The usefulness of cardiac magnetic resonance in prevention of sudden cardiac death after myocardial infarction

To the Editor,

I have read with a great interest the article entitled "No association between scar size and characteristics on T-wave alternans in postmyocardial infarction patients with relatively preserved ventricular function presented with non-sustained ventricular tachycardia" by Yalın et al. (1) that was recently published in Anatolian J Cardiol 2014;14: 442-7. The authors have evaluated the relationship between two non-invasive modalities to assess the risk of arrhythmic burden in patients with postmyocardial infarction. They have selected a relatively borderline group with preserved ejection fraction and non-sustained ventricular tachycardia on Holter recordings. In this patient population, we have limited knowledge in assessing the risk of sudden death or guiding the most accurate treatment for prevention. Furthermore, the majority of the trials in the era of prevention of sudden death is based on echocardiography-derived ejection fraction thresholds. Today, we know that cardiac magnetic resonance imaging (MRI) is the gold standard to evaluate myocardial function. Therefore, the article by Yalın et al. (1), emphasizes the need for conducting further studies in this borderline group by using cardiac MRI.

Cardiac MRI not only assesses myocardial function and anatomy but also identifies characterization of the tissue and demonstrates viability. Late gadolinium enhancement MRI visualizes the presence of the scar and quantifies the involvement. Proton relaxation times can identify tissue characterization and estimate extracellular volume. T1 and T2 mapping provides information about the edema within the myocardium and assesses the area at risk during acute myocardial infarction (2). Also, perfusion MRI implicates ongoing ischemia or infarction. Those properties may allow selection of the appropriate revascularization strategy and follow-up after treatment (3).

Previous studies demonstrated that incorporating MRI findings increased the success of selecting high-risk patients to prevent sudden death. Scar heterogeneity was found to be a predictor of the appropriate implantable cardioverter defibrillator therapy (4). Midwall fibrosis on late gadolinium enhancement MRI was the strongest independent predictor of sudden cardiac arrest in patients with nonischemic and ischemic cardiomyopathy (5). Scar transmurality, as well as post-infarct scar thickness and left ventricular wall thickness measured by MRI, successfully identified inducible sustained ventricular tachycardia (6). Studies have shown that MRI can detect the foci of the arrhythmic sources by depicting transmural scar and peri-infarct zone, which are landmarks for electrophysiological studies. With the use of novel technology, 3-dimensional electroanatomic mapping can be merged with cardiac MRI scar imaging, allowing ablation of the ventricular arrhythmic substrates.

Those findings suggest that cardiac MRI will be an indispensable tool in the near future to identify high-risk patients who can benefit from revascularization, defibrillator devices, or ablation of the lethal arrhythmias to prevent sudden death after myocardial infarction.

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