

SUPPLEMENTAL MATERIAL

Table S1. Terminal digit distribution of LVEF values for assessment of digit bias.

Last digit in LVEF measurement	Number of patients (%)
0	110 (14.1%)
1	71 (9.1%)
2	72 (9.2%)
3	71 (9.1%)
4	70 (9.0%)
5	93 (11.9%)
6	73 (9.4%)
7	70 (9.0%)
8	79 (10.1%)
9	70 (9.0%)

Legend. LVEF=Left Ventricular Ejection Fraction.

Table S2. Predictors of HFimpEF at univariable analysis.

	Odds Ratio	Confidence Interval (95%)	p value
Demographics and Past Medical History			
Age [per 1 year increase]	1.018	1.001 - 1.037	0.039
Male Sex	0.692	0.453 - 1.055	0.087
Body Mass Index [per 1 kg/m ² increase]	1.020	0.986 - 1.057	0.247
Decompensated Chronic HF	0.922	0.616 - 1.379	0.690
Etiology: Ischemic Heart Disease	0.967	0.650 - 1.439	0.868
Etiology: Hypertensive Heart Disease	0.676	0.400 - 1.142	0.143
Etiology: Cardiomyopathy	0.313	0.142 - 0.689	0.004
Etiology: Valvular Heart Disease	3.322	2.037 - 5.435	<0.001
Triggering factor: Tachyarrhythmia	2.160	1.410 - 3.300	<0.001
Triggering factor: Myocardial ischemia	0.860	0.441 - 1.675	0.658
Triggering factor: Infections	1.623	0.830 - 3.175	0.157
Triggering factor: Hypertensive Crisis	0.781	0.269 - 2.262	0.649
Diabetes Mellitus	1.099	0.731 - 1.650	0.651
Myocardial Infarction	0.613	0.355 - 1.059	0.080
Previous Revascularization	0.690	0.381 - 1.252	0.222
Previous Device Implantation	0.448	0.190 - 1.055	0.066
Previous Valvular Surgery/Repair	2.488	1.264 - 4.902	0.008
Peripheral Artery Disease	1.391	0.880 - 2.198	0.158
Previous Stroke/TIA	1.316	0.696 - 2.488	0.397
Chronic Kidney Disease	1.058	0.677 - 1.653	0.806
Chronic Obstructive Pulmonary Disease	1.088	0.612 - 1.934	0.774
Clinical Presentation at admission and In-hospital Treatments			
Systolic Blood Pressure [per 1 mmHg increase]	0.999	0.992 - 1.006	0.764
Heart Rate [per 1 bpm increase]	1.008	1.001 - 1.015	0.019
Signs of hypoperfusion	0.861	0.526 - 1.406	0.549
Pulmonary oedema	0.934	0.542 - 1.608	0.804
Atrial Fibrillation	1.869	1.242 - 2.817	0.003
Left or Right Bundle Branch Block	0.858	0.555 - 1.326	0.489
Inotropes and/or vasopressors	0.686	0.435 - 1.082	0.105
Vasodilators (intravenous)	0.845	0.528 - 1.351	0.481
Medical Therapy Before Admission			
RASi/ARNi $\geq$ 50% of target dose	0.761	0.473 - 1.225	0.262
Beta-blockers $\geq$ 50% of target dose	0.687	0.372 - 1.269	0.231
MRA $\geq$ 50% of target dose	0.735	0.368 - 1.466	0.382
Furosemide $\geq$ 50mg/day	0.736	0.430 - 1.261	0.264
Laboratory Exams At Admission			
Creatinine [per 1 mg/dL increase]	1.082	0.857 - 1.366	0.509
eGFR (CKD-EPI) [per 1 mL/min/1.73m ² increase]	0.998	0.989 - 1.006	0.584
Urea [per 1 mg/dL increase]	1.000	0.993 - 1.007	0.999
Sodium [per 1 mEq/L increase]	1.019	0.964 - 1.076	0.503
Potassium [per 1 mEq/L increase]	1.131	0.797 - 1.603	0.491
Haemoglobin [per 1 g/dL increase]	0.889	0.812 - 0.972	0.010
High NPs (BNP or NT-proBNP >median) *	0.750	0.504 - 1.115	0.155

