APPENDIX A

Statistical Methods

Multiple imputation was used to generate 20 complete data sets for the primary analyses. The number of imputations was chosen based on the extent of missingness and an initial assessment using the approach of von Hippel.[1] His method indicated a minimum of 16 imputed data sets would be needed. Twenty were selected because of uncertainty of his method. Initial covariates were selected based on previous literature. Predictive mean matching (PMM) was used to impute missing continuous variables.[2,3] The advantage of PMM is that it guarantees imputed values within the range of observed values whereas specifying a theoretical distribution to draw from (e.g., normal distribution) may result in invalid values. Binary logistic regression was used to impute missing binary variables.

A 2-stage analytic strategy was used with elastic-net regression[4] for candidate screening followed by Cox proportional hazards regression[5,6] for final model estimation. Penalized regression using elastic-net methodology was applied as a candidate-screening and variable-reduction step to identify predictors of the composite primary and secondary events across the multiply imputed data sets. Elastic-net tuning parameters were set at 1.0, 0.75, and 0.5 and were applied to all imputed data sets. Variables were ranked according to the number of imputed data sets in which they were selected. Cox proportional hazards regression models were then fit using predictors identified in the elastic-net analysis. This 2-stage approach was used to retain clinically interpretable final models while evaluating whether parsimonious models preserved discrimination and calibration.

Model performance was assessed by the c-index (discrimination) and calibration (fit of the model to the data).[5] The latter was assessed by comparing the observed event-free function to the predicted event-free function. Variation in the C-index and calibration slope are presented as the minimum and maximum values over the 20 imputed data sets. The proportional hazards assumption was checked by scaled Shoenfeld residuals.[6]

"Full models" were defined by elastic-net selected variables that appeared in 2 or more of the 20 imputed data sets. Reduced models were assessed by the log-likelihood ratio test and comparing the c-indices of the "full" and "reduced" models. A non-significant ($p > 0.05$) likelihood ratio test was considered to indicate that the more parsimonious model was appropriate. In addition, models based on elastic-net inclusion of 10 or more variables as the "full model" and inclusion of variables appearing in all 20 data sets as the "full model" were tested by the log-likelihood test (Table X1).

Regression coefficients were the average of coefficients for each variable over all imputed data sets. Estimated variance includes both within- and between-data set variance and adjusts for an increase in variance as a function of missing data.[2] Model internal validation was assessed by bootstrapping, with the model-building procedure repeated within bootstrap samples to estimate optimism in parameter estimates and model performance. Validation was also assessed by generating a separate set of imputed data sets and applying the model developed from the original imputed data sets. Overlap of the 95% confidence intervals for each variable in the model was the primary comparison of interest. For each model, a complete case (CC) analysis was performed to compare hazard ratios and 95% confidence intervals with imputed results. Stata v.19 (Stata Corp. College Station, TX) was used for all analyses.

Table A1. Elastic-net variable selection for primary composite – time to first event.

Variable #	Variable	# data sets
1	LGE %	20
2	LV Mass Index	20
3	LVESV Index	20
4	History of heart failure	20
5	Ln(NTProBNP)	20
6	LA Contractile %	19
7	BAP	15
8	Reservoir %	13
9	LVEF	13
10	LA Volume Index	8
11	ST2	3
12	Apical morphology	1
13	Type II DBM	1
14	CICP	1
15	History of stroke	1

References

1. von Hippel PT. How Many Imputations Do You Need? A Two-stage Calculation Using a Quadratic Rule. *Sociological methods & research.* 2020;49(3):699-718.
2. van Buuren S. Flexible imputation of missing data. In: *CRC Interdisciplinary Statistics.* Boca Raton, FL: CRC Press; 2012.
3. Berglund P, Heeringa S. *Multiple Imputation of Missing Data Using SAS.* Cary, N.C.: SAS Press; 2014.
4. Zou H, Hastie T. Regularization and variable selection via the elastic net. *J Royal Statistical Soc Series B (Statistical Methodology).* 2005;67:20.
5. Harrell FJ. *Regression Modeling Strategies.* 2nd ed. New York: Springer; 2015.
6. Hosmer D, Lemeshow S. *Applied Survival Analysis.* John Wiley & Sons, New York; 1999.

APPENDIX B

Colinearity of LGE and LGE%

The correlation between LGE and LGE% was 0.94 (C.I. 0.935 – 0.944) indicating that they would likely be colinear if both were included in a time-to-event model, i.e., only one would be necessary to include. To test this, two models, one with LGE and one with LGE% with the same set of covariates were estimated. The covariates were those selected by the elastic-net analysis for the primary composite event, first event. The results are presented in Table B1.

