The Structural and Dynamic Recognition of Discrete Subaortic Stenosis by Real-Time Three-dimensional Transthoracic Echocardiography

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Summary
Discrete subaortic stenosis is a rare condition to cause left ventricular outflow obstruction. It is sometimes difficult to diagnose it because conventional transthoracic echocardiography may fail to show its 3-dimensional feature. We document the feasibility of on-line 3-dimensional transthoracic echocardiography, by which we can obtain the important 3-dimensional structural and dynamic information of discrete subaortic stenosis.

Key words: 3-dimensional transthoracic echocardiography, discrete subaortic stenosis

A 70-year-old female with a systolic murmur that was pointed out 20 years ago came to our hospital for scrutinizing her exertional dyspnea of recent onset. She was diagnosed with left ventricular outflow obstruction and pulmonary hypertension from unknown origin at a local hospital. She was admitted for further evaluation considering surgical intervention.

Two-dimensional transthoracic echocardiography showed normal left ventricular function without segmental asynergy. There was an abnormal echo at the left ventricular outflow tract which produced a high peak pressure gradient (79 mmHg) (Figure 1). The aortic valve had degenerative changes, but its opening was only mildly restricted without significant aortic stenosis. Moderate aortic regurgitation was seen. The estimated right ventricular systolic pressure from tricuspid regurgitation was about 50 to 60 mmHg.

Although these echocardiograms suggested the presence of discrete subaortic stenosis (DSS) [1, 2], its structural and dynamic nature was not clearly recognized by 2-dimensional echocardiography [3].

The real-time 3-dimensional (3D) transthoracic echocardiography (SONOS 7500, Philips, Andover, Massachusetts, USA) [4] revealed a membrane protruding to the left ventricular outflow tract that caused

Fig. 1. Two-dimensional echocardiogram of the left ventricle. The arrow shows an abnormal echo which is the membranous type of discrete subaortic stenosis. Ao=aorta. LA=left atrium. LV=left ventricle.
outflow obstruction (Figure 2). Thus, this patient was diagnosed as having the membranous type of DSS. The 3D morphology and dynamic changes of DSS were clearly demonstrated.

Two-dimensional transthoracic echocardiography can measure hemodynamics accurately in a case with DSS but has limited spatial assessment [5]. However, by using real-time 3D transthoracic echocardiography, the important 3-dimensional structural and dynamic information of DSS can be obtained before surgical intervention.

References