Prolapsing left atrial myxoma: preoperative diagnosis using a multimodal imaging approach with magnetic resonance imaging and real-time three-dimensional echocardiography

T. Butz1,2*, W. Scholtz2, J. Körfer3, A. Maleszka4, S. Jategaonkar2, A. Meissner1, H.J. Trappe1, R. Körfer4, D. Horstkotte2, G. Kleikamp4, and L. Faber2

1Department of Cardiology and Angiology, Medizinische Klinik II, Ruhr-University Bochum, Hölkeskamp 40, D-44625 Herne, Germany; 2Department of Cardiology, Heart and Diabetes Center North Rhine–Westphalia, Ruhr University Bochum, Georgstr. 11, D-32545 Bad Oeynhausen, Germany; 3Institute of Radiology, Nuclear Medicine and Molecular Imaging, Heart and Diabetes Center North Rhine–Westphalia, Ruhr University Bochum, Georgstr. 11, D-32545 Bad Oeynhausen, Germany; and 4Department of Thoracic and Cardiovascular Surgery, Heart and Diabetes Center North Rhine–Westphalia, Ruhr University Bochum, Georgstr. 11, D-32545 Bad Oeynhausen, Germany

Received 20 November 2007; accepted after revision 23 December 2007; online publish-ahead-of-print 14 March 2008

Real-time three-dimensional echocardiography (RT3DE) is a new promising technique for the evaluation of intracardiac masses. We present the diagnostic work-up using a multimodal-imaging approach in a 74-year-old patient with a prolapsing tumour in the left atrium suggestive of a myxoma, causing severe congestive heart failure attributable to dynamic left ventricular inflow obstruction, and mimicking severe mitral valve stenosis. Real-time three-dimensional echocardiography allowed to accurately image the entire volume of the myxoma, and to analyse the dynamic left ventricular inflow obstruction. The size of the lobulated mass as assessed by RT3DE was 65 × 25 × 22 mm. The mass was surgically removed, histology was diagnostic for myxoma, and the patient had an uneventful recovery.

Real-time three-dimensional echocardiography images the entire volume of a mass allowing for accurate measurements in multiple planes, and allowing for real-time evaluation of obstructive effects on ventricular in- or outflow. This case shows how RT3DE and other non-invasive imaging modalities may be used as complementary techniques for evaluation of intracardiac masses.

The size of an intracardiac mass has clinical relevance as a predictor for embolic events, congestive heart failure, and death. Two-dimensional measurements may underestimate the true maximum size of irregularly shaped structures. Therefore, real-time three-dimensional echocardiography (RT3DE) holds promise by acquiring a pyramidal volume of information contouring the entire mass in all dimensions that can then be visualized from different angles.1,2

We present the diagnostic work-up using a multimodal-imaging approach in a 74-year-old patient with a prolapsing tumour in the left atrium suggestive of a myxoma, causing severe congestive heart failure attributable to dynamic left ventricular inflow obstruction, and mimicking severe mitral valve stenosis.3

Transthoracic echocardiography showed a huge, hyper-echogenic, heterogeneous, and lobulated left-atrial mass attached to the atrial septum, protruding into the left ventricle during diastole (Figure 1, Supplementary material online, Movie S1). Real-time three-dimensional echocardiography allowed to accurately image the entire volume of the myxoma, and to analyse the dynamic left ventricular inflow obstruction (Figure 2, Supplementary material online, Movie S2 and S3). The size of the lobulated mass as assessed by RT3DE was 65 × 25 × 22 mm.

Magnetic resonance imaging (MRI) including a gadolinium contrast enhancement-based perfusion study of the mass...
Prolapsing left atrial myxoma

was consistent with the diagnosis of a myxoma (Figure 3, Supplementary material online, Movies S4 and S5). Indirect left-ventricular angiography also revealed the very bizarre formation of the myxoma (Figure 4) and the prolapse into the mitral valve.

The mass was surgically removed (Figure 5), histology was diagnostic for myxoma, and the patient had an uneventful recovery.4

Atrial myxoma is the most common primary, generally benign cardiac tumour.3

Figure 1 Transthoracic echocardiography (parasternal long-axis view) showed a huge left atrial mass attached to the atrial septum protruding into the left ventricle during diastole (LV, left ventricle; LA, left atrium; Ao, aorta).

Figure 2 Three-dimensional echocardiography (3DE) allowed to accurately image the entire volume of the myxoma, and to analyse the dynamic left ventricular inflow obstruction (LV, left ventricle; LA, left atrium).

Figure 3 Magnetic resonance imaging (MRI; 1.5 Tesla, balanced TFE, transversal axis) demonstrating the protruding of the myxoma into the left ventricle during diastole.

Figure 4 Angiographic imaging of the huge, heterogeneous globular left atrial mass (arrow; LV, left ventricle; LA, left atrium; RV, right ventricle).

Figure 5 Intraoperative finding.
Size usually ranges from 5 to 60 mm. The size and characterization of an intracardiac mass (vegetation, tumour, or thrombus) is an important predictor for embolic events and for response to treatment.\(^1\,^2\) Since a substantial proportion of masses are irregularly shaped, accurate assessment of these masses may be difficult.

Real-time three-dimensional echocardiography images the entire volume of a mass allowing for accurate measurements in multiple planes, and allowing for real-time evaluation of obstructive effects on ventricular in- or outflow.\(^1\,^3\)

This case shows how RT3DE and other non-invasive imaging modalities may be used as complementary techniques for evaluation of intracardiac masses.

**Disclosures:** None.

**Supplementary material**

Supplementary material associated with this article can be found in the online version.

**References**