News and Views From the Literature

Cardiac Magnetic Resonance Imaging

Prognostic Value of High-Dose Dobutamine Stress MRI

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Prognostic Value of High-Dose Dobutamine Stress Magnetic Resonance Imaging in 1493 Consecutive Patients: Assessment of Myocardial Wall Motion and Perfusion

Korosoglou G, Elhmidi Y, Steen H, et al.

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Cardiac magnetic resonance imaging (CMRI) continues to evolve into the "go to" myocardial imaging modality due to its ability to evaluate wall function and myocardial perfusion, distinguish between viable and nonviable myocardium, and (in many cases) identify the causes of cardiomyopathy. This is all accomplished without exposing the patient to radiation—a concept that my group at Westside Medical Imaging (Beverly Hills, CA) has coined "green imaging." Unfortunately, what has been one of the biggest sources of resistance to widespread acceptance of CMRI is the poor reimbursement allowed by Medicare and insurance providers. As the body of clinical trial experience grows, it is hoped that appropriate levels of reimbursement will be achieved. Thus, we are grateful for the investigation by Korosoglou and colleagues, which shows the prognostic value of CMRI.

A total of 1493 consecutive patients with suspected or known coronary artery disease (CAD) underwent dobutamine stress MRI (DS-MRI) using a standard protocol in a 1.5 Tesla scanner. Patients were categorized into two major groups as a part of their analysis: those with low or intermediate pretest likelihood for CAD based on the number of cardiovascular risk factors and the Duke Clinical Score, and those with high risk or those known to have CAD. Wall motion was assessed using apical, midventricular, and basal short-axis views, and four-, three- and two-chamber views. Dobutamine was intravenously infused at incremental doses of 10, 20, 30, and 40 µg/kg of body weight per minute until at least 85% of the age-predicted heart rate was achieved. Atropine was administered if the target heart rate was not achieved. Stress testing was stopped when the target heart rate was achieved or when a new or worsening wall motion abnormality occurred, or with the development of severe chest

