DOES GRAY-ZONE LATE GADOLINIUM ENHANCEMENT ENRICH THE PREDICTION OF VENTRICULAR ARRHYTHMIA? A CARDIOVASCULAR MRI STUDY

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Authors: Asghar Fakhri, Harish Manyam, Mohammad Rana, Sourabh Prabhakar, Ronald Williams, William Belden, John Chenarides, Kenneth Judson, Christopher Bonnet, Robert Biederman, The Gerald McGinnis Cardiovascular Institute, Allegheny General Hospital, Pittsburgh, PA, USA

Background: Sudden cardiac death in patients is predominantly caused by ventricular tachycardia (VT)/ventricular fibrillation (VF). Patients who have a low left ventricular ejection fraction (LVEF) and inducible VT during electrophysiologic study (EPS) are at risk of sudden death and may benefit from an implantable cardioverter-defibrillator (ICD) as do patients with low LVEF. However, LVEF’s primacy in predicted SCD has been questioned. Recently, cardiac MRI (CMR) has shown that a determination of myocardial core scar via late gadolinium enhancement (LGE) may predict VT/VF with greater precision than LVEF presumably due its ability to define likely sources of macro-reentry by delineating the ‘gray-zone’ myocardium. We hypothesize that LGE depiction of gray-zone scar is more predictive of VT/VF than LGE core scar assessment.

Methods: A consecutive, retrospective chart review was performed of patients with both a CMR exam for LGE and with post-CMR ICD implantation from 2006-2010 within 30 days. Demographic and clinical events were collected from patient charts and ICD interrogation. Standard LGE (>2SD) and gray-zone (LGE;2-3SD) was manually determined and related as a percent of LV mass to arrhythmic events and ICD therapy.

Results: A total of 45 subjects met our inclusion criteria. These included patients with both ischemic (n=28) and non-ischemic (n=17) cardiomyopathy. In this population, LVEF was not predictive of ICD therapy in univariate or multivariate analysis (p=NS). In contrast, LGE strongly predicted future ICD therapy (combined anti-tachycardia pacing and defibrillation) in the multivariate logistic model (p=0.02), as well as defibrillation alone (p=0.03). LGE gray zone showed a similar trend for defibrillation but did not reach statistical significance (p=0.06).

Conclusions: LGE via CMR is markedly predictive for future ICD therapy delivery in patients with non-ischemic and ischemic cardiomyopathy alike. This marker may prove to be an important stratification variable that will greatly enhance current approaches that have traditionally relied solely on LVEF.