

SUPPLEMENTAL MATERIAL

Table S1. Pearson Correlation Coefficients of AI MAPSE, GL-Shortening, GL-Strain, EF, EDV, ESV, and LGE mass.

	MAPSE	GL-Shortening	GL-Strain	EF	EDV	ESV	LGE mass
MAPSE	-	0.84 P<.0001	0.79 P<.0001	0.68 P<.0001	-0.28 P<.0001	-0.52 P<.0001	-0.36 <.0001
GL-Shortening	-	-	0.92 P<.0001	0.83 P<.0001	-0.56 P<.0001	-0.73 P<.0001	-0.47 P<.0001
GL-Strain	-	-	-	0.85 P<.0001	-0.57 P<.0001	-0.74 P<.0001	-0.45 P<.0001
EF	-	-	-	-	-0.66 P<.0001	-0.86 P<.0001	-0.50 P<.0001

Table S2. Summary of the net reclassification index (NRI) and the integrated discriminant improvement (IDI) analysis for MAPSE and GL-shortening against EF and GL-Strain. With the addition of MAPSE or GL-shortening to univariable Cox regression models with either EF or GL-Strain, NRI and IDI parameters were all significant for except for when GL-shortening was compared to GL-Strain, which may relate to their correlation (R=0.79, p<0.001). Fully adjusted multivariable models yielded significant continuous NRI parameters, but not categorical NRI or IDI parameters.

	Univariable				Multivariable*			
	type	NRI	NRI Percentile method 95% Bootstrap CI	P-value	type	NRI	NRI Percentile method 95% Bootstrap CI	P-value
MAPSE vs. EF	Continuous NRI	0.4377	(0.2949, 0.5727)	<.001	Continuous NRI(>0)	0.3228	(0.1818, 0.4275)	<.001
MAPSE vs. EF	Categorical NRI (0.05 0.35)	0.1735	(0.1172, 0.2412)	<.001	User NRI(0.05 0.35)	0.0225	(-0.0223, 0.0655)	0.38
GL-Shorting vs. EF	Continuous NRI	0.4389	(0.3284, 0.5557)	<.001	Continuous NRI(>0)	0.2504	(0.1091, 0.3539)	<.001
GL-Shorting vs. EF	Categorical NRI (0.05 0.35)	0.0752	(0.0151, 0.1189)	<.001	User NRI(0.05 0.35)	-0.0061	(-0.04, 0.025)	0.7
MAPSE vs. GL-Strain	Continuous NRI	0.3272	(0.174, 0.4977)	<.001	Continuous NRI(>0)	0.2568	(0.1353, 0.4145)	<.001
MAPSE vs. GL-Strain	Categorical NRI (0.05 0.35)	0.1212	(0.0627, 0.1739)	<.01	User NRI(0.05 0.35)	0.0325	(-0.0283, 0.0812)	0.24
GL-Shortening vs. GL-Strain	Continuous NRI(>0)	0.1813	(0.038, 0.3242)	0.00	Continuous NRI(>0)	0.1953	(0.0848, 0.3205)	<.001
GL-Shortening vs. GL-Strain	User NRI(0.05 0.35)	0.0179	(-0.0209, 0.0464)	0.32	User NRI(0.05 0.35)	-0.0041	(-0.0297, 0.0216)	0.8
	IDI	IDI Percentile method 95% Bootstrap CI	P-value		IDI	IDI Percentile method 95% Bootstrap CI	P-value	
MAPSE vs. EF	0.0123	(0.0096, 0.016)	<.001		.0059	(0.0007, 0.0105)	0.02	
GL-Shorting vs. EF	.0056	(0.004, 0.0074)	<.001		.0016	(-0.0013, 0.0049)	0.28	
MAPSE vs. GL-Strain	.0073	(0.0053, 0.0098)	<.001		.003	(-0.0017, 0.0062)	0.2	
GL-Shortening vs. GL-Strain	.001	(0.0002, 0.0017)	0.02		-.0003	(-0.0019, 0.0009)	0.76	

*adjusted for age, sex, white race, diabetes, hypertension, current or prior smoking, hyperlipidemia, glomerular filtration, percutaneous coronary intervention, coronary artery bypass surgery, atrial fibrillation, moderate or severe mitral regurgitation, moderate or severe aortic stenosis, left ventricular mass index, end diastolic volume index, myocardial infarction on LGE, nonischemic myocardial scar on LGE, and extracellular volume (ECV).

Figure S1. Multi-variable Cox modeled curves for outcomes for GLS, GL-Shortening and MAPSE. These results are for HHF or death.

