

Cardiac magnetic resonance in cocaine-induced myocardial damage

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Received: 14 January 2014 / Accepted: 21 January 2014 / Published online: 31 January 2014
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Abstract A 54-year-old male with history of cocaine abuse underwent trans-thoracic echocardiography that showed hyper-echogenicity of the basal segments of the septum and infero-lateral wall of the left ventricle. The patient underwent cardiac CT that reported diffuse non-obstructive CAD. Cardiac MR showed LGE patterns consistent with non-ischemic myocardial damage associated with cocaine abuse.

Keywords Cocaine abuse · Myocardial fibrosis · Echocardiography · Cardiac computed tomography · Cardiac magnetic resonance

A 54-year-old male with family history of ischemic heart disease, psychosis, type 2 diabetes mellitus, bicuspid aortic valve and ascending aortic dilatation was admitted to our

outpatient clinic. Five years earlier the patient was admitted to the psychiatric service for a delusional disorder substance abuse (cocaine). For over 5 years he was treated for diabetes and high blood pressure medications.

Trans-thoracic echocardiography showed no wall-motion abnormalities with normal global LV function; no ECG/biomarker abnormalities, arrhythmias (24-h Holter monitoring), angina, inducible ischemia (stress ECG) were observed.

During the latest echocardiographic examination he showed mild aortic valve steno-insufficiency and a slight increase of ascending aorta dilatation (45 mm); the investigation demonstrated left ventricular hypertrophy with intra-myocardial patches of hyper-echogenicity in the basal segment of the septum and inferior-lateral wall (Fig. 1a, arrow; movie 1). The patient underwent cardiac CT which showed three-vessel non obstructive coronary artery disease and confirmed the LV hypertrophy (15 mm at septal basal segment; Fig. 1b, arrow) and the dilation of ascending aorta (44 mm).

Cardiac MR was performed for the assessment of LV tissue (Fig. 1c–e). No significant wall-motion or signal abnormalities were detected at pre-contrast T1/T2 weighted images in the left ventricle. Mild aortic valve regurgitation was observed (6 %) with normal LV ejection fraction (55 %) and end-diastolic volume (80 ml/m²). CMR showed the presence of subtle intra-myocardial areas of early (Fig. 1c, arrowheads; Movie 2) and late Gadolinium Enhancement at the level of mid-basal septum (Fig. 1d, e, arrowheads) and infero-lateral mid-basal wall of the left ventricle (Fig. 1d, e, arrow). Given the non-ischemic pattern of LGE location and distribution, the absence of typical patterns associated to LV hypertrophy and the lack of hypertrophic/dilated cardiomyopathy features, the finding is consistent with chronic fibrosis

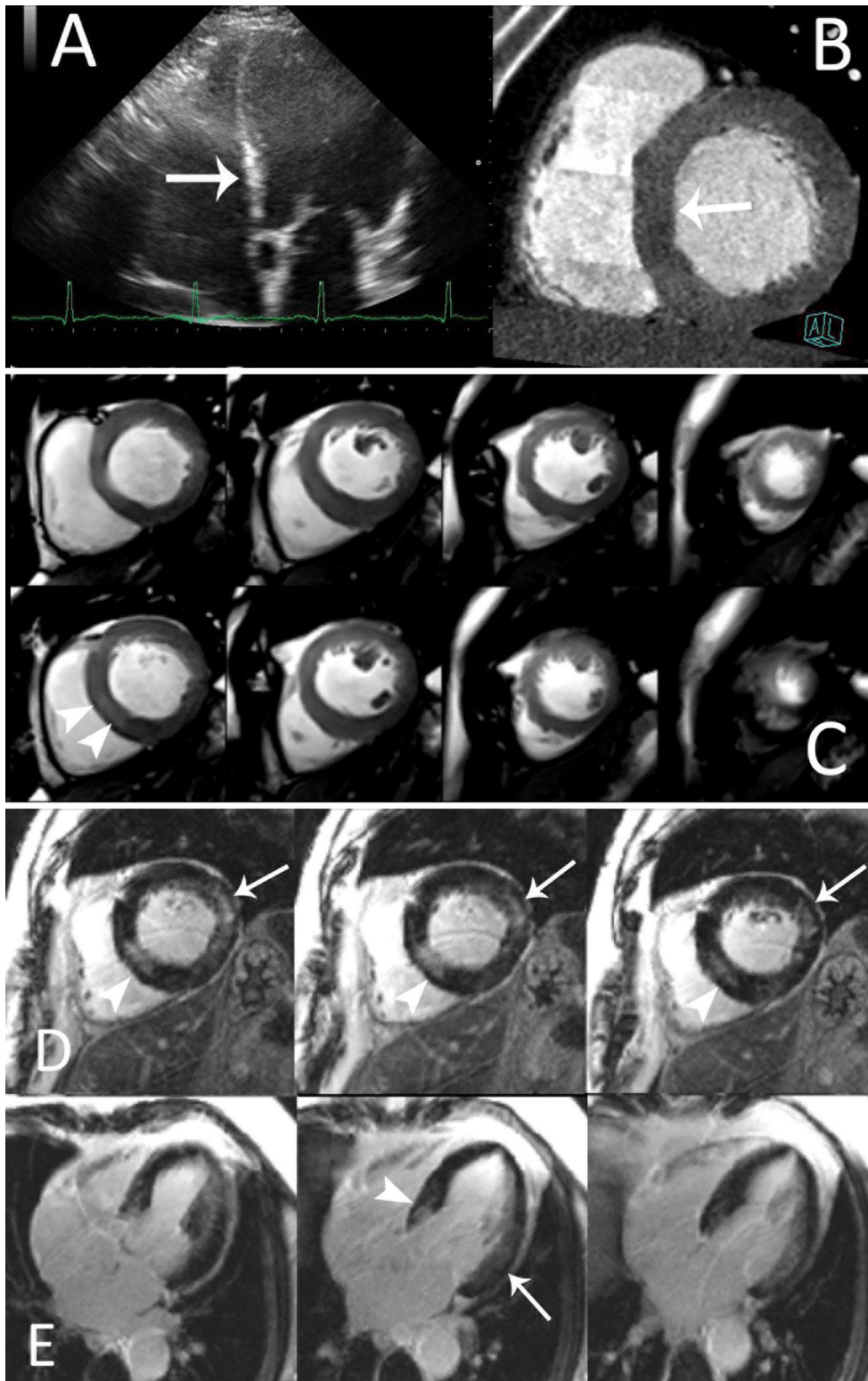
Electronic supplementary material The online version of this article (doi:[10.1007/s10554-014-0381-4](https://doi.org/10.1007/s10554-014-0381-4)) contains supplementary material, which is available to authorized users.

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◀ **Fig. 1** Cardiac CT and conventional coronary angiography findings. Multimodality imaging of *left* ventricle. Echocardiography shows the hyper-echogenicity of the mid-basal septum (**a—arrow**) while on first pass CT there is no evidence of tissue damage (**b—arrow**). Cine MR images performed early after Gadolinium administration show a mild hyper-intensity of the basal septum with intramural distribution (**d—arrowheads**). Delayed MR images clearly depict late Gadolinium enhancement at the level of the basal septum (**d, e—arrowheads**) and at the level of the basal lateral wall (**d, e—arrows**) with intramyocardial distribution

associated with cocaine abuse. Echocardiography is useful mean to address this kind of subtle tissue abnormalities and CMR can complete the assessment with a precise pattern definition.

Conflict of interest None.