

Images in Congenital Cardiac Disease

Assessment of a left circumflex coronary artery–left ventricle fistula by multimodality imaging in a child

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Abstract Multimodality imaging revealed a left circumflex coronary artery–left ventricle fistula in a 4-year-old boy. MRI tissue tracking revealed a slight abnormality in the left ventricular myocardial strain. Early surgery was suggested to avoid serious complications.

Keywords: Coronary artery fistulas; left ventricular myocardial strain; multimodality imaging

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Case report

A 4-year-old boy was admitted to our hospital for a common cold. Transthoracic echocardiography and dual-source CT were performed given the finding of a heart murmur on auscultation. This revealed an abnormal communication between the obviously dilated left circumflex coronary artery and the left ventricle. The drainage site of the fistula was exactly posterior to the base of the left ventricle, resulting in an enlarged left ventricle. Colour flow echocardiography showed turbulent colour flow entering the left ventricle with a broad jet (Fig 1a–f). Owing to the fistula draining into the left ventricle, it was unclear whether or not left ventricular myocardial contractility was affected. MRI tissue tracking was used to measure left ventricular myocardial strain to quantitatively evaluate myocardial contractility (Fig 2a–c). There were abnormal strain patterns at different levels of the left ventricular walls (Fig 2d–i), whereas cardiac function was normal. Surgical ligation of the fistula was recommended. Follow-up echocardiogram at 3 and 9 months postoperatively revealed no residual fistulous connection and decreased left ventricular size (Fig 1g–h).

Discussion

Coronary arterial fistulas are unusual congenital or acquired coronary arterial abnormalities involving direct coronary drainage into a cardiac chamber or pulmonary vessel. As an important outcome predictor, myocardial contractility strongly influences the medical decision making. In addition, left ventricular myocardial strain has been shown to be an earlier and more sensitive marker of contractile dysfunction than left ventricular ejection fraction alone.¹ Therefore, the measurement of left ventricular myocardial strain using MRI tissue tracking is clinically valuable. If there is subclinical contractile dysfunction, early intervention may prevent the progression of myocardial impairment and/or serious complications.

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Conflicts of Interest

None.

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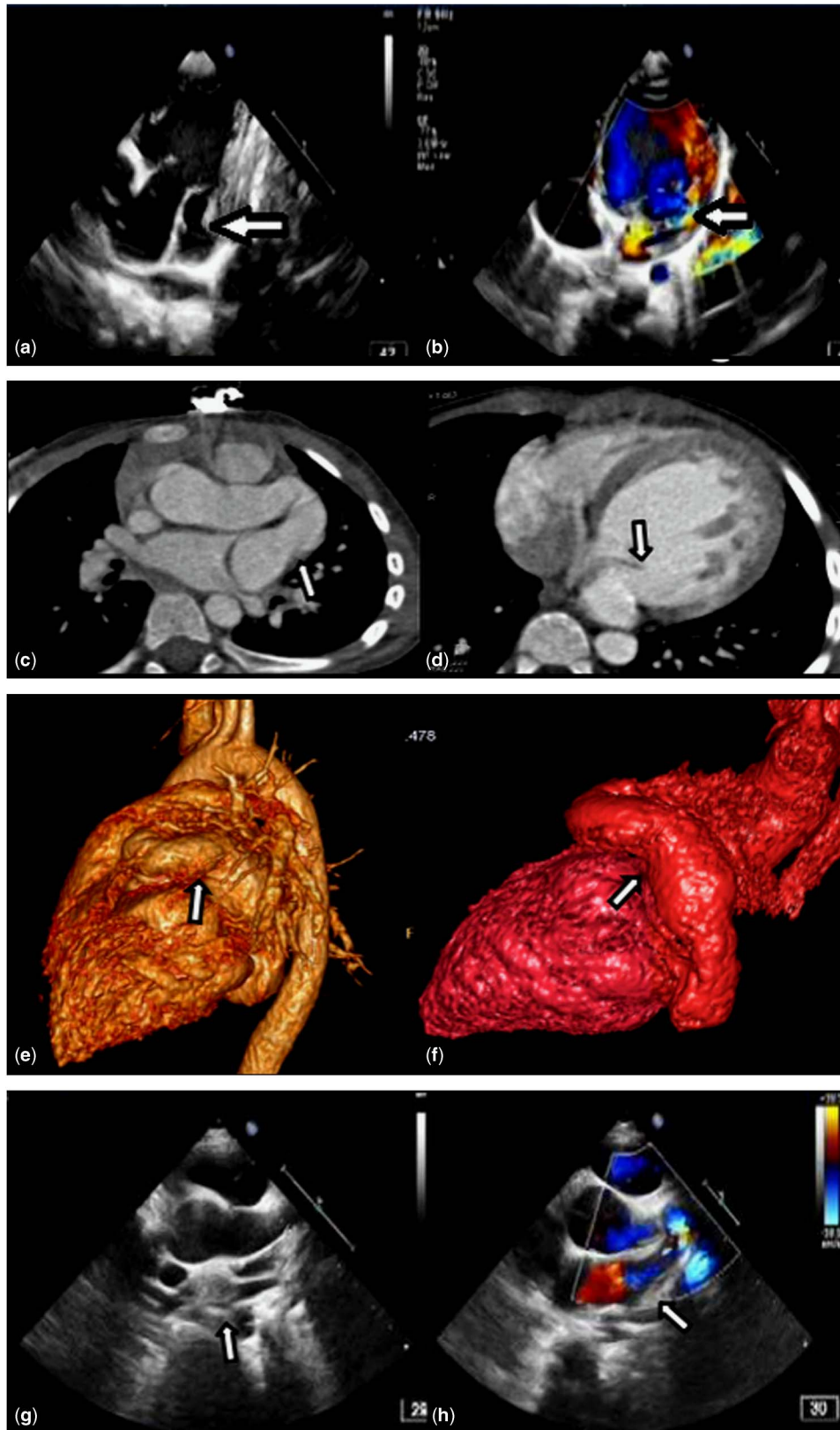


Figure 1.