Table B1. Comparison of LGE% and LGE time to first event models.

Model 1	Model 2	Hazard Ratio (95% CI) Model 1	Hazard Ratio (95% CI) Model 2
LGE %	LGE	1.83 (1.52 – 2.20)	1.44 (1.27 – 1.64)
LV Mass(i)	LVMI	1.11 (1.03 – 1.19)	1.08 (1.00 – 1.16)
LVESV(i)	LVESVI	1.15 (0.91 – 1.46)	1.10 (0.87 – 1.38)
LVEF	LVEF	0.86 (0.58 – 1.26)	0.83 (0.57 – 1.22)
Hx heart failure	Hx heart failure	2.38 (1.38 – 4.10)	2.39 (1.37 – 4.15)
Log(NTProBNP)	Log(NTProBNP)	1.31 (1.08 – 1.59)	1.32 (1.08 – 1.61)
LA Contractile %	LA Contractile %	0.92 (0.78 – 1.09)	0.93 (0.79 – 1.09)
Hx Afib	Hx Afib	1.41 (0.86 – 2.32)	1.46 (0.89 – 2.39)
Reservoir %	Reservoir %	0.91 (0.73 – 1.14)	0.90 (0.73 – 1.13)

Hazard ratios expressed in units of 10 for continuous variables except Log(NTProBNP).

The hazard ratios for LGE and LGE% would, of course, be different, but the hazard ratios of the other covariates were similar and there was a high degree of overlap in the 95% confidence intervals. Thus, a model with either LGE or LGE% results in essentially the same hazard ratios and confidence intervals for the other variables in the model. LGE% was subsequently used in all models since it is the measure most commonly used clinically.

Appendix C

Appendix C presents additional information with respect to the primary and secondary outcomes. Table C1 presents summary statistics and missing value information for the entire sample of 2698 patients. Excluding NSVT, ESC risk score and ECV, 500 patients (18.5%) had at least one missing value.

Tables C2, C4 and C6 present results of the bias correction analysis for the primary composite time to first event, multiple events and ventricular arrhythmia events respectively. These analyses bootstrapped (250 replicates) model results and assessed the difference between model predicted hazard ratios and 95% confidence intervals and the bootstrapped results. For all outcomes, the bias was small: there was little difference between the model hazard ratios and bootstrapped hazard ratios. In addition, the 95% confidence intervals were essentially overlapping.

Tables C3, C5 and C7 presents results from applying the prediction model developed from the original 20 imputed data sets to a different 20 sets. The original hazard ratios for each model are close to those from the validation set for all outcomes and the 95% confidence intervals for each parameter are essentially overlapping.

Figures C1, C2 and C3 present calibration plots for several variables from each outcome model. The observed event-free curves and the model predicted curves overlap across follow-up time for all three outcomes, even for more extreme values at the 75^{th} and 95^{th} percentiles.

Table C1. Summary statistics for variables potentially predicting time to event.

