SUPPLEMENTAL MATERIAL

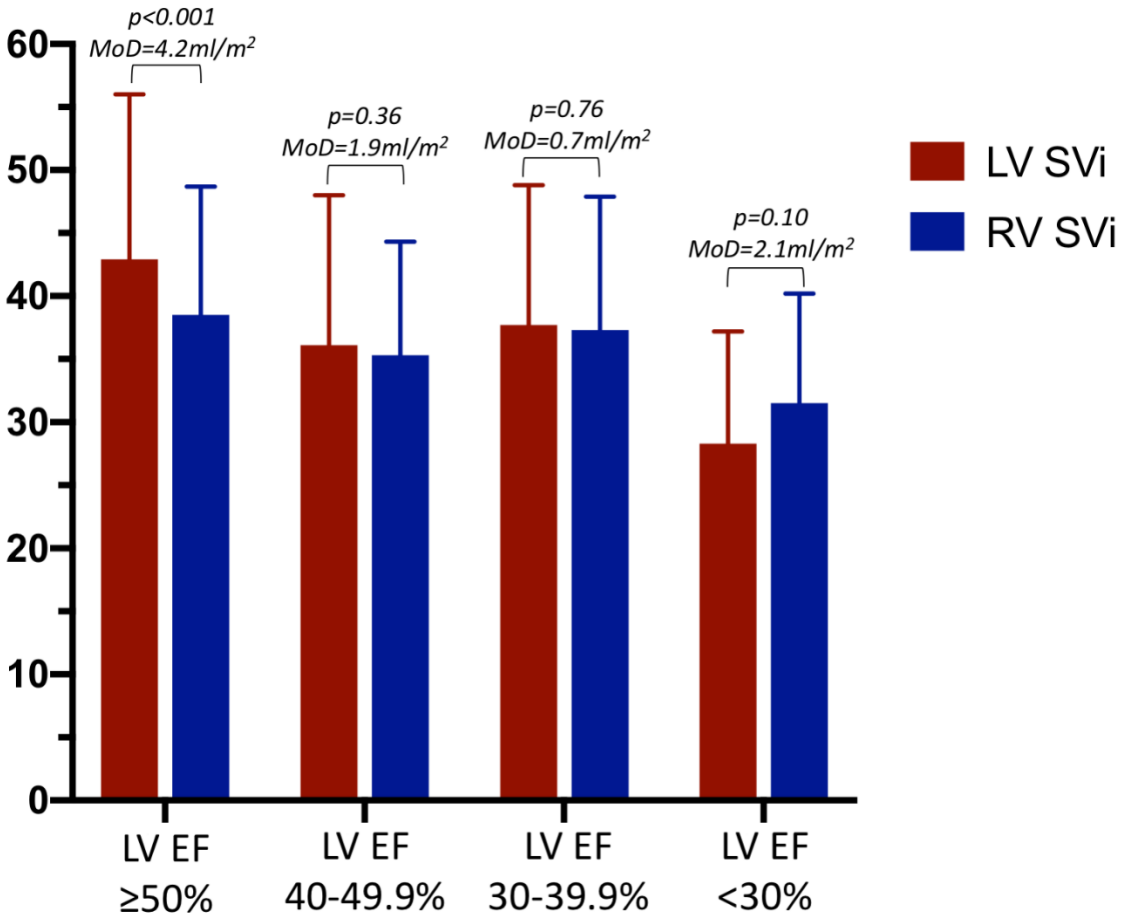
Contraction patterns of the right ventricle associated with different degrees of left ventricular systolic dysfunction

Supplementary Figure I

LV and RV indexed stroke volumes in four groups of patients.