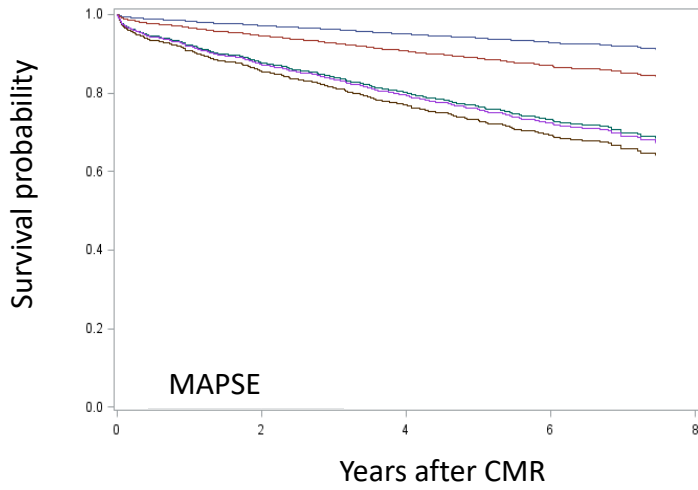
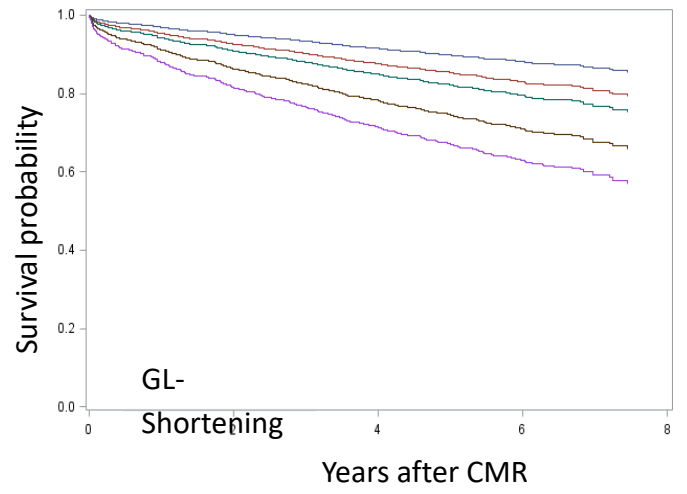
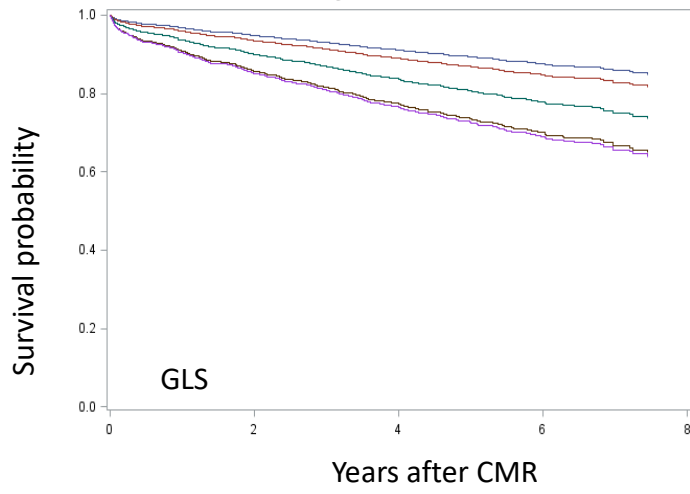
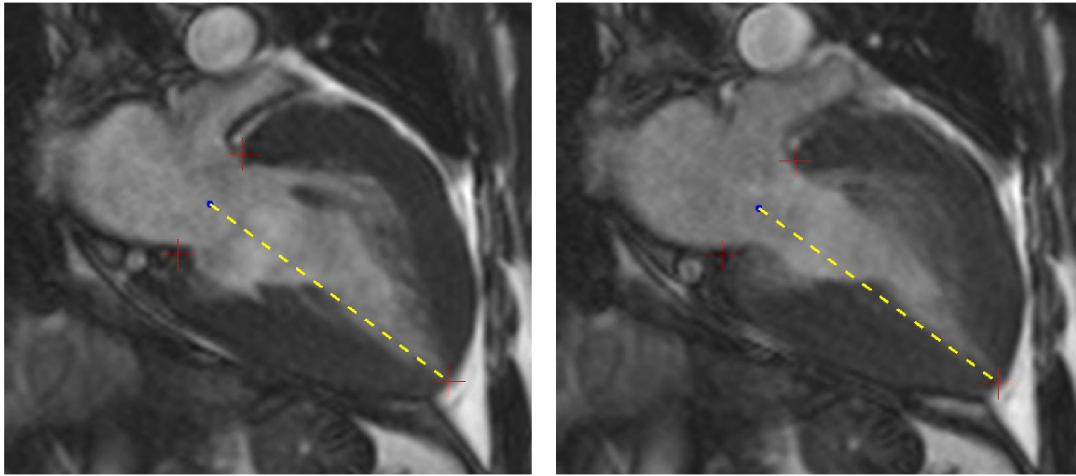
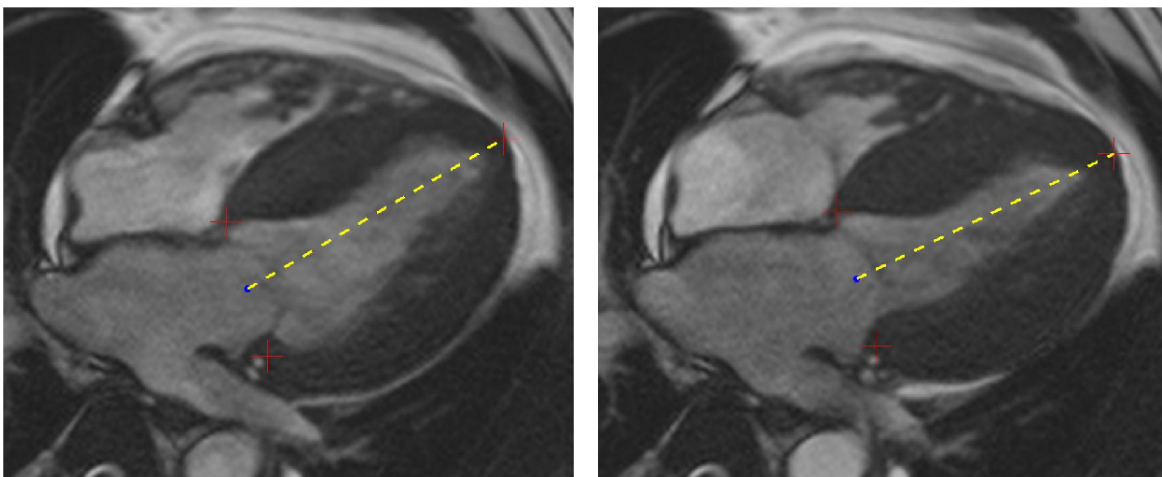


