Noninvasive Risk Assessment Early After a Myocardial Infarction
Are We Looking at the Right Indicators?

Exner et al. (1) looked at the role of combined assessment of autonomic tone plus cardiac electrical substrate as markers of predicting long-term mortality in evaluating 322 patients who survived myocardial infarction (MI) but with left ventricular (LV) dysfunction. We have 3 concerns about this study. First, the authors fail to report the incidence of nonsustained ventricular tachycardia in study patients. Nonsustained ventricular tachycardia has already been proved as an electric substrate and an indicator of high mortality in patients with LV dysfunction (2). Second, there is no information on the use of antiarrhythmic drugs in study patients, which might very well affect the outcome. Third, most patients in the study (81%) underwent revascularization by percutaneous coronary intervention, and the authors reported a significant increase in left ventricular ejection fraction over the initial 2 months after MI. Distal embolization is a known complication of percutaneous coronary intervention. Distal embolization is a phenomenon in which macro emboli from the original lesion migrate distally, causing micro-infarcts leading to inadequate flow at the tissue level despite reopened epicardial coronary artery. It is related to reduced myocardial perfusion and a poor prognosis (3), but the authors did not report any data about it. These micro-infarcts could be playing a role in some of the unexplained increase in mortality in post-MI patients, even though the left ventricular ejection fraction is improved significantly. There is a need to assess the effect of these confounding variables, to truly determine the most accurate and clinically feasible noninvasive markers to predict long-term prognosis after MI. A study that combines clinical, electrophysiological, and imaging (echocardiography and angiography) data to assess the long-term prognosis after MI is warranted.

Sandeep Goyal, MD
*Sujech R. Punnam, MD

*Department of Internal Medicine
Division of Cardiology
A-205 Clinical Center
Michigan State University
East Lansing, Michigan 48823
E-mail: punnam@msu.edu

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We thank Drs. Goyal and Punnam for their interest in our study (1). The prevalence and prognostic significance of nonsustained ventricular tachycardia (NSVT) was evaluated in the REFINE (Risk Estimation Following Infarction, Noninvasive Evaluation) study, but these data were not included, owing to space limitations. At 10 to 14 weeks after the index myocardial infarction (MI), 95 of the 322 patients (30%) had 1 or more NSVT episodes lasting at least 5 beats. The prevalence of NSVT did not differ among patients who suffered the primary outcome of cardiac death or nonfatal cardiac arrest (p = 0.3) versus patients who did not. Also, NSVT was not associated with a significantly higher risk of the primary outcome (hazard ratio [HR] 1.8, 95% confidence interval [CI] 0.8 to 3.8; p = 0.1). Importantly, the association between Holter-assessed impaired heart rate turbulence plus abnormal repolarization alternans with an increased risk of the primary outcome (HR 5.0, 95% CI 2.3 to 10.7; p < 0.0001) was not altered when NSVT was adjusted for (HR 4.9, 95% CI 2.3 to 10.6; p < 0.0001).

Antiarrhythmic drug use was uncommon in the REFINE study; 6 patients (2%) received amiodarone and 3 (1%) received sotalol. Antiarrhythmic drug use was similar in patients who did versus did not suffer the primary outcome (p = 0.2) and was not associated with an increased risk of the primary outcome (HR 1.6, 95% CI 0.2 to 12.5; p = 0.6). As with NSVT, the association of impaired heart rate turbulence plus abnormal repolarization alternans with an increased risk of the primary outcome was not altered when antiarrhythmic drug usage was adjusted for (HR 5.4, 95% CI 2.3 to 12.6; p < 0.0001).

We did not evaluate distal embolization in the REFINE study, because we sought to assess markers of long-term risk. Multiple studies have shown that distal embolization impacts short-term 30- to 60-day risk of adverse clinical outcomes and not long-term 4-year risk (2,3). The strong association between impaired heart rate turbulence plus abnormal repolarization alternans with an increased risk of the primary outcome was not altered when change in ejection fraction over the initial 2 months after MI, a surrogate of successful reperfusion, was adjusted for (HR 5.1, 95% CI 2.2 to 11.9; p < 0.0001). In conclusion, the concerns of Drs. Goyal and Punnam do not detract from our findings. As clearly demonstrated (1), the combination of impaired heart rate turbulence plus abnormal repolarization alternans assessed in the nonacute post-MI period reliably predicts the long-term risk of serious outcomes. Thus, we believe these markers are the right indicators.

*Derek V. Exner, MD, MPH
on behalf of the REFINE Investigators