Cardiac Magnetic Resonance Imaging in Amyloidosis

To the Editor:

We present a case that illustrates the usefulness of cardiac magnetic resonance (CMR) in amyloid heart disease. A 71-year-old woman with diabetes went to the emergency room for syncope of 2 months’ evolution, with 2-3 daily episodes but no focal neurological deficits. The examination revealed pallor of the skin and mucosa and a grade II/VI apical systolic murmur. Blood pressure and heart rate in decubitus and standing position were 130/70 mm Hg and 68 bpm, and 80/40 mm Hg and 74 bpm, respectively. The rest of the examination was normal.

The analyses indicated normochromic, normocytic anemia; elevated urea, creatinine, and sedimentation rate; hypalbuminemia, hyper gammaglobulinemia with monoclonal peak; elevated immunoglobulin G, and enlarged lambda chains in serum and urine.

Figure 1. Inversion-recovery sequence after administration of a gadolinium-DTPA bolus, 4-chamber view. Diffuse myocardial thickening and diffuse subendocardial gadolinium enhancement are observed, mainly in the lateral wall of the left ventricle.
The electrocardiogram showed sinus rhythm, horizontal axis, and low voltage. Mild cardiomegaly was observed on the chest x-ray. The echocardiogram, which was suboptimal due to an inadequate acoustic window, presented concentric left ventricular hypertrophy with no granular sparkling, normal systolic function, and diastolic dysfunction due to slow relaxation.

Since amyloidosis was suspected based on the clinical symptoms and the echocardiography was inconclusive, CMR was performed with anatomical and functional sequences in standard views, a TSE-T1 sequence in the four-chamber view and, following administration of a gadolinium-DTPA bolus (0.1 mmol/kg), inversion-recovery FLASH sequences and TI-scout sequences. Amyloidosis was strongly suggested by the study findings, which included: a) diffuse myocardial thickening, decreased volumes, and loss of longitudinal systolic function; b) slight thickening of the right ventricular free wall and interatrial septum; c) aortic valve thickening, mild mitral and aortic regurgitation; d) diffuse, subendocardial late enhancement, mainly in the lateral LV wall (Figures 1 and 2), accelerated gadolinium kinetics in blood and myocardium, with subendocardial T1 of 510 ms 4 min following gadolinium administration; e) mild pericardial and pleural effusion.

Based on these findings, a sural nerve biopsy was performed and primary amyloidosis was diagnosed. Because of the patient’s age and the fact that she was not eligible for bone marrow transplantation, melphalan and prednisone therapy was initiated. The patient died some months later of progressive heart failure.

The electrocardiogram showed sinus rhythm, horizontal axis, and low voltage. Mild cardiomegaly was observed on the chest x-ray. The echocardiogram, which was suboptimal due to an inadequate acoustic window, presented concentric left ventricular hypertrophy with no granular sparkling, normal systolic function, and diastolic dysfunction due to slow relaxation.

Since amyloidosis was suspected based on the clinical symptoms and the echocardiography was inconclusive, CMR was performed with anatomical and functional sequences in standard views, a TSE-T1 sequence in the four-chamber view and, following administration of a gadolinium-DTPA bolus (0.1 mmol/kg), inversion-recovery FLASH sequences and TI-scout sequences. Amyloidosis was strongly suggested by the study findings, which included: a) diffuse myocardial thickening, decreased volumes, and loss of longitudinal systolic function; b) slight thickening of the right ventricular free wall and interatrial septum; c) aortic valve thickening, mild mitral and aortic regurgitation; d) diffuse, subendocardial late enhancement, mainly in the lateral LV wall (Figures 1 and 2), accelerated gadolinium kinetics in blood and myocardium, with subendocardial T1 of 510 ms 4 min following gadolinium administration; e) mild pericardial and pleural effusion.

Based on these findings, a sural nerve biopsy was performed and primary amyloidosis was diagnosed. Because of the patient’s age and the fact that she was not eligible for bone marrow transplantation, melphalan and prednisone therapy was initiated. The patient died some months later of progressive heart failure.

The electrocardiogram showed sinus rhythm, horizontal axis, and low voltage. Mild cardiomegaly was observed on the chest x-ray. The echocardiogram, which was suboptimal due to an inadequate acoustic window, presented concentric left ventricular hypertrophy with no granular sparkling, normal systolic function, and diastolic dysfunction due to slow relaxation.

Since amyloidosis was suspected based on the clinical symptoms and the echocardiography was inconclusive, CMR was performed with anatomical and functional sequences in standard views, a TSE-T1 sequence in the four-chamber view and, following administration of a gadolinium-DTPA bolus (0.1 mmol/kg), inversion-recovery FLASH sequences and TI-scout sequences. Amyloidosis was strongly suggested by the study findings, which included: a) diffuse myocardial thickening, decreased volumes, and loss of longitudinal systolic function; b) slight thickening of the right ventricular free wall and interatrial septum; c) aortic valve thickening, mild mitral and aortic regurgitation; d) diffuse, subendocardial late enhancement, mainly in the lateral LV wall (Figures 1 and 2), accelerated gadolinium kinetics in blood and myocardium, with subendocardial T1 of 510 ms 4 min following gadolinium administration; e) mild pericardial and pleural effusion.

Based on these findings, a sural nerve biopsy was performed and primary amyloidosis was diagnosed. Because of the patient’s age and the fact that she was not eligible for bone marrow transplantation, melphalan and prednisone therapy was initiated. The patient died some months later of progressive heart failure.

