Contrast enhanced CMR in acute myocarditis: what is the optimal moment for imaging?

Alexis Jacquier1*, Nicolas Amabile2, Jean Yves Gaubert1, Francesca Carta1, Antonin Flavian1, Boris Maurel1, Guy Moulin3

From 2011 SCMR/Euro CMR Joint Scientific Sessions
Nice, France. 3-6 February 2011

Introduction
The pathological processes (ie alteration of myocardial perfusion) that occur during the acute phase of a myocarditis, are different from those of myocardial infarction. Myocardial enhancement kinetics might be different in acute myocarditis compared to myocardial infarct that may impact the optimal moment for imaging acute myocarditis.

Purpose
To compare the kinetics of gadolinium in acute myocarditis and acute myocardial infarction and 2) to establish the best interval between contrast injection and delayed contrast enhanced (DCE) image acquisition for the diagnosis of acute myocarditis.

Methods
Ninety-nine patients were prospectively included, 17 patients with acute myocarditis and 12 with acute myocardial infarction. All patient underwent a 1.5T CMR examination. Look-Locker sequences were acquired before and after administration of 0.2mol/kg Gd-DOTA repeatedly during 14min with the following parameters: TR/TE=26.7/1.27 ms, slice thickness= 8mm, α=30°, matrix=192 x 96, 26 cardiac triggered images were acquired following each non-selective inversion pulse with T10=95ms, ΔTI=25ms. The apparent longitudinal relaxation rate (R1) from left ventricular blood, enhanced and normal myocardium and were calculated. Delayed contrast enhanced (DCE) images were acquired at 5, 10 and 15min after contrast injection (TR/TE=650/1.56 ms, slice thickness=7mm, spacing=0, α=10°, and matrix =152x134. The inversion time=270-325ms. Signal noise ratio (SNR) and contrast noise ratio (CNR) were measured and a qualitative image analysis was performed on a four points scale.

Results
A faster decline in R’1 value was measured within the area of myocardial enhancement in myocarditis compared with myocardial infarction. Myocarditis patients showed a significant decrease in CNR (from 92±58 at 5min vs 64±47 at 15min; P<0.0001) as a function of time (Figure 1). Whereas in myocardial infarction, there was no significant difference between time points for CNR (92±57 at 5min vs 100±50 at 15min; P=ns). Image quality in myocarditis was significantly better at 5 min (3.6±0.6) and decreased over time at 10 (2.7±0.5) and 15min (2.1±0.7; P=0.01) after contrast injection (figure 1).

Conclusions
The gadolinium kinetics of acute myocarditis are different from those of acute myocardial infarction. In

Figure 1 DCE images 5, 10 and 15min in one patient with myocarditis (upper row) and in one other patient with myocardial infarction (lower row).
myocarditis, DCE images acquired 5min after contrast injection provide higher SNR, CNR and image quality compared with images collected at later times.

Author details
1CHU La Timone, CEMEREM, Marseille, France. 2Marielanelongue, Paris, France. 3CHU La Timone, Marseille, France.

Published: 2 February 2011

Cite this article as: Jacquier et al.: Contrast enhanced CMR in acute myocarditis: what is the optimal moment for imaging? Journal of Cardiovascular Magnetic Resonance 2011 13(Suppl 1):O36.