SUPPLEMENTAL MATERIAL

Table S1. Hazard ratio's (95% CIs) showing the association between CAC progression and incident heart failure in participants with available measurements of baseline NT-proBNP.

Models (Number of events/analyzed)	Model 1* (142/4664)	Model 2† (135/4497)	Model 3‡ (75/4214)
Absolute changes in CAC per year§	**1.06**	**1.02**	**1.03**
	(1.05-1.07)	**(1.003-1.04)**	**(1.001-1.05)**
Progressors vs. non-progressors	**2.68**	1.21	1.22
	(1.92-3.73)	(0.83-1.75)	(0.74-2.03)

Statistically significant HRs (95% CIs) are showed in bold. *Model1: unadjusted. †Model 2: adjusted for age, gender, race, BMI, systolic blood pressure (SBP), diastolic blood pressure (DBP), use of antihypertensive medication, total cholesterol, high density lipoprotein (HDL) cholesterol, use of lipid lowering medication, diabetes, cigarette smoking status, heart rate, creatinine, highest education level, household income , baseline CAC score and N-terminal prohormone of brain natriuretic peptide (NT-proBNP , all covariates from Exam 1) .‡ Model3: Model 3 after excluding participants with any coronary heart diseases. §Hazard ration per 10 U annual increase in CAC.

Table S2. Comparing the parameter of LV function and structure measured by cardiac magnetic resonance in participants with baseline CAC=0 and participants with baseline CAC>0

MRI parameter at Exam 5 (unit)	Baseline CAC=0	Baseline CAC>0	P value
EF (%)	62.2 ± 7.1	61.6 ± 7.4	**0.01**
SV (ml/m^2)	40.2 ± 8.2	39.1 ± 8.8	**0.001**
LVEDV (ml/m^2)	64.9 ± 13.1	64.1 ± 14.8	0.1
LVESV (ml/m^2)	24.7 ± 8	24.9 ± 9.1	0.52
LM (gram/m^2)	64.5 ± 13.3	68.1 ± 13.7	**<0.001**
MVR (gram/ml)	1 ± 0.2	1.1 ± 0.2	**<0.001**

Statistically significant p-values are showed in bold. CAC: coronary artery calcium, EF: ejection fraction; SV: stroke volume; LVEDV: left ventricular end diastolic volume; LVESV: left ventricular end systolic volume; LVM: left ventricular mass; MVR: mass to volume ration.

Table S3. Estimated regression coefficients and their 95% confidence intervals showing the association between CAC progression and the left ventricular function and structure measures by cardiac MRI in participants with baseline CAC=0.

	Models(n)	Absolute changes in CAC per year‡	Progressors vs. non- progressors
EF	Model 1* (1545)	-0.48 (-2.04 to 1.08)	-0.22 (-1.21 to 0.77)
	Model 2† (1521)	-0.38 (-1.96 to 1.18)	-0.11 (-1.11 to 0.89)
SV	Model 1 (1544)	1.26 (-0.53 to 3.05)	0.16 (-0.98 to 1.30)
	Model 2 (1520)	0.93 (-0.87 to 2.73)	0.12 (-1.03 to 1.27)
LVEDV	Model 1 (1544)	**2.96 (0.21 to 5.70)**	0.75 (-0.99 to 2.50)
	Model 2 (1520)	2.22(-0.52 to 4.97)	0.50 (-1.26 to 2.25)
LVESV	Model 1 (1544)	**1.7 (0.02 to 3.37)**	0.59 (-0.47 to 1.65)
	Model 2 (1520)	1.29 (-0.38 to 2.95)	0.37 (-0.69 to 1.44)
LVM	Model 1 (1544)	**2.45 (0.11 to 4.78)**	0.77 (-0.71 to 2.25)
	Model 2 (1520)	2.10 (-0.25 to 4.45)	0.75 (-0.74 to 2.25)
MVR	Model 1 (1545)	-0.01 (-0.06 to 0.03)	0.01 (-0.02 to 0.04)
	Model 2 (1521)	-0.01 (-0.05 to 0.04)	0.01 (-0.02 to 0.04)

Statistically significant coefficients (95% CIs) are showed in bold.*Model 1: adjusted for age, sex, race, BMI, systolic blood pressure (SBP), diastolic blood pressure (DBP), use of antihypertensive medication, total cholesterol, high density lipoprotein (HDL) cholesterol, use of lipid lowering medication, diabetes , cigarette smoking status, heart rate, creatinine, highest education level, household income and baseline CAC score (Exam 1).† Model2: Model 1 after excluding participants with any coronary heart diseases. ‡Coefficient (95% CI) per 10 Agatston Unit annual increase in CAC. CAC: coronary artery calcium, EF: ejection fraction; SV: stroke volume; LVEDV: left ventricular end diastolic volume; LVESV: left ventricular end systolic volume; LVM: left ventricular mass; MVR: mass to volume ration.

Table S4. Estimated regression coefficients and their 95% confidence intervals showing the association between CAC progression and the left ventricular function and structure measures by cardiac MRI in participants with baseline CAC>0.

	Models(n)	Absolute changes in CAC per year‡	CAC progression vs. no progression
EF	Model 1* (1176)	-0.02 (-0.1 to 0.06)	-0.32 (-1.19 to 0.54)
	Model 2† (1077)	-0.05 (-0.13 to 0.03)	0.01 (-0.87 to 0.89)
SV	Model 1 (1175)	0.05 (-0.05 to 0.15)	0.58 (-0.44 to 1.61)
	Model 2 (1076)	0.04 (-0.06 to 0.15)	0.83 (-0.24 to 1.90)
LVEDV	Model 1 (1176)	0.12 (-0.05 to 0.28)	1.55 (-0.12 to 3.23)
	Model 2 (1077)	0.15 (-0.02 to 0.32)	1.35 (-0.33 to 3.04)
LVESV	Model 1 (1175)	0.07 (-0.03 to 0.17)	0.97 (-0.07 to 2.01)
	Model 2 (1076)	**0.11 (0.01 to 0.20)**	0.52 (-0.45 to 1.49)
LVM	Model 1 (1176)	0.07 (-0.06 to 0.21)	0.68 (-0.72 to 2.09)
	Model 2 (1077)	0.09 (-0.06 to 0.23)	0.56 (-0.91 to 2.04)
MVR	Model 1 (1177)	-0.001 (-0.003 to 0.001)	-0.01 (-0.04 to 0.01)
	Model 2 (1078)	-0.001 (-0.003 to 0.001)	-0.01 (-0.04 to 0.01)

Statistically significant coefficients (95% CIs) are showed in bold. *Model 1: adjusted for age, sex, race, BMI, systolic blood pressure (SBP), diastolic blood pressure (DBP), use of antihypertensive medication, total cholesterol, high density lipoprotein (HDL) cholesterol, use of lipid lowering medication, diabetes, cigarette smoking status, heart rate, creatinine, highest education level, household income and baseline CAC score (Exam 1). † Model2: Model 1 after excluding participants with any coronary heart diseases. ‡Coefficient (95% CI) per 10 Agatston Unit annual increase in CAC. CAC: coronary artery calcium, EF: ejection fraction; SV: stroke volume; LVEDV: left ventricular end diastolic volume; LVESV: left ventricular end systolic volume; LVM: left ventricular mass; MVR: mass to volume ration.