

Rapid growth of right sinus Valsalva aneurysm dissecting into interventricular septum

A 45-year-old male presented with progressive dyspnea and bilateral leg swelling, which persisted since a week. Six months earlier, the patient underwent pacemaker implantation after experiencing syncope induced by a complete atrioventricular block. Initially, transthoracic echocardiography (TTE) revealed a large sac-like right sinus Valsalva aneurysm (SVA) dissecting into the interventricular septum (IVS) (Fig. 1, Panel a). We observed blood gushing into the aneurysm because of severe aortic regurgitation, which caused the aneurysm to bulge and extrude into the left ventricular outflow tract during diastole (Fig. 1, Panel b, Video 1). Furthermore, we simultaneously documented systolic and diastolic mitral regurgitation (Fig. 1, Panel c). However, we did not detect any shunt flow between the aneurysm and any chamber. Subsequent magnetic resonance imaging (Fig. 1, Panel d) scans confirmed these initial observations. Another TTE exam revealed a moderate amount of pericardial effusion, SVA enlargement,

and left ventricular dilation with impaired biventricular function (aneurysm area increased from 5.1 cm² to 7.0 cm² and LV dilation increased from 5 cm to 6 cm) (Fig. 1, Panel e). Therefore, emergency surgery was performed. Intraoperatively, there was a dilation in right SVA with a cavity that led to the dissected IVS. Panels F, G, and H show intraoperative 3D transesophageal echocardiography findings of aneurysm inlets (Fig. 1, Panels f, g, and h, Video 2). The patient received aortic valve replacement and underwent Dacron patching. Follow-up TTE revealed improved biventricular function (Video 3).

Informed consent: Informed consent was obtained from the patient.

Video 1. Long-axis transthoracic echocardiography video clip showing a large sinus Valsalva aneurysm and severe aortic regurgitation into the aneurysm.

Video 2. A 3D transesophageal echocardiography video clip showing blood gushing into the aneurysm because of severe aortic regurgitation as well as moderate mitral regurgitation.

Video 3. Video clip of follow-up echocardiography confirming improvement in biventricular function. Note that in this video clip, the mechanical prosthetic aortic valve shows normal function.