The electrocardiogram showed sinus rhythm, horizontal axis, and low voltage. Mild cardiomegaly was observed on the chest x-ray. The echocardiogram, which was suboptimal due to an inadequate acoustic window, presented concentric left ventricular hypertrophy with no granular sparkling, normal systolic function, and diastolic dysfunction due to slow relaxation.

Since amyloidosis was suspected based on the clinical symptoms and the echocardiography was inconclusive, CMR was performed with anatomical and functional sequences in standard views, a TSE-T1 sequence in the four-chamber view and, following administration of a gadolinium-DTPA bolus (0.1 mmol/kg), inversion-recovery FLASH sequences and TI-scout sequences. Amyloidosis was strongly suggested by the study findings, which included: a) diffuse myocardial thickening, decreased volumes, and loss of longitudinal systolic function; b) slight thickening of the right ventricular free wall and interatrial septum; c) aortic valve thickening, mild mitral and aortic regurgitation; d) diffuse, subendocardial late enhancement, mainly in the lateral LV wall (Figures 1 and 2), accelerated gadolinium kinetics in blood and myocardium, with subendocardial T1 of 510 ms 4 min following gadolinium administration; e) mild pericardial and pleural effusion.

Based on these findings, a sural nerve biopsy was performed and primary amyloidosis was diagnosed. Because of the patient’s age and the fact that she was not eligible for bone marrow transplantation, melphalan and prednisone therapy was initiated. The patient died some months later of progressive heart failure.

The electrocardiogram showed sinus rhythm, horizontal axis, and low voltage. Mild cardiomegaly was observed on the chest x-ray. The echocardiogram, which was suboptimal due to an inadequate acoustic window, presented concentric left ventricular hypertrophy with no granular sparkling, normal systolic function, and diastolic dysfunction due to slow relaxation.

Since amyloidosis was suspected based on the clinical symptoms and the echocardiography was inconclusive, CMR was performed with anatomical and functional sequences in standard views, a TSE-T1 sequence in the four-chamber view and, following administration of a gadolinium-DTPA bolus (0.1 mmol/kg), inversion-recovery FLASH sequences and TI-scout sequences. Amyloidosis was strongly suggested by the study findings, which included: a) diffuse myocardial thickening, decreased volumes, and loss of longitudinal systolic function; b) slight thickening of the right ventricular free wall and interatrial septum; c) aortic valve thickening, mild mitral and aortic regurgitation; d) diffuse, subendocardial late enhancement, mainly in the lateral LV wall (Figures 1 and 2), accelerated gadolinium kinetics in blood and myocardium, with subendocardial T1 of 510 ms 4 min following gadolinium administration; e) mild pericardial and pleural effusion.

Based on these findings, a sural nerve biopsy was performed and primary amyloidosis was diagnosed. Because of the patient’s age and the fact that she was not eligible for bone marrow transplantation, melphalan and prednisone therapy was initiated. The patient died some months later of progressive heart failure.

The electrocardiogram showed sinus rhythm, horizontal axis, and low voltage. Mild cardiomegaly was observed on the chest x-ray. The echocardiogram, which was suboptimal due to an inadequate acoustic window, presented concentric left ventricular hypertrophy with no granular sparkling, normal systolic function, and diastolic dysfunction due to slow relaxation.

Since amyloidosis was suspected based on the clinical symptoms and the echocardiography was inconclusive, CMR was performed with anatomical and functional sequences in standard views, a TSE-T1 sequence in the four-chamber view and, following administration of a gadolinium-DTPA bolus (0.1 mmol/kg), inversion-recovery FLASH sequences and TI-scout sequences. Amyloidosis was strongly suggested by the study findings, which included: a) diffuse myocardial thickening, decreased volumes, and loss of longitudinal systolic function; b) slight thickening of the right ventricular free wall and interatrial septum; c) aortic valve thickening, mild mitral and aortic regurgitation; d) diffuse, subendocardial late enhancement, mainly in the lateral LV wall (Figures 1 and 2), accelerated gadolinium kinetics in blood and myocardium, with subendocardial T1 of 510 ms 4 min following gadolinium administration; e) mild pericardial and pleural effusion.

Based on these findings, a sural nerve biopsy was performed and primary amyloidosis was diagnosed. Because of the patient’s age and the fact that she was not eligible for bone marrow transplantation, melphalan and prednisone therapy was initiated. The patient died some months later of progressive heart failure.

The electrocardiogram showed sinus rhythm, horizontal axis, and low voltage. Mild cardiomegaly was observed on the chest x-ray. The echocardiogram, which was suboptimal due to an inadequate acoustic window, presented concentric left ventricular hypertrophy with no granular sparkling, normal systolic function, and diastolic dysfunction due to slow relaxation.

Since amyloidosis was suspected based on the clinical symptoms and the echocardiography was inconclusive, CMR was performed with anatomical and functional sequences in standard views, a TSE-T1 sequence in the four-chamber view and, following administration of a gadolinium-DTPA bolus (0.1 mmol/kg), inversion-recovery FLASH sequences and TI-scout sequences. Amyloidosis was strongly suggested by the study findings, which included: a) diffuse myocardial thickening, decreased volumes, and loss of longitudinal systolic function; b) slight thickening of the right ventricular free wall and interatrial septum; c) aortic valve thickening, mild mitral and aortic regurgitation; d) diffuse, subendocardial late enhancement, mainly in the lateral LV wall (Figures 1 and 2), accelerated gadolinium kinetics in blood and myocardium, with subendocardial T1 of 510 ms 4 min following gadolinium administration; e) mild pericardial and pleural effusion.