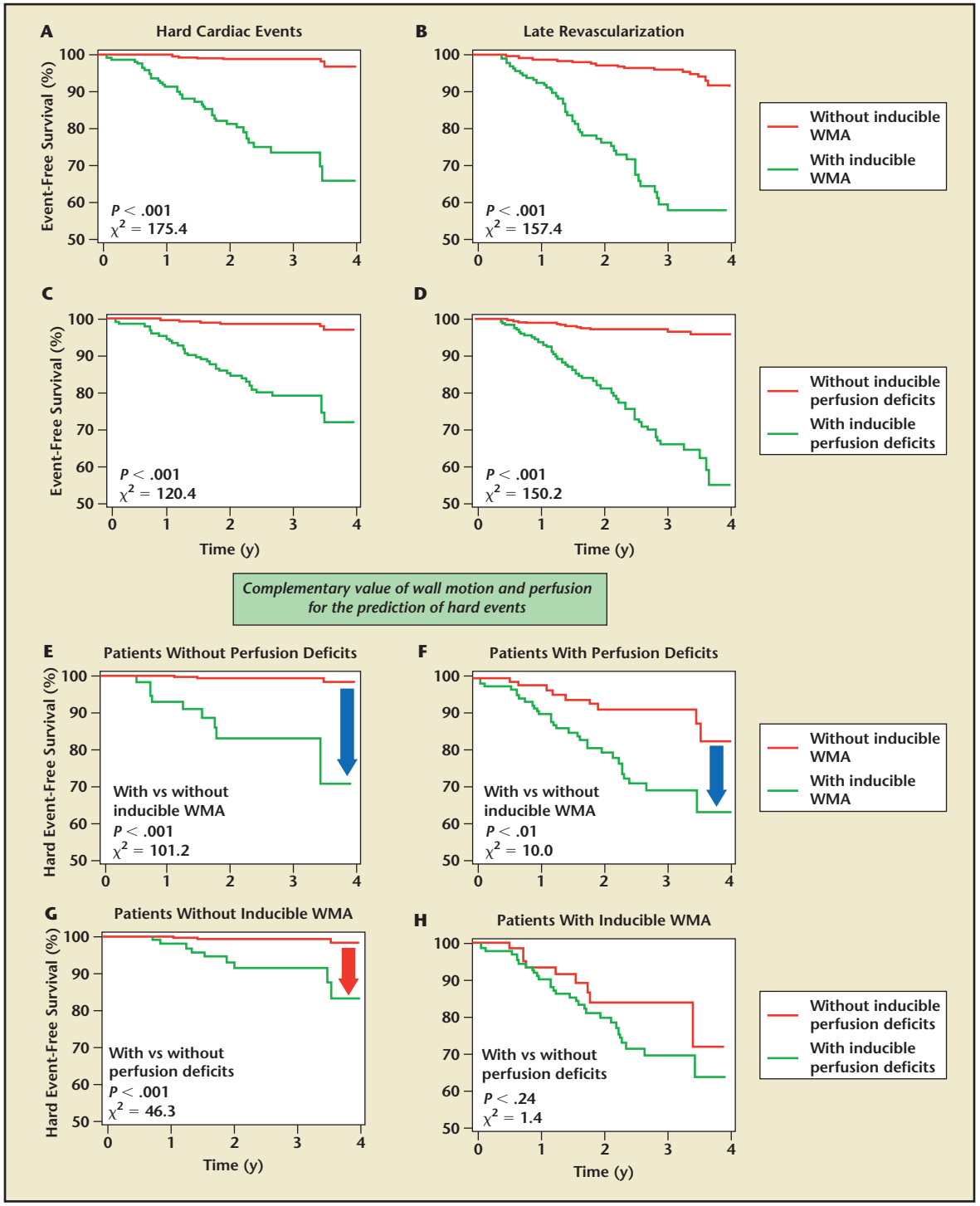

Figure 1. *Kaplan-Meier curves for hard events and revascularization-free survival based on wall motion (***A** *and* **B***) and perfusion test results (***C** *and* **D***). The detection of inducible wall motion abnormalities (WMA) resulted in poorer outcome in patients with and without diagnosed inducible perfusion deficits (*blue arrows *in* **E** *and* **F***), whereas the detection of inducible perfusion deficits added value to the risk stratification only in the absence of inducible WMA (*red arrow *in* **G***). Reprinted from* J Am Coll Cardiol. *Vol. 56, Korosoglu G et al. Prognostic value of high-dose dobutamine stress magnetic resonance imaging in 1,493 consecutive patients: assessment of myocardial wall motion and perfusion, 1225-1234, copyright 2010, with permission from Elsevier.*

discomfort, dyspnea, or a decrease in systolic blood pressure of ≥ 40 mm Hg. Perfusion images were obtained during the first pass of intravenous gadolinium.

The presence of an inducible wall motion abnormality or perfusion deficits was associated with a much higher event rate of cardiac death, nonfatal myocardial infarction, and subsequent rates of coronary revascularization during a mean follow-up duration of 2 years following the CMRI examination (Figure 1). Patients with normal DS-MRI examination results had low event rates.

According to the investigators, "the presence of an inducible wall motion abnormality added value to risk stratification of patients with and without inducible perfusion defects contributing to significantly worse outcomes in both cases." Perfusion defects added prognostic value only in those patients with no inducible wall motion abnormalities. In patients with an inducible wall motion abnormality, the perfusion assessment did not provide incremental prognostic value except in those with a baseline wall motion abnormality.

The authors conclude, based on the results of this investigation, that using DS-MRI to evaluate for inducible wall motion abnormalities is an effective approach to assess those at increased risk for hard events such as cardiovascular death, nonfatal myocardial infarction, and late revascularization. The MRI assessment for wall motion and perfusion abnormalities provides complementary prognostic information. The presence of inducible wall motion provided incremental risk assessment in patients with and without inducible perfusion defects, but perfusion defects were associated with poorer outcomes in those patients who did not have a stress-induced wall motion abnormality. This study suggests that assessment of perfusion by MRI is helpful in patients with known CAD, resting wall motion abnormalities, and left ventricular hypertrophy. In addition, in those without these features, the presence of an inducible wall motion abnormality is complemented by perfusion assessment results. In those without wall motion abnormalities at rest or stress, perfusion appears to have no added benefit. ■