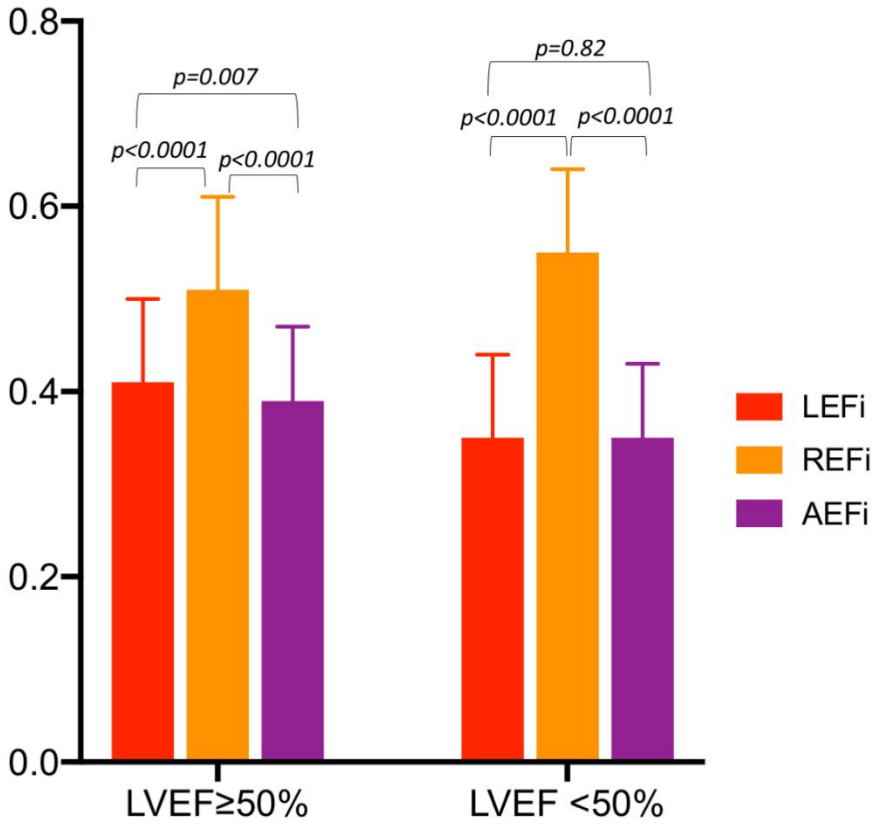
Data are presented as means, bars depict standard deviations. Wilcoxon matched-pairs signed rank test was used to compare the RV and LV stroke volumes within each group.

MoD - Median of Differences; SVi – stroke volume index.



Supplementary Figure II

Comparison of the relative contribution of longitudinal (red bars, LEFi), radial (orange bars, REFi) and anteroposterior (purple bars, AEFi) motion components to total right ventricular ejection fraction in patients with maintained (≥50%) and reduced (<50%) left ventricular ejection fraction (LVEF) with left-sided heart disease. In patients with maintained LVEF, the relative contribution of the radial motion component is significantly higher compared to both longitudinal and anteroposterior components, which pattern becomes even more pronounced in patients with reduced LVEF.



Supplementary Table I

Intra- and interobserver variability and reliability of global and decomposed right ventricular metrics

	Intraclass correlation coefficient		Coefficient of variability (%)	
	intraobserver	**interobserver**	**intraobserver**	**interobserver**
RV EDV	0.981	0.973	4.049	5.456
RV ESV	0.985	0.986	6.044	5.296
RV EF	0.949	0.954	6.529	5.366
RV ESV (longitudinal only)	0.975	0.958	5.352	7.195
RV LEF	0.873	0.808	14.363	21.312
RV ESV (anteroposterior only)	0.954	0.950	7.873	7.897
RV AEF	0.853	0.833	18.551	19.437
RV ESV (radial only)	0.962	0.959	8.178	8.278
RV REF	0.854	0.844	17.991	18.867

Supplementary Table II Echocardiographic characteristics of coronary artery disease patients (n=132) stratified according to left ventricular ejection fraction

Parameter	LV EF ≥50% (N=61)	LV EF 40-49.9% (N=37)	LV EF 30-39.9% (N=22)	LV EF <30% (N=12)	Overall p-value
LV EF, %	57.9 ± 5.2	45.6 ± 2.7*	35.6 ± 2.9*†	22.9 ± 4.7*†‡	<0.001
RV EF, %	48.1 ± 6.3	48.2 ± 5.2	46.3 ± 6.0	31.8 ± 8.0*†‡	<0.001
RV EF ≤45 (%)	16 (26.2)	10 (27.0)	5 (22.7)	11 (91.7)*†‡	<0.001
RV LEF, %	18.7 ± 5.6	17.1 ± 4.4	14.9 ± 4.4*	10.2 ± 4.9*†‡	<0.001
RV REF, %	25.0 ± 6.6	27.4 ± 5.7	27.6 ± 4.7	16.6 ± 5.2*†‡	<0.001
RV AEF, %	17.9 ± 5.1	17.6 ± 4.7	15.8 ± 2.9	10.4 ± 4.4*†‡	<0.001
RV LEFi	0.39 ± 0.10	0.35 ± 0.08	0.32 ± 0.07*	0.32 ± 0.10	0.004
RV REFi	0.52 ± 0.11	0.57 ± 0.09	0.60 ± 0.07*	0.53 ± 0.11	0.005
RV AEFi	0.37 ± 0.08	0.36 ± 0.08	0.34 ± 0.05	0.32 ± 0.06	0.171
TAPSE, mm	21.6 ± 5.4	20.2 ± 5.2	19.5 ± 3.9	16.1 ± 4.7*	0.007
FAC, %	42.9 ± 8.9	42.8 ± 7.1	40.2 ± 8.5	25.5 ± 10.2*†‡	<0.001
2DE free-wall longitudinal strain, %	-26.2 ± 5.2	-25.3 ± 5.7	-24.0 ± 4.2	-18.7 ± 7.5*†	0.011
PASP, mmHg	28.6 ± 15.0	27.9 ± 8.6	33.1 ± 15.0	42.3 ± 18.7*	0.026

Values are reported as mean ± standard deviation (SD) or n (%).