Echocardiographic Exam At Admission			
LV iEDV [per 1 mL/m ² increase]	0.957	0.947 - 0.968	<0.001
LVEF [per 1% increase]	1.028	1.005 - 1.050	0.016
Right Ventricular Dysfunction	0.427	0.283 - 0.644	<0.001
Mitral Regurgitation (moderate-severe)	0.489	0.324 - 0.740	0.001
Tricuspid Regurgitation (moderate-severe)	0.775	0.471 - 1.276	0.315
E/E'	0.979	0.949 - 1.011	0.196
Pulmonary Arterial Systolic Pressure [per 1 mmHg increase]	0.989	0.973 - 1.005	0.161

Legend. ARNi=Angiotensin Receptor Neprilysin inhibitors. BNP=Brain Natriuretic Peptide. HF=Heart Failure. LVEF=Left Ventricular Ejection Fraction. LV iEDV=Left Ventricular indexed End-Diastolic Volume. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide. RASi=Renin-Angiotensin System inhibitors. TIA=Transient Ischemic Attack.

* median value for BNP=915pg/mL, median value for NT-proBNP=6291pg/mL.

Table S3. Association of different variables with 1-year mortality, 5-years mortality, 1-year HFH and 1-year mortality/HFH (univariable analysis).

	HR (95% C.I.), p value	HR (95% C.I.), p value	HR (95% C.I.), p value	HR (95% C.I.), p value
HFimpEF (vs HF with non-impEF)	HR=0.488 (0.237-1.006), p=0.042	HR=0.823 (0.571-1.187), p=0.297	HR=0.985 (0.605-1.601), p=0.950	HR=0.808 (0.531-1.228), p=0.318
LVEF at admission [per 1% increase]	HR=0.991 (0.968-1.015), p=0.460	HR=1.005 (0.991-1.020), p=0.499	HR=1.006 (0.986-1.026), p=0.555	HR=0.997 (0.981-1.014), p=0.745
LVEF at discharge [per 1% increase]	HR=0.972 (0.951-0.993), p=0.010	HR=1.000 (0.989-1.012), p=0.942	HR=0.995 (0.979-1.012), p=0.574	HR=0.987 (0.974-1.001), p=0.075
Age [per 1 year increase]	HR=1.048 (1.027-1.070), p<0.001	HR=1.059 (1.046-1.073), p<0.001	HR=1.023 (1.007-1.039), p=0.005	HR=1.029 (1.016-1.042), p<0.001
Male Sex	HR=0.899 (0.583-1.385), p=0.628	HR=1.134 (0.853-1.509), p=0.387	HR=1.253 (0.834-1.883), p=0.278	HR=1.010 (0.739-1.379), p=0.951
Ischemic Heart Disease	HR=0.942 (0.633-1.401), p=0.767	HR=1.474 (1.150-1.889), p=0.002	HR=2.181 (1.531-3.107), p<0.001	HR=1.536 (1.163-2.027), p=0.002
Diabetes Mellitus	HR=1.317 (0.884-1.962), p=0.175	HR=1.462 (1.139-1.876), p=0.003	HR=1.460 (1.034-2.061), p=0.031	HR=1.357 (1.026-1.796), p=0.032
Peripheral Artery Disease	HR=1.801 (1.177-2.753), p=0.007	HR=2.134 (1.640-2.777), p<0.001	HR=1.592 (1.092-2.322), p=0.016	HR=1.823 (1.351-2.459), p<0.001
Systolic Blood Pressure [per 1 mmHg increase]	HR=0.984 (0.977-0.992), p<0.001	HR=0.992 (0.987-0.996), p=0.001	HR=0.991 (0.984-0.997), p=0.007	HR=0.988 (0.983-0.994), p<0.001
Atrial Fibrillation	HR=1.532 (1.020-2.302), p=0.040	HR=1.390 (1.071-1.804), p=0.013	HR=1.054 (0.725-1.532), p=0.784	HR=1.327 (0.991-1.778), p=0.058
Creatinine [per 1 mg/dL increase]	HR=1.281 (1.151-1.427), p<0.001	HR=1.225 (1.134-1.324), p<0.001	HR=1.192 (1.053-1.349), p=0.005	HR=1.220 (1.115-1.334), p<0.001
Urea [per 1 mg/dL increase]	HR=1.016 (1.012-1.020), p<0.001	HR=1.015 (1.012-1.018), p<0.001	HR=1.010 (1.006-1.014), p<0.001	HR=1.014 (1.011-1.017), p<0.001
High NPs (BNP or NT-proBNP >median) *	HR=1.732 (1.152-2.602), p=0.008	HR=1.248 (0.974-1.600), p=0.080	HR=1.279 (0.906-1.806), p=0.161	HR=1.394 (1.054-1.844), p=0.020
Right Ventricular Dysfunction	HR=1.270 (0.846-1.905), p=0.249	HR=1.128 (0.878-1.450), p=0.346	HR=1.138 (0.806-1.606), p=0.462	HR=1.256 (0.947-1.664), p=0.113
Mitral Regurgitation (moderate-severe)	HR=1.044 (0.698-1.561), p=0.834	HR=0.990 (0.770-1.272), p=0.937	HR=1.297 (0.918-1.833), p=0.140	HR=1.184 (0.894-1.567), p=0.239
Tricuspid Regurgitation (moderate-severe)	HR=2.087 (1.375-3.166), p=0.001	HR=1.719 (1.310-2.256), p<0.001	HR=1.392 (0.951-2.038), p=0.089	HR=1.765 (1.309-2.379), p<0.001
Pulmonary Arterial Systolic Pressure [per 1 mmHg increase]	HR=1.020 (1.006-1.035), p=0.006	HR=1.014 (1.005-1.023), p=0.003	HR=1.017 (1.004-1.030), p=0.008	HR=1.020 (1.010-1.030), p<0.001