Demographic/Clinical	Valid n	Summary statistic	Minimum value	Maximum value	Missing (%)
Age (years)	2696	50.0 (11.3)	18	68	2 (0.1)
Male	2698	1919 (71.3)	0	1	0 (0.0)
Minority	2696	423 (15.7)	0	1	2 (0.1)
BMI (kg/m^2)	2694	29.3 (5.7)	15.4	58.4	4 (0.2)
Hx hypertension	2689	978 (36.4)	0	1	9 (0.3)
Hx heart failure	2689	139 (5.2)	0	1	9 (0.3)
Hx hospitalization for HF	2689	53 (2.0)	0	1	9 (0.3)
Hx stroke	2689	76 (2.8)	0	1	9 (0.3)
Family Hx HCM	2685	905 (33.7)	0	1	13 (0.5)
Family Hx SCD	2686	328 (12.2)	0	1	12 (0.4)
Type II diabetes	2689	211 (7.8)	0	1	9 (0.3)
Hx syncope	2689	359 (13.3)	0	1	9 (0.3)
Hx dyspnea	2689	1163 (43.3)	0	1	9 (0.3)
NYHA Class III/IV	2655	193 (7.3)	0	1	43 (1.6)
Current smoker	2688	378 (14.1)	0	1	10 (0.4)
Hx arrhythmia	2686	492 (18.3)	0	1	12 (0.4)
LVOT gradient > 30 mmHg	2698	495 (18.4)	0	1	0 (0.0)
Hx Atrial fibrillation	2686	318 (11.8)	0	1	12 (0.4)
Mitral regurgitation II/III	2673	68 (2.5)	0	1	25 (0.9)
ESC risk score	1487	2.4 (2.1-2.8)	1.2	5.0	1211 (44.9)
NSVT on monitoring	1617	195 (12.1)	0	1	1081 (40.1)
Morphology					
Isolated basal septal	2610	1188 (44.0)	0	1	88 (3.3)
Reverse curvature	2610	1052 (43.0)	0	1	88 (3.3)
Apical	2610	224 (8.6)	0	1	88 (3.3)
Concentric	2610	36 (1.4)	0	1	88 (3.3)
Apical aneurysm	2610	77 (2.9)	0	1	88 (3.3)
Other morphology	2610	33 (1.3)	0	1	88 (3.3)
Genetic					
Sarcomere mutation (+)	2589	931 (36.0)	0	1	109 (4.0)
CMR					
LVMI	2562	85.4 (27.3)	24.1	236.3	136 (5.0)
LGE (g)	2596	3.2 (7.2)	0.0	106.4	102 (3.8)
LGE % (of LV mass)	2532	1.8 (4.1)	0.0	73.3	166 (6.2)
LVEDVI	2562	84.9 (16.9)	28.6	161.0	136 (5.0)
LVESVI	2562	31.1 (11.5)	6.9	113.1	136 (5.0)
LVEF (%)	2562	64.0 (8.5)	26.1	84.9	136 (5.0)
LVSVI	2562	53.8 (10.5)	17.4	100.6	136 (5.0)
LV Mass/Volume ratio	2562	1.0 (0.3)	0.3	2.5	136 (5.0)
RVEDVI	2562	75.3 (16.1)	22.8	144.9	136 (5.0)
RVESVI	2562	24.4 (10.9)	1.8	83.2	136 (5.0)

RVEF (%)	2562	68.3 (10.4)	30.2	95.6	136 (5.0)
Max wall thickness (mm)	2562	20.7 (4.8)	9.0	45.0	136 (5.0)
LAVI	2506	58.7 (21.2)	4.6	272.1	192 (7.1)
LA reservoir (%)	2512	35.0 (10.1)	0.5	70.7	186 (6.9)
LA contractile (%)	2512	46.6 (13.4)	0.8	81.9	186 (6.9)
ECV	1965	0.30 (0.05)	0.20	0.68	733 (27.2)
Biomarkers					
NT-Pro-BNP (pg/ml)	2641	547.0 (1000.1)	5.3	29,658.0	57 (2.1)
cTNT (pg/ml)	2641	15.9 (44.2)	6.0	2083.0	57 (2.1)
GAL3 (pg/ml)	2567	6959.1 (4525.2)	367	83,393	131 (4.9)
ST2 (pg/ml)	2610	19,281.8 (11,517.3)	1078	235,600	88 (3.3)
MMP1 (pg/ml)	2606	467.2 (515.3)	27	8965	92 (3.4)
TIMP1 (pg/ml)	2610	120,938 (34,582)	692	503,890	88 (3.3)
CICP (ng/ml)	2610	10.3 (5.9)	1.9	153	88 (3.3)
BAP (U/ml)	2579	18.6 (6.2)	4.0	84.6	119 (4.4)

Values are mean (1 SD) for continuous variables, n (%) for binary variables. Mean and percentage calculations reflect number of patients with valid observations.

I indicates “index”

Atrial fibrillation includes paroxysmal or persistent. NSVT - Non-sustained ventricular tachycardia; ECV – Extra cellular volume; BAP - bone alkaline phosphatase; BMI - body mass index; CICP - C-terminal propeptide of type 1 procollagen; CMR - cardiac magnetic resonance; cTnT - cardiac troponin T; ECG - electrocardiogram; EDV - end diastolic volume; ESV - end systolic volume; GAL3 - galectin-3; HCM - hypertrophic cardiomyopathy; LA - left atrial; LAV - left atrial volume; LGE - late gadolinium enhancement; LV - left ventricular; LVEF - left ventricular ejection fraction; LVOT - left ventricular outflow tract; LVSV - left ventricular stroke volume; MMP1 – matrix metalloproteinase-1; MR - mitral regurgitation; NT-proBNP - N-terminal probrain natriuretic peptide; NYHA - New York Heart Association; PAF - paroxysmal atrial fibrillation; RV - right ventricular; RVEF – right ventricular ejection fraction; ST2 - suppression of tumorigenicity 2; TIMP1-tissue inhibitor metalloproteinase-1.

Time to first composite event.

