Myocardial fibrosis as a predictor of sudden death in patients with coronary artery disease

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BACKGROUND The 'grayzone' of myocardial fibrosis (GZF) on cardiovascular magnetic resonance may be a substrate for ventricular arrhythmias (VAs).

OBJECTIVES To determine whether GZF predicts SCD and VAs (ventricular fibrillation or sustained ventricular tachycardia) in patients with coronary artery disease (CAD) and a wide range of LVEFs.

METHODS In this retrospective study of CAD patients, myocardial fibrosis presence on visual assessment (MFVA) and GZF mass in patients with MFVA was assessed in relation to SCD and the composite, arrhythmic endpoint of SCD or VAs.

RESULTS Among 979 patients (age: 65.8 ± 12.3 yrs [mean ± SD]), 29(2.96%) suffered a SCD and 80(8.17%) met the arrhythmic endpoint over 5.82 years (median; interquartile range: 4.1-7.3). In the whole cohort, MFVA was strongly associated with SCD (hazard ratio [HR]:10.1, 95% CI 1.42-1278.9) and the arrhythmic endpoint (HR:28.0, 95% CI 4.07-3525.4). In competing risks analyses, associations between LVEF < 35% and SCD (subdistribution HR [sHR]:2.99, 95% CI 1.42-6.31) and the arrhythmic endpoint (sHR:4.71, 95% CI 2.97-7.47) were weaker. In competing risks analyses of the MFVA subcohort (n = 832), GZF using the 3SD method (GZF3SD) > 5.0 g was strongly associated with SCD (sHR:10.8, 95% CI 3.74-30.9) and the arrhythmic endpoint (sHR:7.40, 95% CI 4.29-12.8). Associations between LVEF < 35% and SCD (sHR:2.62, 95% CI 1.24-5.52) and the arrhythmic endpoint (sHR:4.14, 95% CI 2.61-6.57) were weaker.

CONCLUSIONS In CAD patients, MFVA plus quantified GZF3SD mass was more strongly associated with SCD and VAs than LVEF. In selecting patients for implantable cardioverter defibrillators, assessment of MFVA followed by quantification of GZF3SD mass may be preferable to LVEF.

Abstract Figure.