Journal of Cardiovascular Magnetic Resonance

BioMed Central

Poster presentation

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New insight of CMR in the diagnosis of left ventricular non-compaction: measurement of trabeculated left ventricular mass

Alexis Jacquier*[1], Franck Thuny[1,2,3], Bertrand Jop[1], Roch Giorgi[1], Gilbert Habib[1], Jean Michel Bartoli[1] and Guy Moulin[1]

Address: [1]CHU La Timone, Marseille, France, [2]CHU la Timone, Marseille, France and [3]CHU Timone, Marseille, France
* Corresponding author

from 13th Annual SCMR Scientific Sessions
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

Journal of Cardiovascular Magnetic Resonance 2010, **12**(Suppl 1):P182 doi:10.1186/1532-429X-12-S1-P182

This abstract is available from: http://jcmr-online.com/content/12/S1/P182

Introduction

Introduction: There is no universally accepted definition of left ventricular non compaction (LVNC) at present. Furthermore, investigators recently showed that there was a poor correlation between the 3 echocardiographic definitions of LVNC.

Purpose

To describe a method for measuring trabeculated left ventricular (LV) mass using cardiac magnetic resonance imaging (CMR) and to assess its value in the diagnosis of LVNC.

Methods

Between January 2003 and 2008, we prospectively included 16 patients with LVNC. During the mean period we included 16 patients with dilated cardiomyopathy (DCM), 16 patients with hypertrophic cardiomyopathy (HCM), and 16 control subjects. All patients underwent a 1.5 T CMR with SSFP cine sequences, the following parameters were used: TR/TE = 40 ms/1.8 ms, slice thickness = 6 mm, no gap between slice, flip angle = 65°, matrix = 148 × 256, field of view = 350 × 350 mm, temporal resolution = 35 ms, retrospective gating for the Siemens scan; and TR/TE = 3.5/1.5 ms, slice thickness = 6 mm, no gap between slice, flip angle = 60°, matrix = 148 × 256, field of view = 350 × 350 mm, temporal resolution = 35 ms, retrospective gating for the Philips scan. LV volumes, LV ejection fraction and trabeculated LV mass were measured (Figure 1). Figure 1: Illustration of the described method for measuring the global and trabeculated LV masses in patients with LVNC, DCM, HCM and controls. Row A shows the short axis end-diastolic cine images used for measurement without contouring. Row B shows inclusion of papillary muscles but exclusion of LV trabeculation for the measurements of the compacted LV mass. Row C shows inclusion of papillary muscles and trabeculation for the measurements of global LV mass.

Results

The percentage of trabeculated LV mass was almost 3 times higher in the patients with LVNC (32 ± 10 %), compared to those with DCM (11 ± 4 %; $P < 0.0001$), HCM (12 ± 4 %, $P < 0.0001$), and controls (12 ± 5 %; $P < 0.0001$). A value of trabeculated LV mass above 20% of the global mass of the LV predicted the diagnosis of LVNC with a sensitivity of 93.7% (95% CI: 71.6%-98.8%) and a specificity of 93.7% (95% CI: 83.1%-97.8%; $\kappa = 0.84$).

Conclusion

The method described is reproducible and provides an assessment of the global amount of LV trabeculation. A trabeculated LV mass above 20% of the global LV mass is highly sensitive and specific for the diagnosis of LVNC.

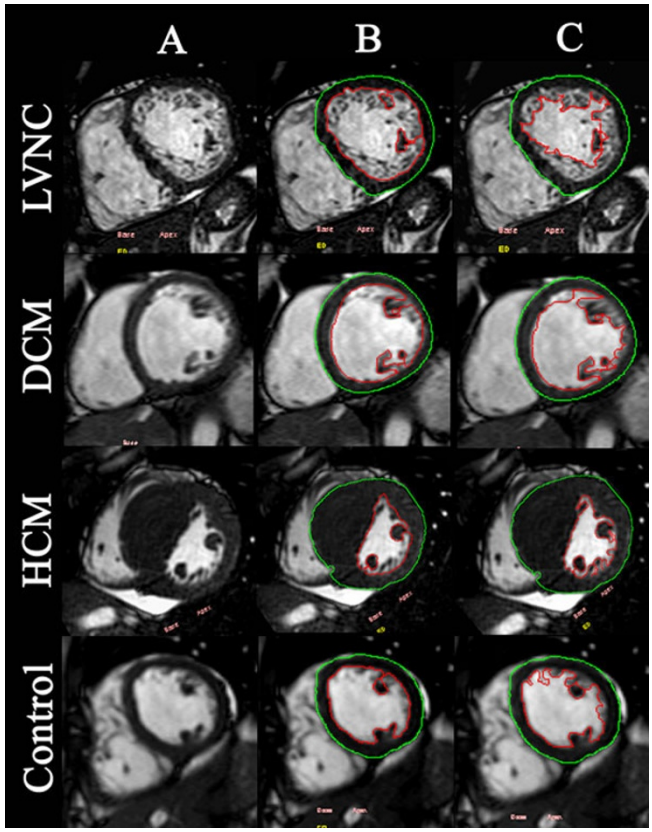

Figure 1