Table C2. Bootstrap bias correction for time to first composite event model.

Variable	HR observed	HR biased corrected	95% CI Observed	95% CI biased corrected
LGE%	1.86	1.87	1.58 – 2.20	1.49 – 2.39
LVMI	1.09	1.09	1.01 – 1.17	1.01 – 1.17
LVESVI	1.28	1.27	1.12 – 1.46	1.10 – 1.45
Hx HF	2.89	2.78	1.75 – 4.77	1.70 – 4.77
Log(NTProBNP)	1.41	1.42	1.17 – 1.70	1.17 – 1.70

LGE%, LVMI and LVEF parameters expressed in units of 10, NTProBNP 1 log unit.

Table C3. Validation of first primary event model with a different imputed data set.

Variables	Observed Model	Validation Model
LGE %	1.86 (1.58 – 2.20)	1.86 (1.58 – 2.20)
LVMI	1.09 (1.01 – 1.17)	1.08 (1.00 – 1.16)
LVESVI	1.28 (1.12 – 1.46)	1.28 (1.13 – 1.46)
Hx heart failure	2.89 (1.75 – 4.77)	2.93 (1.77 – 4.84)
log(NTProBNP)	1.41 (1.17 – 1.70)	1.42 (1.18 – 1.70)

Validation model estimated from different 20 imputed data sets.
LGE%, LVMI and LVESVI hazard ratios expressed in units of 10.
NTProBNP hazard ratio expressed in 1 log unit.

