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Diagnostic Imaging

Massive mitral annular calcification mimicking intracardiac mass: Multimodality approach to diagnosis

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ABSTRACT

The correct differential diagnosis of cardiac masses can be challenging and often carries important clinical implications. We present the case of a 78-year-old man with a cardiac mass of unclear etiology diagnosed on echocardiography. Using a multimodality approach with cardiac magnetic resonance and computed tomography, it was possible to define the real nature of the mass as *composed of* 2 voluminous calcifications of the mitral annulus.

Case report

We present the case of a 78-year-old man who was referred to our cardiologic outpatient clinic. The man's medical history included hypertension, dyslipidemia, and chronic obstructive pulmonary disease. In December 2015 a transthoracic echocardiography identified the presence of a voluminous oval hyperechoic mass, located at the level of the posterior cusp of the mitral valve. The characteristics of the mass suggested a calcified nature, but other etiologies (as an atypical form of myxoma) could not be excluded. A chest radiograph provided no evidence of calcification. A transesophageal echocardiography was therefore recommended but not performed. One year later, a second transthoracic echocardiography confirmed the presence of an inhomogeneous and irregular mass, located at the level of the posterolateral portion of the mitral annulus, which was *essentially unchanged*. The motion of the valve leaflets was not significantly affected, and mild mitral regurgitation, along with atrial dilatation, was pointed out (Fig. 1).

A cardiac magnetic resonance (CMR) was therefore requested to complete the differential diagnosis and to characterize the mass. At the level of the lateral segment of the mitral annulus, 2 contiguous masses (maximum diameter of 17 and 12 mm, respectively) were observed, which appeared hypointense on T1-weighted, T2-weighted, and short tau inversion recovery sequences. No contrast uptake or late enhancement was observed after the administration of gadolinium. These characteristics were highly suggestive of degenerative mitral annular calcification (MAC). To confirm the presence of the calcifications, a multimodality approach was implemented and a computed tomography (CT) was performed, clearly demonstrating the presence of 2 contiguous calcified masses (Fig. 2).

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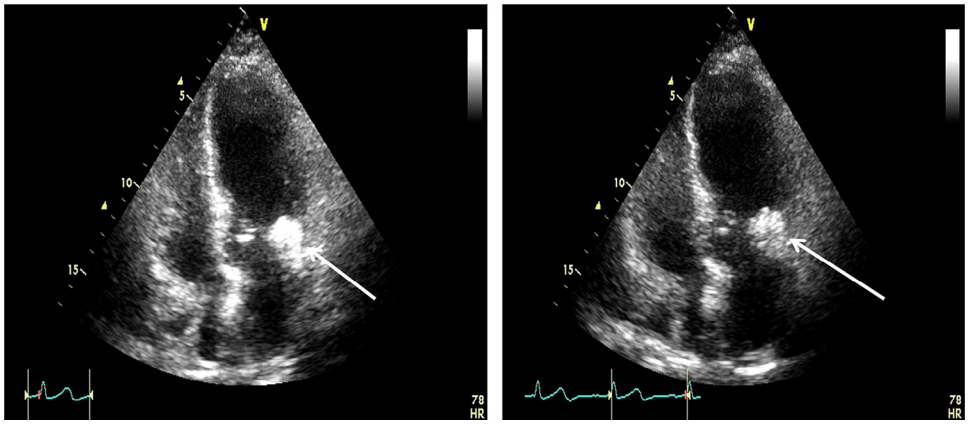

Fig. 1 – Transthoracic ultrasound, long-axis projections: hyperechoic cardiac mass (arrows) in a patient with poor acoustic window.

Discussion

The majority of cardiac masses are detected incidentally during routine echocardiographic studies for other indications. In many cases, echocardiography reveals characteristic anatomic and functional features that already enable differential diagnosis of a cardiac mass.

When diagnosis is doubtful, a multimodality imaging approach is generally necessary for precise tissue characterization and risk stratification and for choosing the best therapeutic option. Cardiac CT is a commonly used second-line diagnostic modality to assess cardiac masses [1,2]. In addition, incidental findings of cardiac masses are becoming more common as CT is increasingly used to evaluate coronary artery disease. Several technological advances in CT, including submillimeter detector arrays, increased rows of detectors, half-scan postprocessing algorithms, and electrocardiographic gating, have resulted in improved imaging of cardiac structures, including cardiac masses. CT can also offer information regarding vascularity by means of contrast enhancement, presence of calcifications (unlike magnetic resonance imaging [MRI]), and presence of fat. Limitations of CT include exposure to ionizing radiation, lower temporal resolution compared with echocardiography or MRI, and lower soft-tissue contrast resolution compared with MRI. MRI characteristics can be used to predict the likely malignancy of a cardiac mass. Compared with CT, MRI offers higher temporal resolution and better tissue characterization, and MRI does not expose patients to ionizing radiation. However, although access to cardiac MRI is increasing, the procedure remains less available than echocardiography or CT.

Cardiac masses include a variety of conditions for which the treatment can be completely different, ranging from normal anatomic variants (embryonic remnants like the Chari network or the Eustachian valve, false tendons, the moderator band, etc), pseudotumors (thrombus, pericardial cysts, and caseous calcifications of mitral valve), benign lesions (myxoma, lipoma, papillary fibroelastoma, fibroma, and hemangioma), and malignant tumors (cardiac metastases and sarcomas).

MAC is characterized by a chronic degenerative process of the fibrous support structure of the mitral valve, which mainly occurs at the level of the posterior subvalvular angle. The re-

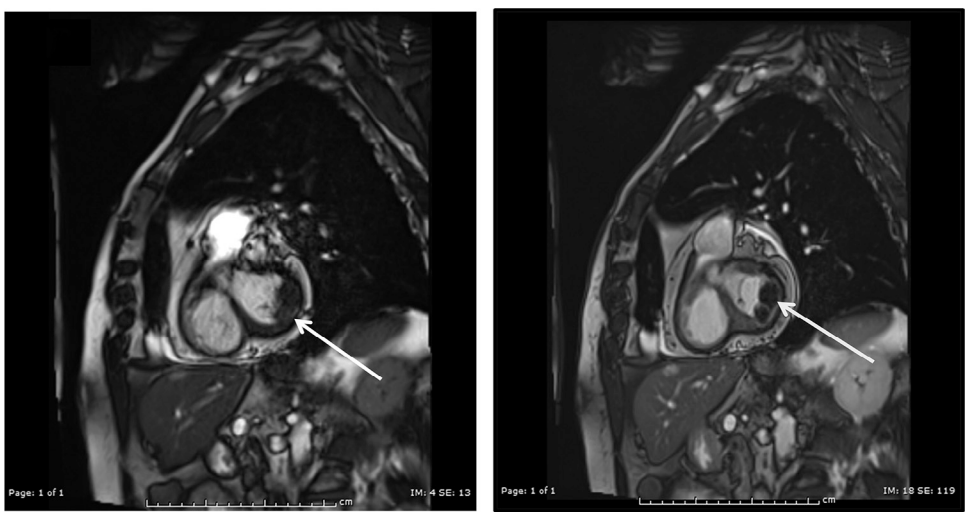

Fig. 2 – Cine magnetic resonance imaging along the short cardiac axis: 2 contiguous hypointense lesions (arrows).