Legend. BNP=Brain Natriuretic Peptide. C.I.=Confidence Interval. HF=Heart Failure. HFimpEF=Heart Failure with improved Ejection Fraction. HFrefEF=Heart Failure with reduced Ejection Fraction. HR=Hazard Ratio. LVEF=Left Ventricular Ejection Fraction. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide.

* median value for BNP=915pg/mL, median value for NT-proBNP=6291pg/mL.

Table S4. Association of LVEF at admission with 1-year all-cause mortality (multivariable analysis).

	Hazard Ratio	Confidence Interval (95%)	p value
LVEF at admission [per 1% increase]	0.993	0.967 - 1.020	0.625
Age [per 1 year increase]	1.039	1.014 - 1.065	0.002
Male Sex	1.134	0.654 - 1.968	0.654
Ischemic Heart Disease	0.551	0.332 - 0.914	0.021
Diabetes Mellitus	1.312	0.815 - 2.112	0.263
Peripheral Artery Disease	1.529	0.926 - 2.524	0.097
Systolic Blood Pressure [per 1 mmHg increase]	0.987	0.977 - 0.996	0.007
Atrial Fibrillation	1.212	0.748 - 1.962	0.435
Creatinine [per 1 mg/dL increase]	1.022	0.818 - 1.278	0.846
Urea [per 1 mg/dL increase]	1.011	1.005 - 1.018	0.001
High NPs (BNP or NT-proBNP >median) *	1.521	0.925 - 2.502	0.099
Right Ventricular Dysfunction	0.880	0.526 - 1.472	0.625
Mitral Regurgitation (moderate-severe)	0.659	0.400 - 1.085	0.101
Tricuspid Regurgitation (moderate-severe)	1.397	0.806 - 2.422	0.234
Pulmonary Arterial Systolic Pressure [per 1 mmHg increase]	1.006	0.988 - 1.025	0.508

Legend. BNP=Brain Natriuretic Peptide. LVEF=Left Ventricular Ejection Fraction. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide.

* median value for BNP=915pg/mL, median value for NT-proBNP=6291pg/mL.

Table S5. Association of LVEF at discharge with 1-year all-cause mortality (multivariable analysis).