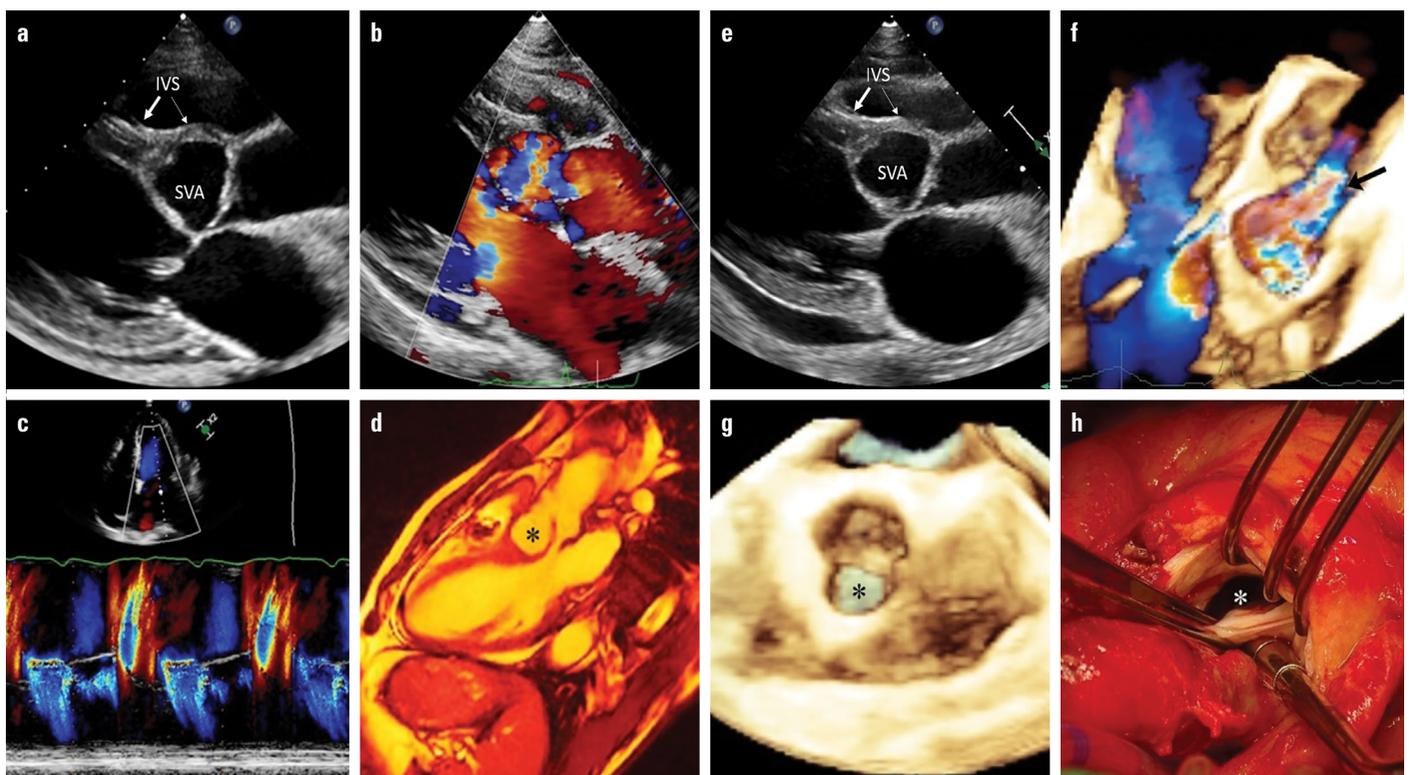


Figure 1. Long-axis transthoracic echocardiography (TTE) image showing the aneurysm bulging into the left ventricle dissecting into the interventricular septum (thin arrow) (a). Blood gushing into the aneurysm because of severe aortic regurgitation during diastole (b). Systole and diastole mitral regurgitation was observed using TTE color m-mode (c). Large sinus Valsalva aneurysm revealed by cardiac magnetic resonance imaging (*) as in TTE (d). Long-axis transthoracic echocardiography (TTE) image (taken during the second TTE examination) showing moderate pericardial effusion and a markedly dilated LV chamber size (e). Intraoperative 3D transesophageal echocardiography (TEE) image showing the aneurysm inlet (black arrow) and diastolic flow filling up the inlet (f). A 3D TEE image reveals that the sinus Valsalva aneurysm (SVA) originated from the right coronary sinus (*) (g). Intraoperative view of the SVA inlet (*) (h)

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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

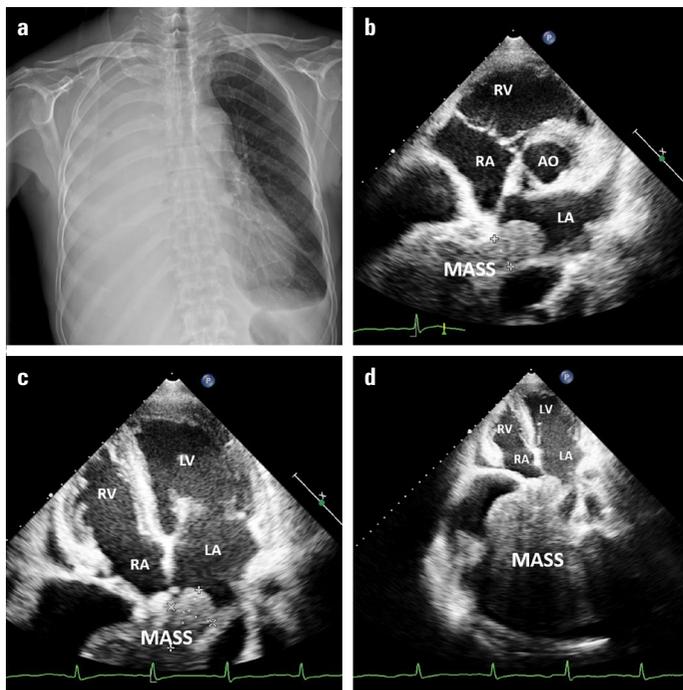


Figure 1. Chest X-ray revealing significant pleural effusion on the bilateral side with marked cardiomegaly (a). Transthoracic echocardiographic images showing the transfer of mass to the left atrium through the right inferior pulmonary vein at short axis view (b) and apical four-chamber view (c and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

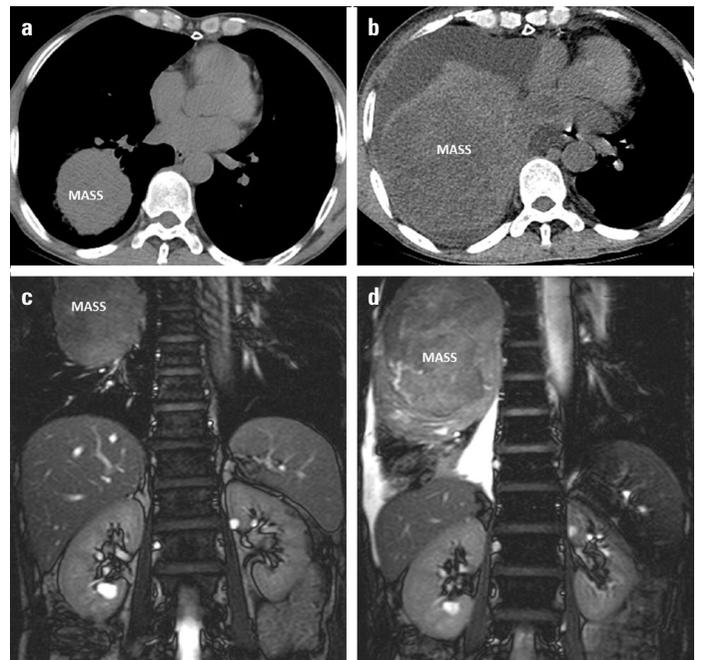


Figure 2. The CT and MRI images. The tumor in the lower right lung is significantly larger (a and c) than it was 8 months ago (b and d)
 LA - left atrial; LV - left ventricle; RA - right atrial; RV - right ventricle

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).

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.

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