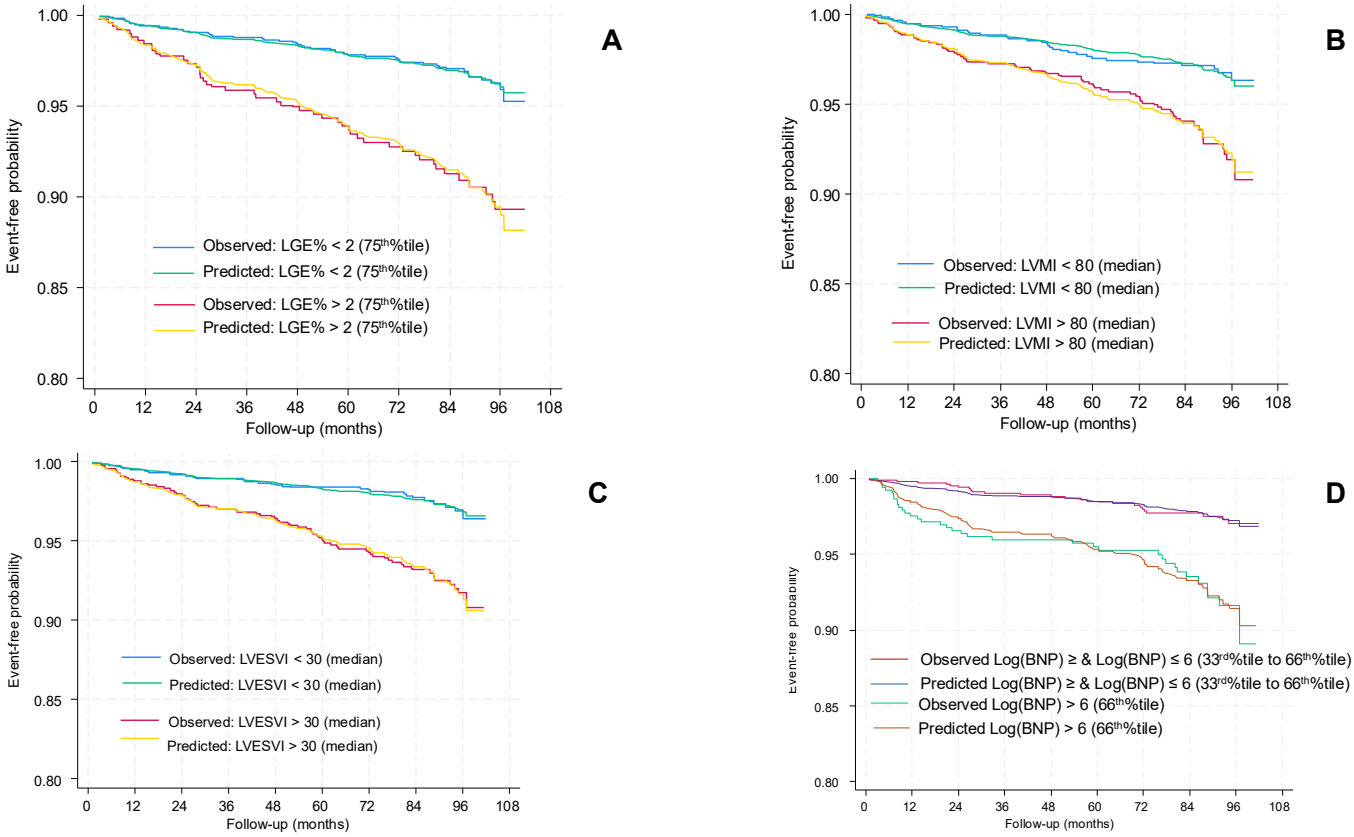

Figure C1. Calibration plots of selected values of LGE% (A), LVMI (B), LVESVI (C) and Log(NTProBNP) (D) for time to first event model.

Multiple event analysis.

Table C4. Bootstrap bias correction for primary outcome multiple event model.

Variable	HR observed	HR biased corrected	95% CI Observed	95% CI biased corrected
LGE%	1.97	1.99	1.65 – 2.34	1.64 – 2.51
LVMI	1.10	1.11	1.04 – 1.17	1.03 – 1.18
LVESVI	1.26	1.26	1.12 – 1.43	1.12 – 1.42
Hx HF	2.91	2.84	1.77– 4.79	1.81 – 4.62
Stratified Log(NTProBNP	2.10	2.12	1.53 – 2.90	1.48 – 2.98

LGE%, LVMI and LVESI parameters expressed in units of 10, Log(NTProBNP stratified by tertiles.

Table C5. External validation of primary outcome multiple-event analysis.

Variables	Observed Model	Validation Model
LGE %	1.97 (1.69 – 2.30)	1.96 (1.63 – 2.35)
LV Mass(i)	1.10 (1.02 – 1.19)	1.10 (1.02 – 1.19)
LVESV(i)	1.26 (1.12 – 1.42)	1.27 (1.13 – 1.42)
Hx heart failure	2.89 (1.74 – 4.80)	2.94 (1.76 – 4.90)
Stratified log(NTProBNP)	2.20 (1.53 – 3.15)	2.20 (1.53 – 3.16)

LGE%, LV Mass(i) and LVESV(i) expressed in units of 10. Log(NTProBNP) stratified by tertiles