	Hazard Ratio	Confidence Interval (95%)	p value
LVEF at discharge [per 1% increase]	0.964	0.941 - 0.988	0.003
Age [per 1 year increase]	1.045	1.018 - 1.072	0.001
Male Sex	0.933	0.533 - 1.633	0.807
Ischemic Heart Disease	0.511	0.303 - 0.864	0.012
Diabetes Mellitus	1.372	0.840 - 2.240	0.206
Peripheral Artery Disease	1.525	0.904 - 2.574	0.114
Systolic Blood Pressure [per 1 mmHg increase]	0.985	0.975 - 0.996	0.005
Atrial Fibrillation	1.353	0.814 - 2.250	0.243
Creatinine [per 1 mg/dL increase]	1.021	0.798 - 1.306	0.868
Urea [per 1 mg/dL increase]	1.013	1.006 - 1.019	<0.001
High NPs (BNP or NT-proBNP >median) *	1.463	0.885 - 2.418	0.138
Right Ventricular Dysfunction	0.768	0.453 - 1.302	0.326
Mitral Regurgitation (moderate-severe)	0.596	0.353 - 1.004	0.052
Tricuspid Regurgitation (moderate-severe)	1.263	0.707 - 2.256	0.430
Pulmonary Arterial Systolic Pressure [per 1 mmHg increase]	1.006	0.987 - 1.026	0.550

Legend. BNP=Brain Natriuretic Peptide. LVEF=Left Ventricular Ejection Fraction. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide.

* median value for BNP=915pg/mL, median value for NT-proBNP=6291pg/mL.

Table S6. Association of HFimpEF with 5-years all-cause mortality (multivariable analysis).

	Hazard Ratio	Confidence Interval (95%)	p value
HFimpEF (vs HF with non-impEF)	0.584	0.382 - 0.895	0.013
Age [per 1 year increase]	1.058	1.042 - 1.075	<0.001
Male Sex	1.337	0.952 - 1.877	0.093
Ischemic Heart Disease	0.800	0.588 - 1.087	0.154
Diabetes Mellitus	1.257	0.945 - 1.672	0.116
Peripheral Artery Disease	1.735	1.291 - 2.332	<0.001
Systolic Blood Pressure [per 1 mmHg increase]	0.991	0.986 - 0.997	0.002
Atrial Fibrillation	1.125	0.837 - 1.511	0.435
Creatinine [per 1 mg/dL increase]	0.990	0.831 - 1.178	0.908
Urea [per 1 mg/dL increase]	1.011	1.006 - 1.015	<0.001
High NPs (BNP or NT-proBNP >median) *	0.966	0.724 - 1.287	0.811
Right Ventricular Dysfunction	0.994	0.732 - 1.350	0.971
Mitral Regurgitation (moderate-severe)	0.782	0.578 - 1.056	0.109
Tricuspid Regurgitation (moderate-severe)	1.195	0.847 - 1.686	0.310
Pulmonary Arterial Systolic Pressure [per 1 mmHg increase]	1.003	0.992 - 1.014	0.633

Legend. BNP=Brain Natriuretic Peptide. HF=Heart Failure. HFimpEF=Heart Failure with improved Ejection Fraction. HFrEF=Heart Failure with reduced Ejection Fraction. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide.

* median value for BNP=915pg/mL, median value for NT-proBNP=6291pg/mL.

Table S7. Association of HFimpEF with 1-year HFH (multivariable analysis).