*p<0.05 vs. LV EF ≥50%. †† p<0.05 vs. LV EF 40-49.9%. ‡ p<0.05 vs. LV EF 30-39.9%.

Supplementary Table III Echocardiographic characteristics of dilated and hypertrophic cardiomyopathy patients (n=48) stratified according to left ventricular ejection fraction

Parameter	LV EF ≥50% (N=10)	LV EF 40-49.9% (N=9)	LV EF 30-39.9% (N=12)	LV EF <30% (N=17)	Overall p-value
LV EF, %	62.2 ± 4.5	45.8 ± 2.7*	35.8 ± 3.2*†	18.9 ± 6.3*†‡	<0.001
RV EF, %	51.1 ± 7.0	46.9 ± 2.7	41.1 ± 9.5*	29.4 ± 8.6*†‡	<0.001
RV EF ≤45 (%)	2 (20.0)	1 (11.1)	7 (58.3)	16 (94.1)*†	<0.001
RV LEF, %	21.1 ± 6.0	15.9 ± 3.4	16.6 ± 6.4	8.9 ± 3.1*†‡	<0.001
RV REF, %	26.9 ± 6.8	25.6 ± 5.0	19.5 ± 6.8	16.9 ± 6.9*†	0.002
RV AEF, %	20.5 ± 2.8	19.6 ± 3.7	14.7 ± 5.3*†	8.2 ± 3.8*†‡	<0.001
RV LEFi	0.41 ± 0.08	0.34 ± 0.07	0.40 ± 0.09	0.31 ± 0.09	0.045
RV REFi	0.52 ± 0.09	0.55 ± 0.11	0.47 ± 0.10	0.57 ± 0.09	0.067
RV AEFi	0.40 ± 0.03	0.42 ± 0.06	0.35 ± 0.08	0.27 ± 0.08*†‡	<0.001
TAPSE, mm	22.8 ± 3.2	22.6 ± 3.6	18.1 ± 4.3*	15.1 ± 3.9*†	<0.001
FAC, %	42.4 ± 9.5	44.8 ± 3.1	34.0 ± 9.7	24.2 ± 9.4*†	<0.001
2DE free-wall longitudinal strain, %	-27.6 ± 4.2	-23.3 ± 3.4	-20.8 ± 6.4*	-14.4 ± 3.3*†‡	<0.001
PASP, mmHg	21.8 ± 5.3	22.8 ± 4.2	23.2 ± 7.2	40.9 ± 13.7*†‡	<0.001

Values are reported as mean ± standard deviation (SD) or n (%).

*p<0.05 vs. LV EF ≥50%. † p<0.05 vs. LV EF 40-49.9%. ‡ p<0.05 vs. LV EF 30-39.9%.

Supplementary Table IV Clinical and echocardiographic characteristics of the patients according to the composite outcome of cardiac death or heart failure hospitalization.

Variable	Cardiac death or heart failure hospitalization (N=107)	No events (N=185)	p value
Age, years	63±19	56±16	**<0.001**
Gender, male (%)	74 (69.2)	129 (69.7)	1.000
Body surface area, m^2	1.81±0.20	1.83±0.19	0.322
BMI, kg/m^2	24.9±3.8	25.0±3.4	0.556
Systolic blood pressure, mmHg	123±21	125±16	0.096
Diastolic blood pressure, mmHg	72±10	76±10	**0.007**
Smoking (%)	32 (29.9)	73 (39.5)	0.130
Diabetes (%)	29 (27.1)	17 (9.2)	**<0.001**
Dyslipidemia (%)	46 (43.0)	79 (42.7)	1.000
Obesity (%)	10 (9.3)	13 (7.0)	0.629
Family history of CAD (%)	22 (20.6)	50 (27.0)	0.274
History of atrial fibrillation (%)	31 (29.0)	17 (9.2)	**<0.001**
Hypertension (%)	67 (62.6)	103 (55.7)	0.300
CAD (%)	44 (41.1)	88 (47.6)	0.345
Valvular heart disease (%)	36 (33.6)	42 (22.7)	0.058
Mitral valve disease (%)	14 (13.1)	15 (8.1)	0.169
Aortic valve disease (%)	8 (7.5)	17 (9.2)	0.618
Both mitral and aortic valve disease (%)	2 (1.9)	1 (0.5)	0.251
Previous MVR and/or AVR (%)	12 (11.2)	9 (4.9)	**0.045**
Cardiomyopathies (%)	26 (24.3)	28 (15.1)	0.074
LV end-diastolic volume index, ml/m^2	100.9±43.9	79.0±23.7	**<0.001**
LV end-systolic volume index, ml/m^2	61.9±42.3	38.6±20.9	**<0.001**

