A physician in practice referred a 52-year-old woman to our hospital for a closer examination of systolic murmur. She reported nothing particular. Auscultation showed ejection-type murmur of Levine 2/VI maximally heard at the fourth left sternal border that seemed to be functional. ECG and chest x-ray film showed no abnormal findings. To confirm the cause of systolic murmur, echocardiography was performed. Routine echocardiography indicated that the sizes and functions of both left and right ventricles and valvular functions were normal, so we diagnosed her systolic murmur as functional.

Figure 1 shows apical 2-chamber views of a B-mode echocardiogram. As shown in Figure 1A (Movie I in the online-only Data Supplement), a cavity indicated by an asterisk was confirmed at the apex. This cavity was connected to the left ventricle. In diastole, blood flowed from the left ventricle into the cavity (Figure 1B, Movie II in the online-only Data Supplement), and in systole blood flowed from the cavity into the left ventricle (Figure 1C, Movie II in the online-only Data Supplement). These findings indicate that this cavity itself contracts.

To delineate the whole shape of the cavity and the relation between the cavity and the left ventricle, the examination of enhanced computed tomography was performed. Figure 2 shows the left ventriculogram during end-diastole at the right anterior oblique position. The cavity (shown by an asterisk) was connected to the apex of the left ventricle at the point shown by an arrow. In addition, the cavity had sufficient myocardial thickness and also contracted. To confirm whether the wall of the cavity consists of muscle, cardiac magnetic resonance was performed. Figure 3 shows a magnetic resonance image of the cavity. We could clearly confirm that the wall of the cavity consisted of muscle, and blood existed in the cavity. This patient had no history of cardiac events such as myocardial infarction, myocarditis, and takotsubo cardiomyopathy, so we diagnosed her as having a congenital left ventricular apical diverticulum.

Structural abnormalities of left ventricle crypts have recently been identified in patients with hypertrophic cardiomyopathy.1 Morphological patterns in our case are different from those in crypts based on several criteria. First, different from crypts, our patient has no family history of hypertrophic cardiomyopathy. Second, crypts can be identified often in the septum and usually penetrate compact myocardium, but the structure in our case is located in the apical segment. Third, in addition, the structure in our case has a cavity and contracts itself through the cardiac cycle.

This congenital left ventricular apical diverticulum was found by chance by means of an echocardiographic study to elucidate the etiology of systolic murmur, and its diagnosis was established by enhanced computed tomography. The patient has been receiving anticoagulant therapy with warfarin to prevent thromboembolism.

Disclosures

None.

Reference

Figure 1. Apical 2-chamber views in B-mode echocardiogram. 
A, Routine apical 2-chamber view. 
B, Color Doppler echocardiogram during diastole. 
C, Color Doppler echocardiogram during systole. LA indicates left atrium; and LV, left ventricle.

Figure 2. Left ventriculogram at right anterior oblique position at end-diastolic phase gained from enhanced computed tomography. LA indicates left atrium; and LV, left ventricle.

Figure 3. Magnetic resonance image of the diverticulum.

Fat (muscle) Wall Blood

Diverticulum
Congenital Left Ventricular Diverticulum: Diagnostic Usefulness of Color Doppler Echocardiography and Computed Tomography

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**Movie Legend**

**Movie 1** shows the relationship between the left ventricle and the diverticulum. B: color Doppler echocardiogram during diastole, C: color Doppler echocardiogram during systole. Best viewed with Windows Media Player.

**Movie 2** shows flow patterns between the left ventricle and the diverticulum. Abbreviations: LV: left ventricle, LA: left atrium. Best viewed with Windows Media Player.