MYOCARDIAL INFARCT HETEROGENEITY ASSESSED BY LATE GADOLINIUM-ENHANCED CARDIOVASCULAR MAGNETIC RESONANCE (LGE-CMR) IS ASSOCIATED WITH THE DEVELOPMENT OF VENTRICULAR TACHYCARDIAS AFTER ACUTE MYOCARDIAL INFARCTION

ACC Oral Contributions
McCormick Place South, S404
Sunday, March 25, 2012, 11:00 a.m.-11:15 a.m.

Session Title: Cardiac MRI for the Treatment and Evaluation of Arrhythmias
Abstract Category: 17. Arrhythmias: VT
Presentation Number: 918-4

Authors: Lourens Robbers, Ronak Delewi, Michiel Kemme, Robin Nijveldt, Aernout Beek, Alexander Hirsch, Anja Van Der Laan, Pieter van der Vleuten, Jan Piek, Felix Zijlstra, Albert van Rossum, VU University Medical Center, Amsterdam, The Netherlands, Interuniversity Cardiology Institute of the Netherlands, Utrecht, The Netherlands

Background: Infarct heterogeneity, visualized by LGE-CMR may identify patients with increased risk for developing ventricular arrhythmias after an acute myocardial infarction (AMI). We assessed the association between the amount of heterogeneity after revascularized AMI and the prevalence of ventricular arrhythmias.

Methods: Two-hundred patients after AMI, treated with primary percutaneous coronary intervention (PCI) underwent LGE-CMR after 3-7 days and Holter registration after 1 month. Paired data sets were available in 162 patients. With LGE-CMR, total infarct size was quantified and divided into a core zone and a penumbra (border zone), using the full-width at half-maximum technique (core: 50-100%, penumbra: 25-50% of maximal signal intensity). From Holter registration we measured the amount of ventricular tachycardias (VTs), defined as any ventricular arrhythmia consisting of >4 successive PVCs.

Results: In all patients, the mean total infarct size was 31±11% of the left ventricle. The infarcted area consisted for 61±11% of core zone and for 39±11% of penumbra. Twenty-nine patients (18%) had ventricular tachycardias. When present, ventricular tachycardias occurred with a median of 1 (IQR 1-3) episode per 24 hours. Patients with VTs had significantly smaller total infarct sizes than patients without VTs (VT: 27±12% vs. no VT: 32±11%, p=0.04), but these infarcts consisted of more penumbra within the infarcted area (VT: 45±11% of the infarct vs. no VT: 38±11%, p=0.002). Enlarged penumbra size increased the odds of ventricular tachycardias (OR 1.1, p=0.003). When using a multivariate logistic regression analysis, only the presence of ventricular fibrillation before PCI (OR 5.5, p=0.01) and the percentage of penumbra within the infarcted area (OR 1.1, p=0.04) were independently associated with an increased incidence of ventricular arrhythmias.

Conclusion: Directly after AMI, an increased proportion of penumbra within the infarct is already associated with increased odds of developing ventricular arrhythmias. Further research of the penumbra and its heterogeneity with LGE-CMR may offer additional options to identify patients at risk for developing ventricular arrhythmias.