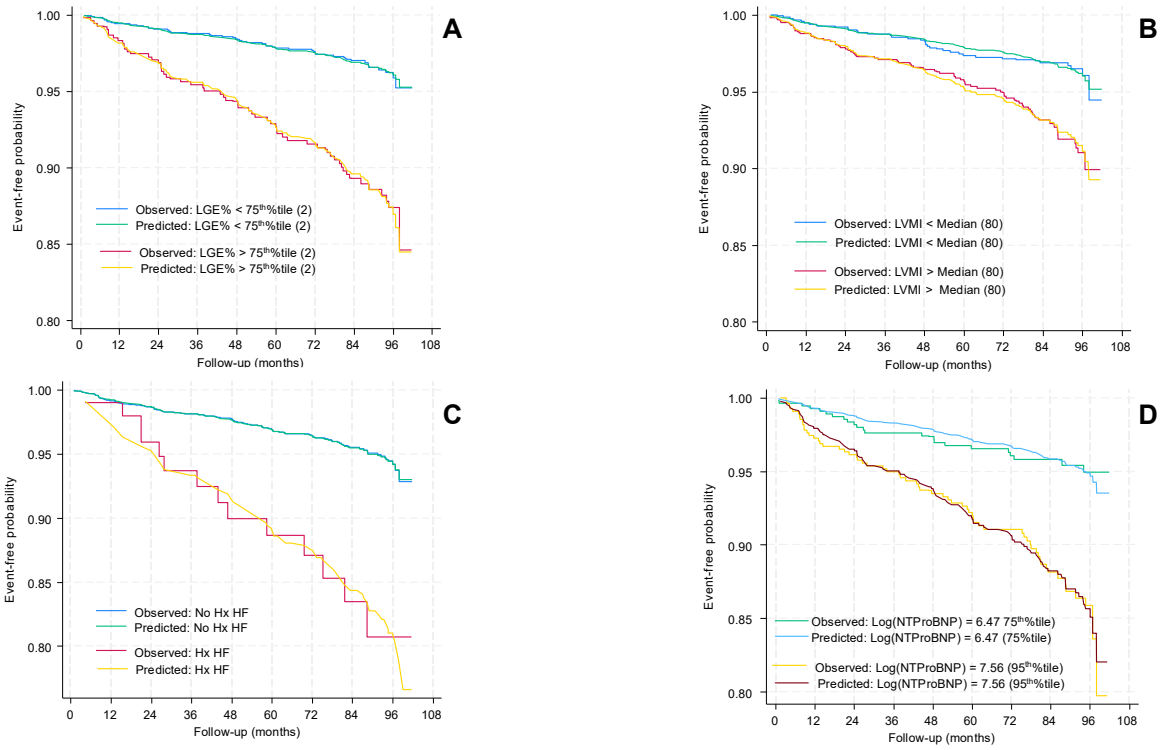

Figure C2. Calibration plots of selected values of LGE% (A), LVMI (B), Hx Heart Failure (C) and Log(NTProBNP) (D) for multiple event model.

Ventricular Arrhythmia events (SCD/VT).

Table C6. Bias correction for ventricular arrhythmia model parameters.

Variable	HR observed	HR biased corrected	95% CI observed	95% CI biased corrected
LGE%	1.92	1.92	1.55 – 2.38	1.45 – 2.46
LVMI	1.12	1.12	1.04 – 1.21	1.03 – 1.22
LVEF	0.68	0.69	0.52 – 0.89	0.53 – 0.91
Log(NTProBNP	1.39	1.40	1.12 – 1.73	1.11 – 1.77

LGE%, LVMI and LVEF parameters expressed in units of 10, NTProBNP in units of 1 log.

Table C7. External validation of ventricular arrhythmia events model.

Variables	Observed Model	Validation Model
LGE %	1.92 (1.61 – 2.29)	1.92 (1.61 – 2.28)
LV Mass(i)	1.12 (1.03 – 1.21)	1.11 (1.03 – 1.20)
log(NTProBNP)	1.39 (1.11 – 1.74)	1.40 (1.12 – 1.74)
LVEF	0.68 (0.52 – 0.90)	0.67 (0.51 – 0.87)

LGE%, LVMI and LVEF parameters expressed in units of 10, NTProBNP 1 log unit.

