Int J Cardiovasc Imaging (2009) 25:643–645
DOI 10.1007/s10554-009-9466-x

EDITORIAL COMMENT

Cardiac magnetic resonance imaging in primary PCI: additional value?

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Received: 14 April 2009 / Accepted: 16 April 2009 / Published online: 26 May 2009

Cardiac magnetic resonance imaging (CMR) has long been recognized as an accurate and reliable means of evaluating cardiac anatomy and ventricular function. Considerable progress has been made in the field of CMR, providing accurate evaluation of left ventricular function parameters in coronary artery disease, heart failure, hypertrophic cardiomyopathy, and many other cardiac diseases [1–11]. Stress first-pass contrast-enhanced myocardial perfusion CMR can be used to detect subendocardial ischemia and recent studies have demonstrated the high diagnostic accuracy of stress myocardial perfusion CMR for detecting significant coronary artery disease [12–17]. Magnetic resonance angiography (MRA) has been introduced as a method that can provide visualization of all three major coronary arteries, coronary anomalies, coronary bypasses and the aorta within a single three-dimensional acquisition [18–21]. CMR has become the first choice imaging modality in complex congenital heart disease [22–26] and imaging great vessels [27, 28].

Over the past years, contrast-enhanced CMR has been used to visualize the transmural extent of myocardial infarction with high spatial resolution [29–34]. Infarcted myocardium appears hyper enhanced compared with normal myocardium when imaged by a late enhancement MRI technique with the use of T1-weighted sequence after injection of gadolinium chelates. Late gadolinium-enhanced CMR can clearly delineate subendocardial infarction and the transmural extent of delayed enhancement potentially predicts functional outcome after revascularization in acute myocardial infarction and chronic ischemic heart disease [35, 36].

In a recent issue of the *International Journal of Cardiovascular Imaging,* Larose et al. [37] investigated the value of contrast-enhanced CMR in patients following primary percutaneous coronary intervention (PCI) because of ST-segment elevation myocardial infarction (STEMI). The first hours of STEMI are critical: the earlier patient evaluation is performed—preferably within hours—the more rapidly prognosis-guiding therapies can be initiated. To determine whether CMR is effective in risk stratification in the hyperacute phase of STEMI, the feasibility and safety of CMR was studied in the hyperacute phase of STEMI immediately after primary PCI. A total of 128 consecutive patients immediately after primary PCI for STEMI, of whom 64 underwent CMR 12 h after primary PCI versus 64 matched controls. Outcomes were followed over 6 months. CMR in hyperacute STEMI was not associated with in-hospital death,

Editorial comment to the article of Larose et al. (doi: 10.1007/s10554-009-9451-4).

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infarct expansion, or urgent revascularization. CMR immediately after primary PCI did not increase nephropathy. CMR did not increase major adverse cardiac events (5 vs. 8%) or recurrence of angina (6 vs. 8%) at 6 months. It was concluded that CMR immediately after primary PCI is feasible and safe, allowing very early risk stratification in STEMI. In the current study [37] a very low event rate was recorded both in-hospital and during the 6 months following CMR which was similar to that of primary PCI subjects not undergoing CMR.

Until now, only a few studies have evaluated the effects of primary PCI using contrast-enhanced CMR, mostly focused on the effects of stents on CMR imaging quality [38–40]. Kitabata et al. [41] showed in 27 patients with anterior acute STEMI that the microvascular resistance index, being a parameter of microvascular damage, measured immediately after primary PCI was a useful predictor for CMR-determined infarct size. In the HEBE trial, a large, multicentre, randomized trial performed in The Netherlands, the effects of intracoronary infusion of autologous bone marrow mononuclear cells after primary PCI were evaluated with contrast-enhanced CMR both in the acute phase of STEMI and 4 months later [42, 43]. In these studies [41–43], CMR proved to be feasible and there were no safety concerns for CMR in the hyperacute phase.

The present study is therefore one of the leading studies to demonstrate the feasibility and safety of CMR in the hyperacute phase of STEMI after primary PCI. Very early risk stratification may be further refined safely by CMR, guiding the way for improved tapering of therapies—such as stem cell therapy—in the hyperacute phase of STEMI. Consequently, performing CMR in the acute phase of STEMI offers additional value in patients undergoing primary PCI.

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