Demonstration of Inverted Left Atrial Appendage Using Cardiac Computed Tomography

An Unusual Complication Mimicking Left Atrial Mass After Cardiac Surgery

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An 18-year-old boy with aortic sinus dilatation, aortic regurgitation, and mitral regurgitation caused by cardiovascular involvement of the vasculitis was referred to our hospital for surgery. He underwent a Bentall operation and mitral valve replacement uneventfully. On preoperative echocardiography, left atrial appendage (LAA) appeared normal. There was no anatomic variation or abnormal mass in the left atrium seen on surgical inspection. Postoperative transesophageal echocardiography revealed a tongue-like, protruding mass in the left atrium cavity (Figure [A], and Movie I in the online only Data Supplement). The mass measured 17×13 mm and demonstrated mixed echogenicity with a low-echogenic outer layer and a central, high-echogenic portion. The mass was initially thought to be a thrombus mixed with a foreign body. ECG-gated cardiac computed tomography (CT) showed a lobulated, low-density, mass-like lesion in the left atrium, which arose from the anterolateral wall with a broad base and between the left upper pulmonary vein and the mechanical mitral valve (Figure [B and C], and Movie II in the online-only Data Supplement). The LAA was also not visible. These findings suggested the diagnosis of inverted LAA. The 3-dimensional, endoluminal CT view demonstrated the geometric relationship between the presumed inverted LAA and the mitral inflow tract, and no significant obstruction was seen (Figure [D], and Movie III in the online-only Data Supplement). There was also no flow acceleration in the mitral inflow. The patient was then symptom free and was discharged without surgical exploration. A follow-up, non–ECG-gated, cardiac CT scan obtained 15 months later revealed no left atrial mass, as well as the normal, tubular, pyramidal LAA, both of which were suggestive of spontaneous reversion of the LAA (Figure [E]).

The inverted LAA is a rare cause of a left atrial mass and often leads to misdiagnoses, such as left atrial thrombus or neoplasm.1 Because this is a rare phenomenon, the natural history and incidence of subsequent complications are as yet undefined. When an inverted LAA is discovered postoperatively, it invariably presents as an echogenic, left atrial mass on transesophageal or transthoracic echocardiography. Differential diagnoses include atrial myxoma, vegetation, or thrombus, with the last being more likely in a patient immediately postsurgery. The unusual area of blood clot formation and the absence of a long, tubular, pyramidal LAA shadow on echocardiography have made inverted LAA a more usual suspect.2 Cardiac MRI has been used previously to diagnose this lesion by observing the mass extending from the LAA and having the same characteristics as the left atrial wall, although this may not be helpful in all patients.1,3

CT findings of an inverted LAA have not yet been well established. In our patient, a lobulated, low-density mass was arising from the anterolateral wall of the left atrium and had a broad base, which was an unusual position for a thrombus. In particular, the normal LAA was not seen along the left atrioventricular groove. Demonstration of a geometric relationship between the inverted LAA and left upper pulmonary vein using 3-dimensional reconstruction may be helpful for making the correct diagnosis. Cardiac CT may be a good complementary imaging modality for diagnosis of this type of lesion when the echocardiographic findings are inconclusive.

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References

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Figure. Transesophageal echocardiography (A) shows a tongue-like mass (arrows) with central high-echogenic portion (asterisks) protruding to the left atrium. Cardiac computed tomography (CT; B and C) demonstrates a mass-like lesion with internal fat tissue (asterisks) and an air bubble (arrowhead) arising from the anterolateral wall of left atrium (LA) between the left upper pulmonary vein (LUPV) and the mechanical mitral valve (curved arrow). A 3-dimensional endoluminal view of the CT image (D) obtained during the diastolic phase reveals the inverted left atrial appendage (LAA; arrows) at the posterior aspect of the mitral inflow tract, and there is no significant obstruction. A follow-up CT scan (E) obtained 15 months later shows the normal LAA (arrows). Ao indicates ascending aorta; LCx, left circumferential artery; LV, left ventricle; and PA; pulmonary artery.
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