Fibrosis suggested by 3D contrast-enhanced echocardiography in hypertrophic cardiomyopathy

Fibrose myocardique suggérée par l’échocardiographie 3D contraste dans la cardiomyopathie hypertrophique

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Direct visualization of myocardial fibrosis in vivo remains a challenge. In hypertrophic cardiomyopathy, myocardial fibrosis is usually imaged by late gadolinium enhancement cardiac magnetic resonance (LGE-CMR), with major prognostic implications. Extensive areas of collagen within the myocardium produce abnormal reflection of ultrasound. The ability of three-dimensional contrast-enhanced echocardiography (3DCE) to detect myocardial scars was recently emphasized in ischaemic cardiomyopathy. In the cases of three patients with hypertrophic cardiomyopathy, harmonic 3DCE was performed with an iE33 (Philips®) equipped with a matrix array transducer (×4 2–4 MHz). After intravenous injection of contrast (SonoVue®, bolus of 0.5 mL), pyramidal full-volume data sets from the apical transducer position were acquired just after irruption and homogenous distribution of contrast in the left ventricle, with a high mechanical index (0.4). Compression was adjusted to soften the healthy myocardium. Gain settings were optimized. Comparison of 3DCE and LGE-CMR images clearly demonstrated agreement. For patient 1, 3DCE revealed a hyperechogenic nodule in the mid septum (Fig. 1, panel 1a). Findings with LGE-CMR correlated with 3DCE, with the visualization of a nodular area of hyper-enhancement in the mid septum (Fig. 1, panels 1b and 1c). In patient 2, 3DCE showed an area of hyperechogenicity for basal and mid-septal segments (Fig. 1, panel 2a). LGE-CMR demonstrated a large area of septal hyperenhancement (Fig. 1, panels 2b and 2c), well correlated with the echocardiographic findings. For patient 3, 3DCE did not show any region of hyperechogenicity (Fig. 1, panel 3a). In the same way, LGE-CMR did not reveal

Abbreviations: 3DCE, three-dimensional contrast-enhanced echocardiography; LGE-CMR, late gadolinium enhancement cardiac magnetic resonance.

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Figure 1. Comparison of three-dimensional contrast-enhanced echocardiography (3DCE) images clearly demonstrated agreement between the regions of enhancement. Patient 1 had asymmetric septal hypertrophic cardiomyopathy (maximum wall thickness, 22 mm); late gadolinium enhancement cardiac magnetic resonance (LGE-CMR) revealed a large nodular area of hyperenhancement located in the mid septum (panels 1b and 1c); findings in 3DCE were in agreement with the detection of a hyperechogenic nodule in the septum (panel 1a). Please see the accompanying i-slice function video clip corresponding to patient 1. Patient 2 had asymmetric septal hypertrophic cardiomyopathy (maximum wall thickness, 21 mm); LGE-CMR demonstrated a large area of septal hyperenhancement for basal and mid segments (panels 2b and 2c); 3DCE showed an area of hyperechogenicity correlated with the area of myocardial hyperenhancement, suggesting marked myocardial scarring (panel 2a). For patient 3, 3DCE did not show any region of hyperechogenicity (panel 3a); in the same way, LGE-CMR did not reveal hyperenhancement suggesting the presence of myocardial fibrosis (panels 3b and 3c).

hyperenhancement (Fig. 1, panels 3b and 3c). Although further studies are required, these first observations may suggest the ability of 3DCE to detect myocardial fibrosis in hypertrophic cardiomyopathy.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.