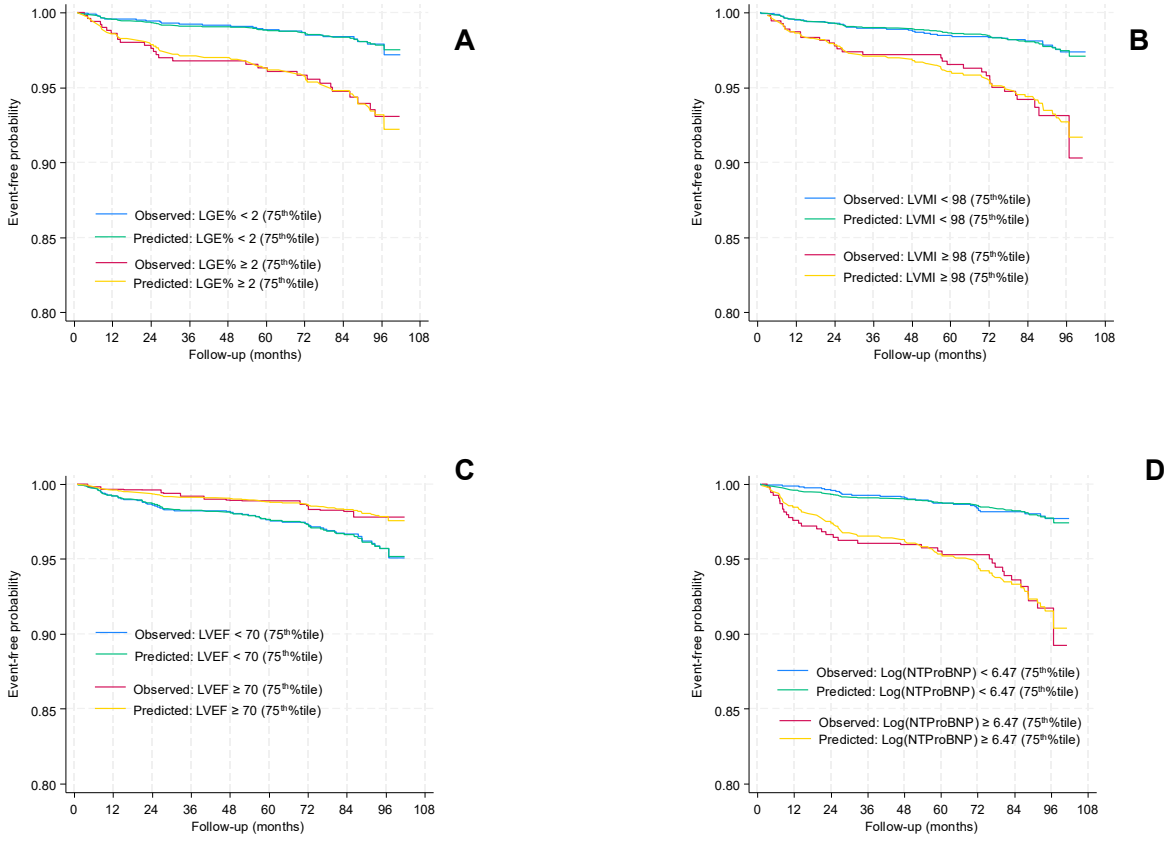

Figure C3. Calibration plots of selected values of LGE% (A), LVMI (B), LVEF (C) and Log(NTProBNP) (D) for ventricular arrhythmia event model.

Appendix D

Complete Case Analyses

Complete case (CC) analyses were made for the three outcomes, time to first composite event, multiple events and SCD events using the Cox regression methods described in the main paper. The number of events is reduced due to the missing data.

RESULTS

Table D1 presents results for time to first composite event. There were a total of 2,481 patients with no missing data. The complete case analysis included 89 (85.6%) of the 104 events. Hazard ratios and 95% confidence intervals were similar for the imputed and complete case analyses. The largest difference in hazard ratios was those for history of heart failure, 2.89 vs. 2.58, for the imputed and complete case analysis respectively. However, there was considerable overlap in the confidence intervals. For the multiple event analysis there were 2,490 patients with no missing data. Nineteen (16.2%) of the 117 total events were excluded. The largest difference in hazard ratios was that for heart failure (0.49). Otherwise, hazard ratios and 95% confidence intervals for all other variables were similar with considerable overlap in the confidence intervals (Table D2). For SCD events, there were 2,487 patients with no missing data with 11 (15.9%) of the 69 first events excluded. The hazard ratios and confidence intervals for all variables were essentially the same (Table D3).

In addition, complete case analyses were made for the three variables with excessive missing data, ESC risk score, NSVT and ECV. In these analyses, ESC risk was added to the SCD model and NSVT and ECV were added to the first event model to assess whether the additional variable changed the hazard ratios and 95% confidence intervals of the original model. The comparison model included the original variables without the additional variable, but with the same patients. For ESC risk, there were 1,373 complete cases (50.9% of 2,698) with 29 (42.0% of 69 SCD/VT) events. For NSVT, there were 1,477 complete cases (54.7% of 2,698) with 60 (57.7% of 104) primary composite events. There were 1,897 complete cases (70.3% of 2698) for ECV with 78 (75% of 104) primary composite events.

The results are presented in Tables D4, D5 and D6. The additional variable had little impact on hazard ratios and confidence intervals for ESC risk and NSVT as well as the c-indices: with and without ESC, 0.814 and 0.813 respectively, and with and without NSVT, 0.804 and 0.805 respectively. For ECV, there did appear to be a potential impact on the model although the models with and without ECV were not statistically different (p = 0.11) nor was there much difference in the c-indices: 0.798 with and 0.789 without.

Table D1. Imputed vs. complete case analyses for time to first composite event.

Primary composite time to first event

	Imputed analysis		**Complete case analysis (2481)**	
Variables	**Hazard Ratio (95% CI)**	**p value**	**Hazard Ratio (95% CI)**	**p value**
LGE %	1.86 (1.58 – 2.20)	< 0.001	1.92 (1.63 - 2.27)	< 0.001
LVMI	1.09 (1.01 – 1.17)	0.030	1.11 (1.03 - 1.20)	0.008
LVESVI	1.28 (1.12 – 1.46)	< 0.001	1.30 (1.14 - 1.48)	< 0.001
Hx heart failure	2.89 (1.75 – 4.77)	< 0.001	2.58 (1.50 - 4.44)	0.001
log(NTProBNP)	1.41 (1.17 – 1.70)	< 0.001	1.40 (1.14 - 1.71)	0.001

Imputed c-index = 0.77; CC c-index = 0.79

Table D2. Imputed vs. complete case analyses for time to multiple composite events.