(a) Transthoracic echocardiography revealed a fistula (white arrow) posterior to the mitral annulus between the left circumflex coronary artery and the left ventricle. (b) Doppler echocardiography revealed turbulent colour flow (white arrow) with a broad jet entering the left ventricular base. (c and d) Dual-source CT demonstrated an abnormal communication between the obviously dilated left circumflex coronary artery and the left ventricle (white arrow). (e and f) Volume rendering clearly shows the dilated left circumflex coronary artery. (g and h) Echocardiogram showing no residual fistulous connection or abnormal colour flow 9 months postoperatively (white arrow).

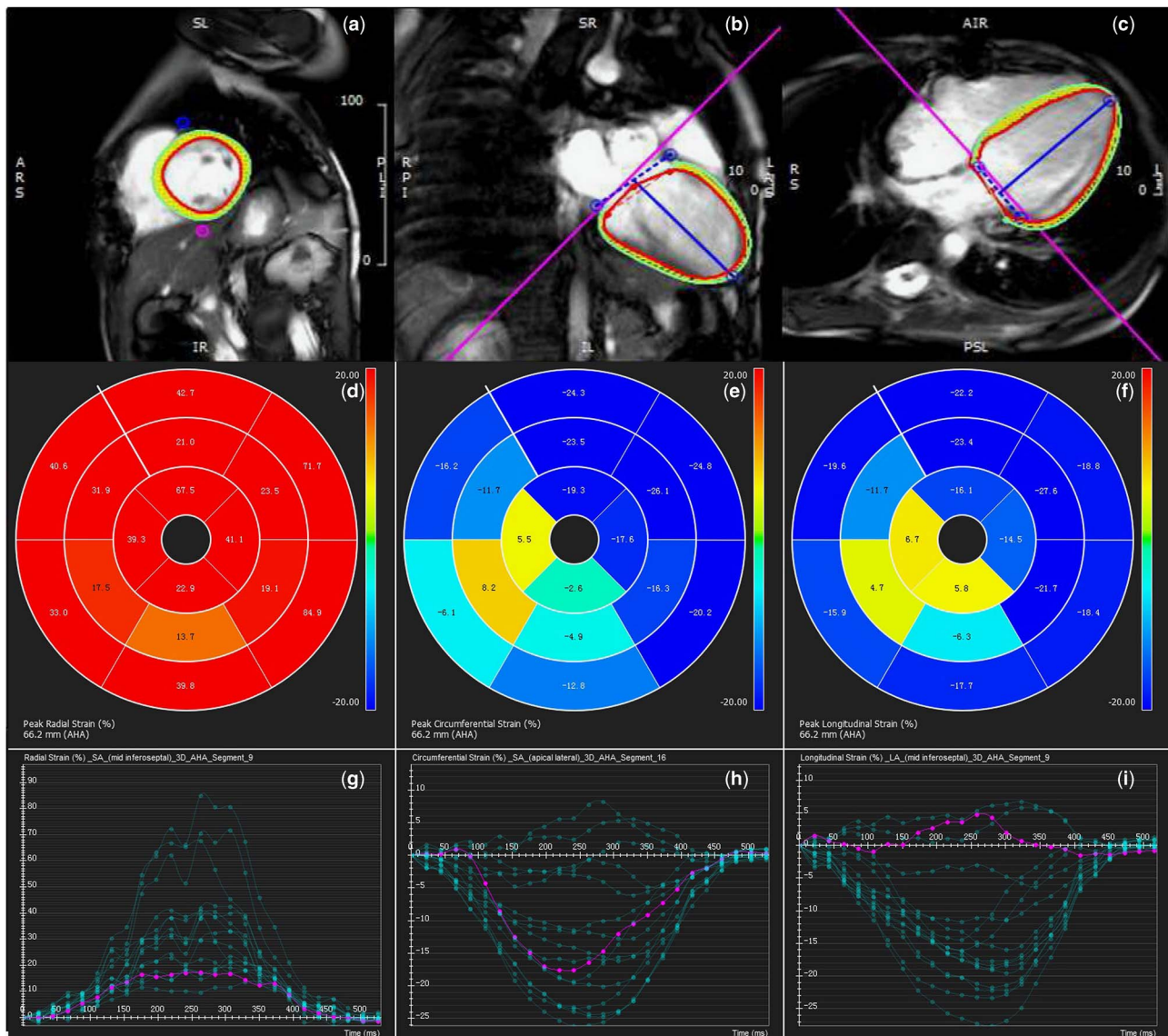


Figure 2.

(a–c) Images illustrating the measurement of left ventricular myocardial strain with MRI tissue tracking. (d–f) Polar maps for peak radial, circumferential, and longitudinal strain patterns, respectively. The peak radial strain was slightly reduced at the inferior wall of the left ventricle (d). Peak circumferential strain was abnormal at the inferior and/or inferoseptal walls of the left ventricle at the basal, mid, and apical levels (e). Moreover, at mid and apical left ventricular levels, longitudinal strain was abnormal for the inferior and inferoseptal walls (f). (g–i) The graphs demonstrate corresponding peak radial, circumferential, and longitudinal strains.

Ethical Standards

This study was conducted in accordance with the Declaration of Helsinki (2000 Edition), and an application for the exemption of patient informed consent was approved by the Institutional Review Board of the West China Hospital of Sichuan University, owing to the retrospective nature of the study.

Reference

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