Intracardiac Echocardiography-Guided Biopsy of a Lipomatous Cardiac Tumor Arising From the Interatrial Septum

Akira Takashima, MD, PhD; Tatsuro Ogata, MD, PhD; Hirotugu Yamada, MD, PhD; Tetsuzo Wakatsuki, MD, PhD; Masataka Sata, MD, PhD

Figure 1. (A) Computed tomography (CT), (B) cardiac magnetic resonance imaging (MRI), and (C, D) transthoracic echocardiography of an interatrial septum tumor (arrow). (A) Abnormal low-density mass arising from the interatrial septum. (B) Low tumor density on fat-suppression T2-weighted imaging. (C) A highly echogenic and homogenous mass in the right atrium (parasternal short-axis view), and (D) tumor extending along the right atrial septal wall, except for the fossa ovalis (subcostal four-chamber view). LA, left atrium; RA, right atrium.
A 66-year-old woman developed dyspnea and was urgently transferred to the present hospital. She had a history of hypertension and dyslipidemia, and was taking a calcium channel blocker and fibrate. Physical examination was unremarkable, except for the heart rate (116 beats/min) and arterial blood oxygen saturation (89% with oxygen mask). Chest radiography was normal. Twelve-lead electrocardiogram indicated sinus tachycardia without ST-segment elevation. The laboratory data suggested liver injury (γ-glutamyl transferase, 85 U/L), without elevated troponin I (5 pg/mL) or D-dimer (0.81 μg/mL). Computed tomography (CT) showed an abnormal low-density mass arising from the atrial septum (Figure 1A). On contrast-enhanced CT there was no contrast enhancement of the tumor. Cardiac magnetic resonance imaging (MRI) showed a high-density tumor on T1- and T2-weighted imaging, and low density on fat-suppression T2-weighted imaging (Figure 1B). Transthoracic and transesophageal echocardiography showed a 33×32-mm diameter, highly echogenic, homogenous mass in the right atrium (Figure 1C,D: Movie S1). Percutaneous cardiac tumor biopsy was performed for histopathological diagnosis. Right atrial angiography showed a tumor protruding into the right atrium, without any blood flow restriction (Figure 2A; Movie S2). A cardiac biopsy catheter and 9-MHz intracardiac echocardiography (ICE) catheter (Boston Scientific, CA, USA) were percutaneously inserted into the right atrium, and cardiac tumor specimens were obtained without any complications (Figure 2B,C). Histology indicated traces of adipose tissue without any atypia among the trapped myocardial fibers, suggesting lipomatous hypertrophy of the interatrial septum (LHIS; Figure 2D). Surgery was not carried out for the cardiac tumor because the tumor did not affect cardiac function. Six months after the biopsy, transthoracic echocardiography and MRI showed no change in cardiac tumor size, and the patient had no symptoms.

LHIS is a benign disorder characterized by fat accumulation in the interatrial septum and the frequency of occurrence is estimated at 1% in autopsy examination or 2–8% on echocardiography. It is defined as a specific septal location of atrial thickening ≥2 cm, and which typically spares the fossa ovalis (the dumbbell sign). These structural features allow differentiation of tumors from other
cardiac masses without tissue biopsy, but, even if LHIS was highly probable, the possibility of other tumors, such as sarcoma or myxoma, could not be completely excluded. Although cardiac biopsy has the risk of complications, ICE-guided biopsy was useful and safe, because ICE allowed detailed visualization of the tumor and biopsy catheter position.

The cause of the dyspnea, the chief compliant in the present case, remained unknown. Pulmonary embolism, heart failure, and ischemic heart disease were excluded on contrast-enhanced CT, echocardiography, and coronary angiography, respectively. LHIS is usually asymptomatic, but some cases involving intractable atrial arrhythmia or severe superior vena cava obstruction requiring surgical excision with septal reconstruction have been reported.

In patients with cardiac fatty tumors arising from the interatrial septum, LHIS should be considered in the differential diagnosis. If differentiation of cardiac tumors on non-invasive imaging modalities is difficult, ICE-guided cardiac biopsy may be a useful diagnostic method.

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Disclosures
The authors declare no conflicts of interest.

References

Supplementary Files
Supplementary File 1
Movie S1. Transthoracic echocardiography (parasternal short-axis view) showing a highly echogenic and homogenous mass in the right atrium.

Supplementary File 2
Movie S2. Angiography of the right atrium showing the tumor protruding into the right atrium.

Please find supplementary file(s); http://dx.doi.org/10.1253/circj.CJ-17-0138