additional small, broad-based, irregular mitral valve (MV) lesions (Figure 1d). Differential diagnoses included metastases and vegetations, within the context of infective endocarditis or non-bacterial thrombotic endocarditis (NBTE). However, the patient was afebrile, with consecutive negative blood cultures, and lacked clinical or laboratory findings consistent with infective endocarditis. Therefore, indicating metastases or NBTE as a more likely diagnosis.



**FIG. 1.** (a) Mass visible in the right atrium (RA), prolapsing through the tricuspid valve. (b) Heterogeneous, irregular, and multilobulated mass observed in the RA. (c) Vascularization of the mass depicted using contrast echocardiography. (d) Presence of two irregular lesions identified on the mitral valve.



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The patient was scheduled for cardiac magnetic resonance imaging while on lorlatinib and low molecular weight heparin. However, during hospitalization, she underwent an emergency thromboembolectomy due to bilateral arterial embolism and acute lower limb ischemia. Within the next two days, she experienced brain and renal artery embolic episodes, resulting in acute kidney injury. She passed away due to multiple organ failure.

Our NSCLC patient had a history of DVT and PE, along with a vascularized mass (metastasis) in the RA and two smaller masses on the MV. Subsequently, she developed multiple embolic events affecting several organs. This clinical presentation supports the diagnosis of NBTE, as proposed by Kay's triad (heart murmur, multiple embolic events, and cancer)<sup>1</sup>, along with findings from TTE and TOE, abnormalities in coagulation/disseminated intravascular coagulation, and negative blood cultures. Adenocarcinomas are the most common neoplasms associated with NBTE, and cases of NSCLC and NBTE have been reported.<sup>2</sup>

**Informed Consent:** The informed consent form was provided by the patient to publish this case.

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