Composite multiple event analysis

	Imputed analysis		**Complete case analysis (n = 2490)**	
Variables	**Hazard Ratio (95% CI)**	**p value**	**Hazard Ratio (95% CI)**	**p value**
LGE %	1.97 (1.69 – 2.29)	< 0.001	1.93 (1.60 - 2.32)	< 0.001
LVMI	1.10 (1.02 – 1.20)	0.014	1.15 (1.05 - 1.25)	0.002
LVESVI	1.26 (1.12 – 1.42)	< 0.001	1.25 (1.11 - 1.40)	< 0.001
Hx heart failure	2.91 (1.76 – 4.83)	< 0.001	2.42 (1.39 - 4.19)	0.002
Stratified log(NTProBNP)	2.10 (1.36 – 3.00)	< 0.001	1.80 (1.27 - 2.57)	0.001

Imputed c-index = 0.78; CC c-index = 0.79

Table D3. Imputed vs. complete case analyses for time to first ventricular arrhythmia event.

Time to first ventricular arrhythmia event

	Imputed analysis		Complete case analysis (n = 2487)	
Variables	**Hazard Ratio (95% CI)**	**p value**	**Hazard Ratio (95% CI)**	**p value**
LGE %	1.92 (1.55 - 2.38)	< 0.001	1.99 (1.68 - 2.35)	< 0.001
LVMI	1.12 (1.04 - 1.21)	0.004	1.15 (1.06 - 1.25)	0.001
LVEF	0.68 (0.52 - 0.89)	0.004	0.67 (0.51 - 0.89)	0.006
log(NTProBNP)	1.39 (1.12 - 1.73)	0.003	1.37 (1.08 - 1.74)	0.009

Imputed c-index = 0.76; CC c-index = 0.79

Table D4. Complete case analyses for ESC risk score.

Time to first ventricular arrhythmia event

	Complete case analysis (n = 1897)		Complete case analysis w/o ESC risk	
Variables	**Hazard Ratio (95% CI)**	**p value**	**Hazard Ratio (95% CI)**	**p value**
LGE %	2.06 (1.23 - 3.43)	0.006	2.05 (1.23 - 3.42)	0.006
LVMI	1.17 (1.03 - 1.34)	0.014	1.17 (1.03 - 1.33)	0.013
LVEF	0.67 (0.45 - 1.01)	0.055	0.67 (0.45 - 1.01)	0.055
log(NTProBNP)	1.54 (1.06 - 2.23)	0.023	1.53 (1.06 - 2.21)	0.024
ESC risk score	0.92 (0.50 – 1.68)	0.784		

ESC risk score expressed in units of 1.

Table D5. Complete case analyses for NSVT.

Time to first composite event

	Complete case analysis (n = 1477)		Complete case analysis w/o NSVT	
Variables	**Hazard Ratio (95% CI)**	**p value**	**Hazard Ratio (95% CI)**	**p value**
LGE %	1.89 (1.55 - 2.29)	< 0.001	1.89 (1.56 - 2.28)	< 0.001
LVMI	1.09 (0.94 - 1.21)	0.065	1.10 (1.00 - 1.21)	0.058
LVESVI	1.40 (1.21 - 1.62)	< 0.001	1.40 (1.22 - 1.61)	< 0.001
Hx Heart Failure	3.95 (2.13 – 7.33)	< 0.001	3.99 (2.16 – 7.36)	< 0.001
log(NTProBNP)	1.43 (1.11 - 1.85)	0.005	1.47 (1.14 - 1.88)	0.002
NSVT	1.71 (0.93 – 3.16)	0.084		

Table D6. Complete case analyses for ECV.

Time to first composite event

	Complete case analysis (n = 1897)		Complete case analysis w/o NSVT	
Variables	**Hazard Ratio (95% CI)**	**p value**	**Hazard Ratio (95% CI)**	**p value**
LGE %	1.71 (1.37 - 2.15)	< 0.001	1.87 (1.54 - 2.28)	< 0.001
LVMI	1.13 (1.05 - 1.23)	0.002	1.12 (1.04 - 1.21)	0.005
LVESVI	1.21 (1.04 - 1.42)	0.016	1.28 (1.11 - 1.48)	0.001
Hx Heart Failure	2.24 (1.14 – 4.39)	0.019	2.22 (1.13 – 4.36)	0.020
log(NTProBNP)	1.30 (1.06 - 1.60)	0.012	1.37 (1.12 - 1.67)	0.002
ECV	1.50 (1.01 – 2.21)	0.043		

ECV expressed in units of 0.10.

DISCUSSION

The results for ESC risk and NSVT suggest that the addition to the models had virtually no impact on the hazard ratios, 95% confidence intervals and c-indices. For ECV, there did appear to be a potential impact on the model although the models with and without ECV were not statistically different or differed with respect to c-indices. The large number of missing values for these three variables preclude a definitive conclusion regarding their impact on the outcomes.