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Visualization of Double-Chambered Left Ventricle by Multimodality Imaging

A 28-year-old man with acute exacerbation of dyspnea was referred to our hospital. A 12-lead electrocardiography revealed sinus rhythm with left bundle branch block. Transthoracic echocardiography showed that the dilated left ventricle (LV) was divided into 2 separate chambers by hypertrophied muscle bundles with a reduced left ventricular ejection fraction (35%). The septal chamber (main chamber, LV1) communicated with the mitral and aortic valves, measuring 3.8 × 7.5 cm. The lateral chamber (accessory chamber, LV2) was located in the lateral posterior wall with excessive trabeculation, measuring 4.5 × 8.4 cm (Figure 1A). Color Doppler echocardiography showed no flow acceleration between the 2 chambers (Figure 1B). Three-dimensional transthoracic echocardiogram revealed abnormal muscle bundles that obliquely divided the LV into 2 chambers (Figure 1C, 1D). Contrast-enhanced echocardiography demonstrated the contrast agent filling into the main and accessory chambers (Figure 1E, 1F). Cardiac magnetic resonance imaging indicated that an abnormal muscle bundle divided the LV cavity into main and accessory chambers, consistent with echocardiographic findings (Figure 1G, 1H). Cine imaging revealed that both chambers exhibited hypokinetic wall motion. The wall of LV2 showed interspersed late gadolinium enhancement with some transmural enhancement, indicating mild to moderate fibrosis (Figure 1I). Based on the aforementioned findings, a diagnosis of double-chambered left ventricle was made.

Double-chambered left ventricle is an extremely rare congenital anomaly characterized by the division of the LV into 2 chambers by an abnormal septum or by muscle bundles. Our case highlights that multimodality imaging plays a vital role in the diagnosis of this condition.

E-PAGE ORIGINAL IMAGE

Informed Consent: Informed consent was obtained from the patient for this study.

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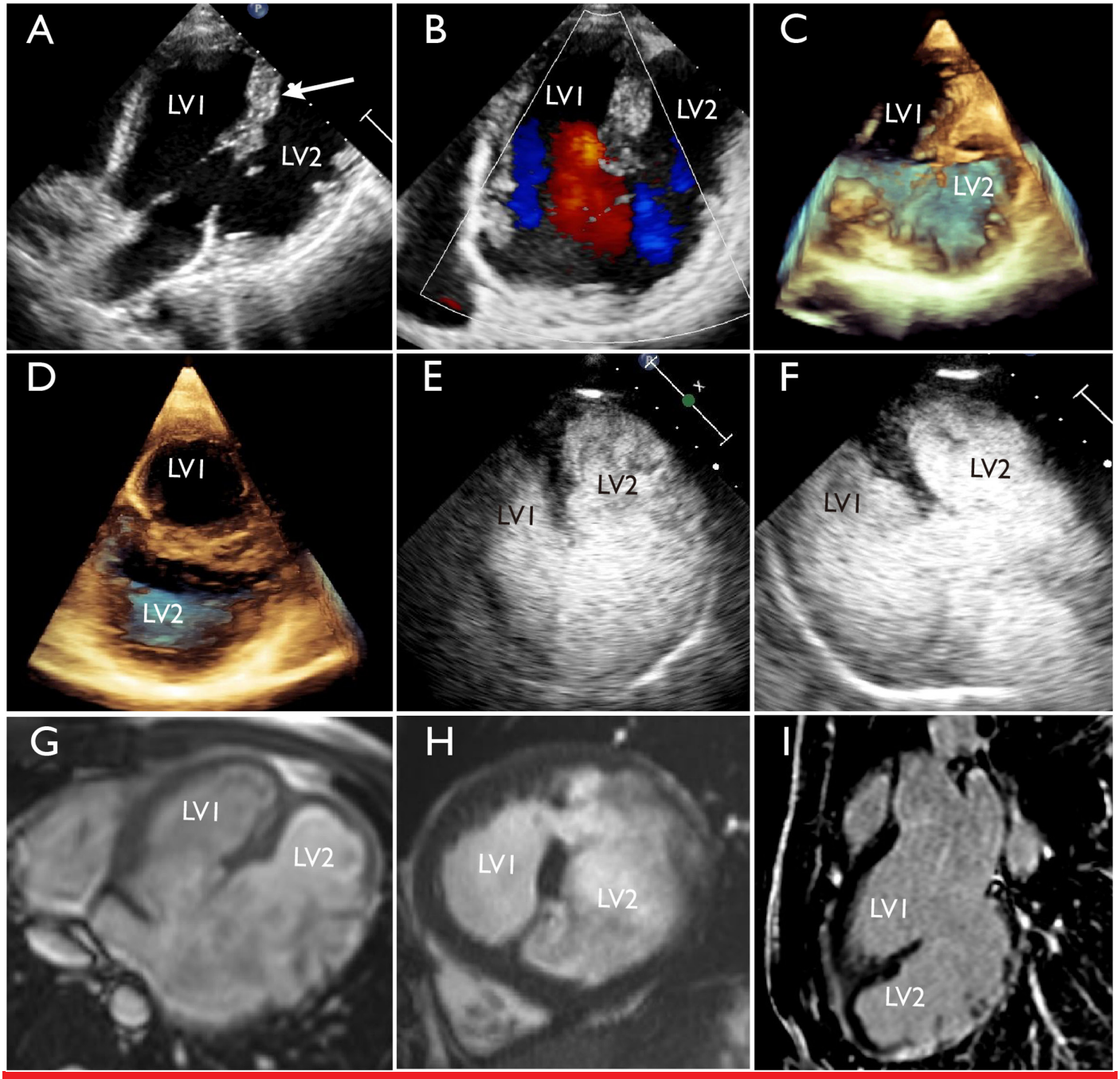

Figure 1. (A): Transthoracic echocardiography shows that the dilated LV is divided into two separate chambers by hypertrophied muscle bundles (white arrows). (B): Color Doppler echocardiography shows no flow acceleration between the 2 chambers. (C and D): Three-dimensional transthoracic echocardiogram reveals abnormal muscle bundles that obliquely divided the LV into a septal chamber and a lateral chamber. (E and F): Contrast-enhanced echocardiography demonstrates the contrast agent filling well into LV1 and LV2. (G and H): Cardiac magnetic resonance imaging confirms the abnormal muscle bundles that divide the LV cavity into main and accessory chambers. (I): Cardiac magnetic resonance imaging shows interspersed late gadolinium enhancement of LV2. LV, left ventricle; LV1, main chamber; LV2, accessory chamber.