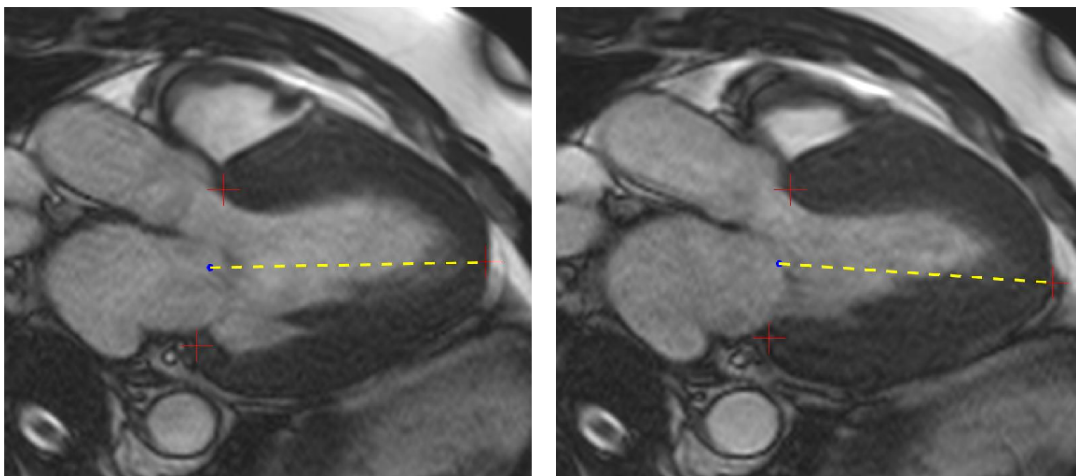
Figure S2. Examples of landmark detection for a patient with the hypertrophic cardiomyopathy. This is a male patient, 45 years old, with elevated LV mass (396g) and reduced cardiac function. The AI model correctly detected the landmark points on (a) CH2, (b) CH4, and (c) CH3 cine views, for both end-diastolic (left column) and end-systolic (right column) phases. The AI derived GL-Shortening is 3.02%, consistent with impaired contractibility.



(a) CH2, ES and ED phases



(b) CH4, ES and ED phases



(c) CH3, ES and ED phases

Supplemental Video Legends:

Video S1. Examples of AI based landmark detection from long-axis CH2 images.

Video S2. Examples of AI based landmark detection from long-axis CH3 images.

Video S3. Examples of AI based landmark detection from long-axis CH4 images.

Video S4. Illustration of cine acquisition, image reconstruction, and inline processing to report AI GL-Shortening and MAPSE on the MR scanner. Output image series include the raw cine images, the cine images with landmarks, summary report and plots which include LV length and LV shortening vs cardiac phase, longitudinal shortening velocity for septal and lateral wall, and measurement of mitral annular valve diameter at ES and ED.