demonstrate that volume reduction and shape changes are valuable components in the treatment of congestive heart failure following infarction. Ejection fraction improved, volume was reduced, and clinical status improved by New York Heart Association (NYHA) functional classification status. Moreover, five-year survival was very gratifying, especially when compared to conventional therapy.

The effects of ventricular restoration have been studied and referenced in our report (1). These include improvement of systolic and diastolic function, confirmed by the centerline method and pressure-volume loop studies. The operation’s primary physiological impact is on the remote noninfarcted myocardium and has been well described.

Our study did not report hemodynamics because we believe that little can be extrapolated from such data. It is well known that heart failure progresses independently of hemodynamic status and is directly related to ventricular size and shape changes (2,3). Indeed, patients with markedly dilated hearts and advanced heart failure often have normal cardiac output and pulmonary pressures at rest. Our reporting is, therefore, consistent with the majority of clinical trials of heart failure, few of which assert that acute resting hemodynamic changes are of functional or prognostic significance.

Hemodynamics, however, may be of value during exercise. Consequently, conversion of 67% in NYHA functional class III/IV category to 85% in class I/II seems an effective functional counterpart. In the meanwhile, the recently documented neurohormonal consequences of ventricular restoration are very pertinent to the reviewer’s comments regarding “cause and effect” (4).

Constantine L. Athanasuleas, MD
*Gerald D. Buckberg, MD
*Department of Surgery
UCLA Medical Center
10833 Le Conte Avenue
Room 62-258 CHS
Los Angeles, CA 90095-1741
E-mail: gbuckberg@mednet.ucla.edu

doi:10.1016/j.jacc.2005.05.019

REFERENCES

Cardiac Magnetic Resonance-Directed Intervention in Non–ST-Segment Elevation Acute Coronary Syndrome

I read with great interest the study by Plein et al. (1) on the use of cardiac magnetic resonance (CMR) imaging to determine the presence of significant coronary stenosis in patients with non–ST-segment elevation acute coronary syndromes (NSTE-ACS). The investigators showed an impressive sensitivity (96%) and specificity (83%) to predict significant coronary stenosis using combined myocardial function, perfusion, viability (employing late enhancement), and coronary anatomy. They also pointed out that the diagnostic yield of combining only perfusion, wall motion, and late enhancement was similar without the addition of CMR angiography, representing a significant reduction in scanning time.

The advent of evidence-based international guidelines that all patients with NSTE-ACS should undergo early (<72 h) revascularization (2,3) has created both an enormous burden on worldwide health care systems and long inpatient waiting times for intervention (4). A more precise risk-stratification of those patients with a diagnosis of NSTE-myocardial infarction, such as that advocated by the Plein et al. (1) study, would prevent exposing patients to unnecessary risk and markedly alleviate the extra burden on health care systems. This is particularly relevant to this study as only 53% of subjects had a positive troponin level and thereby fulfilled the definition of NSTE-ACS and evidence-based criteria for early intervention.

The difficulty of accurate risk-stratification highlights the importance of the study by Plein et al. (1), but the real strength of CMR lies in not only detecting coronary artery stenoses, but in directing interventional therapy. Although 56 of the 68 patients studied were found to have coronary artery disease, a more profound question is whether the stenotic vessel supplied a territory that was viable or ischemic, as these are the stenoses that, when treated, result in beneficial ventricular remodeling, prognosis, or reduction in symptoms (5). This information is inherent in the CMR technique and therefore readily already available to the investigators. Further analysis of the data would determine how appropriate the intervention was, and allow the potential cost benefit of a single CMR scan to be calculated.

*Nick G. Bellenger, MD
*Wessex Cardiothoracic Centre
E Level, East Wing
Tremona Road
Southampton
Hants
SO16 6YD
United Kingdom
E-mail: nickbellenger@doctors.org.uk

doi:10.1016/j.jacc.2005.05.016

REFERENCES

REPLY

We are grateful to Dr. Bellenger for his interesting comments. We share his enthusiasm regarding the potential of cardiac magnetic resonance (CMR) to provide a guide to revascularization in patients presenting with acute coronary syndromes and also in other clinical scenarios.

Some of the information Dr. Bellenger requests is indeed inherent in our data (1). Of the 56 patients with significant coronary artery disease (CAD) in our study, 49 had perfusion defects (the sensitivity of perfusion analysis to detect the presence of CAD on X-ray angiography was therefore 87.5%, as reported in our study). Seven patients thus had no perfusion defects on CMR despite the presence of significant CAD on X-ray angiography. Only three patients in our population showed transmural scar on late contrast-enhanced CMR imaging. Two of these patients underwent percutaneous intervention to vessels supplying myocardium that appeared on CMR to be predominantly nonviable (one of these is shown in Figure 4C of our study [1]).

However, other than reporting these results, our study design does not permit us to draw conclusions regarding the appropriateness of revascularization decisions in these patients. In the absence of a true standard for the detection of “significant” CAD, we used X-ray angiography as the reference test to determine the need for coronary revascularization therapy. We cannot therefore conclude that in patients with discrepant results between CMR and X-ray angiography, coronary revascularization was inappropriate or unnecessary.

Our study (1) is the first report of using CMR in patients with acute coronary syndromes. In this work it was our aim to establish whether CMR can be applied safely to this group of patients and whether it can accurately detect CAD. We fully agree with Dr. Bellenger that the potential future role of CMR, as we have discussed in our report, could exceed this relatively narrow application we have studied, and could include guiding revascularization decisions by providing comprehensive data on myocardial function, perfusion, and viability. This potential role should be explored in future work with an appropriately designed study.

*Sven Plein, MD
John P. Greenwood, PhD
John P. Ridgway, PhD
Gillian Cranny, MSc
Stephen G. Ball, PhD
Mohan U. Sivananthan, MD

*BHF Cardiac Magnetic Resonance Unit
Room 170, D-Floor
Jubilee Building
The General Infirmary at Leeds
Great George Street
Leeds LS1 3EX
United Kingdom
E-mail: sven.plein@leedsth.nhs.uk

doi:10.1016/j.jacc.2005.05.015

REFERENCE