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# Lung carcinoma extended to the left atrium through the right inferior pulmonary vein

A 59-year-old man was presented with a precipitous deterioration of progressive dyspnea and bilateral leg edema. He was diagnosed with lung carcinoma 8 months ago, for which he had been receiving chemotherapy with regular follow-ups.

Chest X-ray revealed significant pleural effusion on the right side with marked cardiomegaly (Fig. 1a). Transthoracic echocardiography showed a large intracavitary globular and linear mass originating from the right lower pulmonary vein. This mass invaded the left atrium (LA) via the thoracic cavity (17.7×12.1 cm) (Fig. 1b–1d, Video 1-3). Computed tomography and magnetic resonance imaging showed that the tumor of the right lung lobe was significantly larger than it was 8 months ago (Fig. 2a–2d).

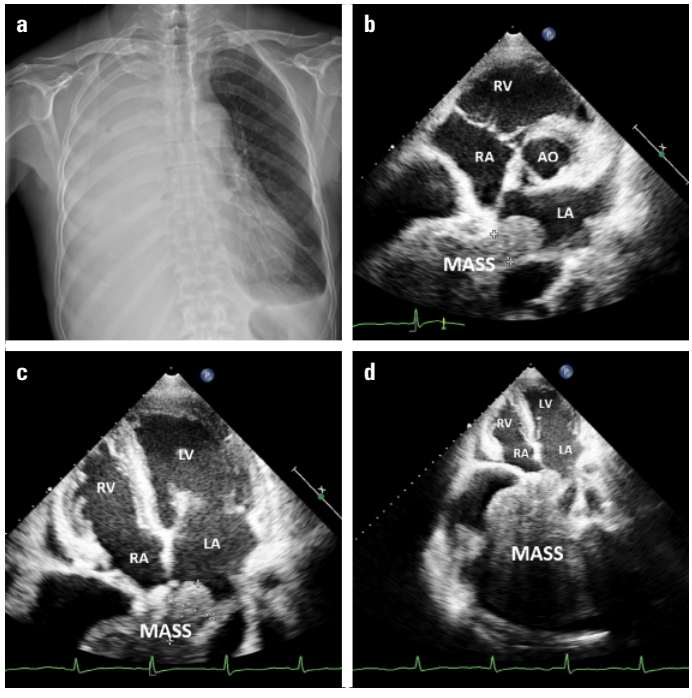


**Figure 1.** Chest X-ray revealing significant pleural effusion on the bilateral side with marked cardiomegaly (a). Transthoracic echocardiographic images showing the transfer of mass to the left atrium through the right inferior pulmonary vein at short axis view (b) and apical four-chamber view (c and d)

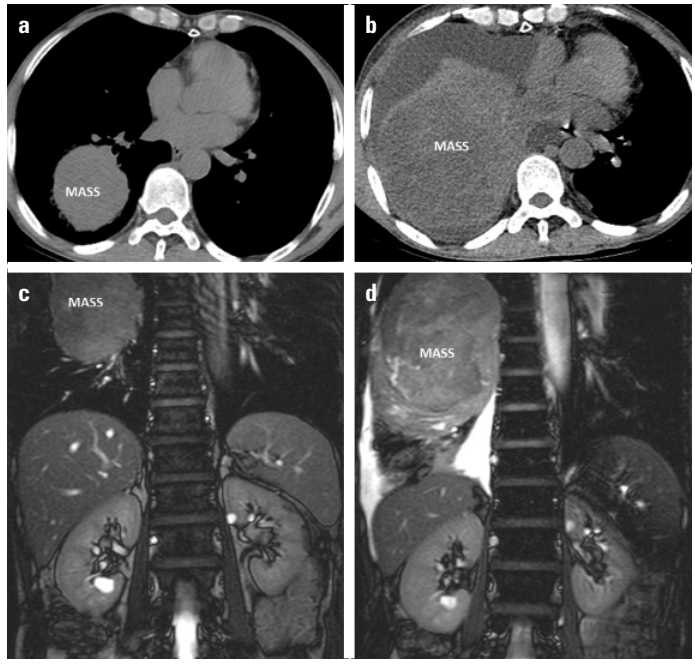


**Figure 2.** The CT and MRI images. The tumor in the lower right lung is significantly larger (a and c) than it was 8 months ago (b and d)
LA - left atrial; LV - left ventricle; RA - right atrial; RV - right ventricle

Because of the deterioration of symptoms and emergence of new complications of LA metastasis, the patient underwent a series of surgical interventions, namely lung resection, tumor removal, and partial LA resection. During the surgery, we found a large mass extending from the right lower pulmonary vein to the LA. Pathological examinations confirmed the presence of squamous carcinoma.

The direct extension of left atrial tumor via pulmonary veins is uncommon (1, 2). There are two types of cardiac invasion: direct invasion and expansion through a "limited" space (such as the pulmonary artery and vein) (3). Although tumors with direct cardiac extension are considered inoperable, complete resection may considerably prolong survival time for patients with tumors that only extend through the pulmonary veins and do not have pericardial and myocardial infiltration. In our case, the patient underwent surgery and had improved quality of life due to echocardiographic diagnosis, in which transthoracic echocardiography as able to clearly identify the source and extent of the tumor. Our case reaffirms the importance of echocardiography as a useful diagnostic tool for the detection of source and extent of cardiac invasion.

**Informed consent:** Informed consent was obtained from this patient.

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**Video 1.** Transthoracic echocardiography showing the transfer of mass to the left atrium through the right inferior pulmonary vein at apical four-chamber view

**Videos 2, 3.** Transthoracic echocardiography showing the transfer of mass to the left atrium through the right inferior pulmonary vein at the short axis view


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