LETTERS TO THE EDITOR

Relationship Between Myocardial Reperfusion, Infarct Size, and Mortality

Brener et al. (1) show in a substudy of INFUSE-AMI (Intracoronary Abciximab and Aspiration Thrombectomy in Patients With Large Anterior Myocardial Infarction) trial that myocardial blush grade (MBG) 2/3 in a relatively small study population of 452 patients is associated with smaller infarct size, less microvascular obstruction, improved ejection fraction as assessed by contrast-enhanced cardiac magnetic resonance, and, strikingly, significantly lower 30-day mortality.

As mentioned by the authors in the limitations section of the study, ST-segment resolution (STR) is a powerful predictor of myocardial salvage and of clinical outcome, as recently confirmed in an electrocardiogram substudy of the HORIZONS-AMI (Harmonizing Outcomes With Revascularization and Stents in Acute Myocardial Infarction). In this study, absent STR at 60 min after primary percutaneous coronary intervention was a significant independent predictor of major adverse cardiovascular events and target vessel revascularization at 3 years (2).

In the present study the differences in MBG were associated with significantly better clinical outcomes, and, furthermore, the robust association between MBG and infarct size was independent of STR. Unfortunately, the authors do not report whether STR, as mentioned as a very important independent predictor of major adverse cardiovascular events, is associated with better clinical outcomes. Providing these additional data on the association of STR with clinical outcomes would be helpful to shape future surrogate endpoints of clinical trials.

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http://dx.doi.org/10.1016/j.jcin.2013.08.010

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Reply

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We thank Dr. Haeck for his interest in our paper (1) and for his insightful comments. Assessing success of myocardial reperfusion in ST-segment elevation myocardial infarction is critical to improving outcome. As we noted in Table 3 of our paper (1), there was no difference in the incidence of ST-segment resolution (STR) >70% between patients with and without adequate myocardial blush grade (MBG) (53.3% vs. 47.4%, p = 0.35). We further explored the association between electrocardiographic parameters, infarct size, and outcome in a separate paper (2). In short, STR did not correlate with mortality at 30 days, but new Q waves at 60 min post-percutaneous coronary intervention did (p = 0.04). We also assessed the complementary value of STR and MBG in a much larger cohort of patients enrolled in the HORIZONS AMI (Harmonizing Outcomes with RevasculariZatiON and Stents in Acute Myocardial Infarction) trial (3). We demonstrated that there is discordance between MBG 2/3 and STR ≥50% in 30% of patients. MBG 2/3 was achieved in 77.7% of patients and STR ≥50% was achieved in 75.1% of patients. By multivariable analysis (including MBG and STR), MBG 2/3 was an independent predictor of lower mortality at 3 years (4.4% vs. 8.4%, adjusted hazard ratio [HR]: 0.57 [0.39 to 0.82], p = 0.003). In contrast, STR ≥50% was not predictive of mortality (5.1% vs. 5.9%, adjusted HR: 1.11 [0.68 to 1.56], p = 0.89). We believe that in aggregate, the data support the concept that MBG and STR represent different aspects of myocardial reperfusion. MBG reflects predominantly the integrity of the microcirculation, but not necessarily the health and stability of the myocardial cells in that territory. STR is principally indicative of the restoration of the transmembrane potential in viable myocardium, even in the presence of compromised microcirculation. The 2 measures offer important, but not mutually exclusive, information.

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