



Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

NORMAL FINDINGS ON NONINVASIVE CARDIAC ASSESSMENT AND THE PREDICTION OF HEART FAILURE: THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS (MESA)

Poster Contributions
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Background: We hypothesized that concomitant presence of normal findings on routine electrocardiogram (ECG) and cardiac magnetic resonance imaging (MRI) identifies a group at low risk to develop heart failure (HF) which could improve prediction of HF in the general population.

Methods: This analysis included 4,986 (mean age=62 ± 10 years; 52% women; 39% White; 13% Chinese-American; 26% Black; 22% Hispanic) participants with complete ECG and cardiac MRI data from the Multi-Ethnic Study of Atherosclerosis who were free of baseline HF. A normal ECG was defined as the absence of major ECG abnormalities as defined by Minnesota ECG Classification, and a normal MRI was defined as the absence of contractile dysfunction (EF<55%) or abnormal left ventricular mass (>95th percentile). Cox regression was used to compute the risk of developing HF events across different combinations of normal ECG and MRI.

Results: There were 3,988 (80%) participants with normal findings on both measures, 894 (18%) with either a normal ECG or normal MRI, and 104 (2%) with abnormal findings on both ECG and MRI. Over a median follow-up of 12.2 years, a total of 177 (3.6%) HF events were detected. Both normal ECG and MRI separately were associated with lower risk of HF and their combination was associated with much lower risk (Table).

Conclusions: Normal findings on noninvasive cardiac assessment identify individuals in whom the risk of HF is low. Further studies are needed to explore the utility of this low-risk profile in HF prevention strategies.

Table: Risk of Heart Failure Associated with Different Combinations of Normal ECG and MRI					
Category	Events/No at risk	Model 1* HR (95%CI)	P-value	Model 2† HR (95%CI)	P-value
Abnormal ECG	56/524	Ref	-	Ref	-
Normal ECG	121/4,462	0.34 (0.25, 0.47)	<0.001	0.41 (0.29, 0.56)	<0.001
Abnormal MRI	53/578	Ref	-	Ref	-
Normal MRI	124/4,408	0.31 (0.23, 0.43)	<0.001	0.32 (0.23, 0.45)	<0.001
Abnormal ECG + Abnormal MRI	26/104	Ref	-	Ref	-
Normal ECG or Normal MRI	57/894	0.22 (0.14, 0.35)	<0.001	0.27 (0.17, 0.44)	<0.001
Normal ECG + Normal MRI	94/3,988	0.10 (0.07, 0.16)	<0.001	0.13 (0.08, 0.21)	<0.001

*Adjusted for age, sex, and race/ethnicity.
†Adjusted for Model 1 with the addition of systolic blood pressure, diabetes, body mass index, total cholesterol, high-density lipoprotein cholesterol, smoking, antihypertensive medications, lipid-lowering therapies, and aspirin.
CI=confidence interval; ECG=electrocardiogram; HR=hazard ratio; MRI=magnetic resonance imaging.