	Hazard Ratio	Confidence Interval (95%)	p value
HFimpEF (vs HF with non-impEF)	0.961	0.556 - 1.659	0.885
Age [per 1 year increase]	1.012	0.993 - 1.032	0.225
Male Sex	1.120	0.713 - 1.760	0.623
Ischemic Heart Disease	1.752	1.166 - 2.632	0.007
Diabetes Mellitus	1.179	0.808 - 1.722	0.393
Peripheral Artery Disease	1.354	0.904 - 2.028	0.141
Systolic Blood Pressure [per 1 mmHg increase]	0.992	0.985 - 0.999	0.025
Atrial Fibrillation	1.049	0.701 - 1.569	0.816
Creatinine [per 1 mg/dL increase]	1.037	0.807 - 1.332	0.778
Urea [per 1 mg/dL increase]	1.006	1.000 - 1.012	0.068
High NPs (BNP or NT-proBNP >median) *	0.974	0.661 - 1.437	0.895
Right Ventricular Dysfunction	0.895	0.596 - 1.344	0.594
Mitral Regurgitation (moderate-severe)	1.151	0.773 - 1.713	0.488
Tricuspid Regurgitation (moderate-severe)	0.946	0.591 - 1.513	0.816
Pulmonary Arterial Systolic Pressure [per 1 mmHg increase]	1.011	0.996 - 1.026	0.161

Legend. BNP=Brain Natriuretic Peptide. HF=Heart Failure. HFimpEF=Heart Failure with improved Ejection Fraction. HFrEF=Heart Failure with reduced Ejection Fraction. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide.

* median value for BNP=915pg/mL, median value for NT-proBNP=6291pg/mL.

Table S8. Association of HFimpEF with 1-year all-cause mortality or HFH (multivariable analysis).

	Hazard Ratio	Confidence Interval (95%)	p value
HFimpEF (vs HF with non-impEF)	0.729	0.452 - 1.177	0.197
Age [per 1 year increase]	1.018	1.002 - 1.035	0.028
Male Sex	1.020	0.706 - 1.475	0.915
Ischemic Heart Disease	1.091	0.776 - 1.536	0.616
Diabetes Mellitus	1.183	0.860 - 1.628	0.302
Peripheral Artery Disease	1.616	1.157 - 2.258	0.005
Systolic Blood Pressure [per 1 mmHg increase]	0.989	0.983 - 0.995	0.001
Atrial Fibrillation	1.183	0.851 - 1.645	0.318
Creatinine [per 1 mg/dL increase]	0.995	0.815 - 1.215	0.960
Urea [per 1 mg/dL increase]	1.010	1.005 - 1.015	<0.001
High NPs (BNP or NT-proBNP >median) *	1.067	0.774 - 1.471	0.691
Right Ventricular Dysfunction	0.883	0.630 - 1.238	0.470
Mitral Regurgitation (moderate-severe)	0.921	0.656 - 1.291	0.631
Tricuspid Regurgitation (moderate-severe)	1.167	0.797 - 1.708	0.428
Pulmonary Arterial Systolic Pressure [per 1 mmHg increase]	1.011	0.999 - 1.024	0.084

Legend. BNP=Brain Natriuretic Peptide. HF=Heart Failure. HFimpEF=Heart Failure with improved Ejection Fraction. HFrfEF=Heart Failure with reduced Ejection Fraction. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide.

* median value for BNP=915pg/mL, median value for NT-proBNP=6291pg/mL.

Table S9. Medical therapy, at 1-year follow-up visit, of patients with non-impEF at discharge, classified according to LVEF trajectory during follow-up.

	Overall n=385	Late HFimpEF n=159 (41.3%)	LVEF≤40% or improvement<10% n=226 (58.7%)	p value
RASi/ARNi ≥50% of target dose	206 (53.9%)	94 (59.5%)	112 (50.0%)	0.067
Beta-blockers ≥50% of target dose	113 (29.6%)	55 (34.8%)	58 (25.9%)	0.060
MRA ≥50% of target dose	174 (45.5%)	61 (38.6%)	113 (50.4%)	0.022
Furosemide ≥50mg/day	158 (41.4%)	37 (23.4%)	121 (54.0%)	<0.001

Legend. ARNi=Angiotensin Receptor Neprilysin inhibitors. BNP=Brain Natriuretic Peptide. HF=Heart Failure. LVEF=Left Ventricular Ejection Fraction. LV iEDV=Left Ventricular indexed End-Diastolic Volume. NPs=Natriuretic Peptides. NT-proBNP=N-terminal pro-B-type Natriuretic Peptide. RASi=Renin-Angiotensin System inhibitors. TIA=Transient Ischemic Attack.