Cardiac Magnetic Resonance Imaging for Differentiating New-Onset Right-Sided Heart Failure

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A 58-year-old man was admitted to our tertiary care hospital because of new-onset heart failure during the last 4 weeks and sustained ventricular tachycardia (Figure 1). Before admittance to our hospital, coronary artery disease was ruled out by coronary angiography at another hospital. At that time, left ventricular angiography showed slightly reduced left ventricular function and inferior hypokinesia. Chest x-ray at admission did not show any signs of congestion, but revealed a narrowed retrosternal space, giving reason to suspect right ventricular failure as the cause of fatigue and dyspnea (Figure 2). Cardiac magnetic resonance imaging showed poor right ventricular function and moderately reduced left ventricular function (Movies I and II in the online-only Data Supplement). Early gadolinium enhancement and T2-weighted imaging showed active inflammation (Figure 3). Late gadolinium enhancement showed enhancement of nearly the entire right ventricle (Figure 4) and involvement of the left ventricle. These findings on T2-weighted and early enhancement imaging gave reason to highly suspect active inflammation caused by myocarditis. Other causes of predominantly right ventricular cardiomyopathy, such as arrhythmogenic right ventricular cardiomyopathy, were unlikely. To confirm this hypothesis and to aid in decisions about immunosuppressive therapy, a myocardial biopsy was performed. The myocardial biopsy revealed giant-cell myocarditis (Figure 5) with extensive fibrosis. Corticosteroids and azathioprine were given. However, the patient remained unstable. A second magnetic resonance imaging 4 weeks later showed persistent poor right ventricular function; thus, the patient was placed on the list for highly urgent heart transplantation.

Disclosures

None.

Figure 1. Ventricular tachycardia, 150 bpm with left bundle-branch block morphology and inferior axis. Arrow indicates dissociated P wave (VA dissociation) recorded at 50 mm/s and 10 mm/mV.
Figure 2. Chest x-ray without signs of congestion. Lateral chest x-ray shows a narrowed retrosternal space as a sign of right ventricular enlargement. Black arrow indicates narrowed retrosternal space.

Figure 3. T2-weighted dark-blood imaging of the left ventricular long axis showing high signal intensity in the left ventricular anterior and inferior wall, a sign of myocardial edema. A, T1-weighted dark-blood imaging (early enhancement) shows high signal intensity directly after gadolinium administration in the corresponding area of the anterior left ventricular wall. Arrows indicate myocardial edema. B, T1-weighted imaging before gadolinium administration. C, Arrows indicate myocardial early enhancement.
Figure 4. Inversion-recovery magnetic resonance image showing a 4-chamber view with extensive delayed enhancement of the right and left ventricles. Arrows indicate areas of delayed enhancement.

Figure 5. Myocardial biopsy of the right-sided interventricular septum. Arrow indicates a typical giant cell.
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