LV ejection fraction, %	43.3±16.5	53.2±11.5	**<0.001**
LV mass index, g/m²	110.4±24.8	98.8±22.2	**<0.001**
2DE LV GLS, %	-12.8±5.6	-15.7±4.4	**<0.001**
2DE left atrial volume index, ml/m²	66.0±65.9	41.2±17.3	**<0.001**
RV end-diastolic volume index, ml/m²	87.0±24.4	78.1±21.1	**<0.001**
RV end-systolic volume index, ml/m²	51.3±21.6	40.2±15.6	**<0.001**
RV ejection fraction, %	42.5±10.3	49.1±7.5	**<0.001**
RV longitudinal ejection fraction, %	15.4 ± 6.5	19.7±5.8	**<0.001**
RV radial ejection fraction, %	23.1±7.5	25.6±6.5	**0.003**
RV anteroposterior ejection fraction, %	14.8±5.8	19.0±5.3	**<0.001**
RV LEFi	35.7±10.1	39.9±8.6	**<0.001**
RV REFi	54.2±10.4	52.2±9.9	0.107
RV AEFi	34.0±7.8	38.4±7.5	**<0.001**
TAPSE, mm	18.2±5.8	21.8±4.8	**<0.001**
FAC, %	35.6±11.5	41.5±8.8	**<0.001**
2DE free-wall longitudinal strain, %	-22.5±7.2	-26.7±5.9	**<0.001**
PASP, mmHg [a]	35.9±13.8	28.1±11.2	**<0.001**

Values are reported as mean ± standard deviation (SD) or n (%).

AVR – aortic valve replacement or repair; BMI – body mass index; CAD – coronary artery disease; MVR – mitral valve replacement or repair.

Supplementary Table V

Parameters associated with cardiac death and heart failure hospitalization in the entire study cohort

	Hazard Ratio [95% Confidence Interval]	p value
Age, n = 292	**1.019 [1.006 – 1.032]**	**0.003**
Male, = 292	0.996 [0.661 – 1.502]	0.986
Body surface area, n = 292	0.541 [0.199 – 1.472]	0.229
BMI, n = 292	0.983 [0.930 – 1.039]	0.537
Smoking, n = 292	0.692 [0.458 – 1.048]	0.082
Diabetes, n = 292	**2.456 [1.602 – 3.766]**	**<0.001**
Dyslipidemia, n = 292	0.944 [0.644 – 1.385]	0.769
Obesity, n = 292	1.212 [0.632 – 2.324]	0.562
Family history of CAD, n = 292	0.751 [0.470 – 1.200]	0.231
History of atrial fibrillation, n = 292	**2.514 [1.653 – 3.824]**	**<0.001**
Hypertension, n = 292	1.154 [0.780 – 1.707]	0.475
CAD, n = 292	0.793 [0.539 – 1.166]	0.238
Valvular heart disease, n = 292	1.485 [0.994 – 2.217]	0.054
Cardiomyopathy, n = 292	**1.660 [1.067 – 2.583]**	**0.025**
LV end-diastolic volume index, n = 292	**1.015 [1.010 – 1.019]**	**<0.001**
LV end-systolic volume index, n = 292	**1.017 [1.012 – 1.021]**	**<0.001**
LV ejection fraction, n = 292	**0.959 [0.947 – 0.971]**	**<0.001**
LV mass index, n = 261	**1.017 [1.009 – 1.025]**	**<0.001**
2DE LV GLS, n = 263	**1.112 [1.066 – 1.160]**	**<0.001**
2DE left atrial volume index, n = 221	**1.006 [1.004 – 1.009]**	**<0.001**
RV end-diastolic volume index, n = 292	**1.015 [1.008 – 1.023]**	**<0.001**
RV end-systolic volume index, n = 292	**1.025 [1.017 – 1.033]**	**<0.001**
RV ejection fraction, n = 292	**0.940 [0.925 – 0.956]**	**<0.001**
RV longitudinal ejection fraction, n = 292	**0.903 [0.873 – 0.933]**	**<0.001**
RV radial ejection fraction, n = 292	**0.947 [0.920 – 0.974]**	**<0.001**
RV anteroposterior ejection fraction, n = 292	**0.893 [0.865 – 0.923]**	**<0.001**
RV LEFi, n = 292	**0.960 [0.939 – 0.980]**	**<0.001**
RV REFi, n = 292	1.014 [0.994 – 1.033]	0.167

RV AEFi, n = 292	**0.946 [0.924 – 0.967]**	**<0.001**
TAPSE, n = 291	**0.903 [0.872 – 0.935]**	**<0.001**
FAC, n = 292	**0.952 [0.936 – 0.969]**	**<0.001**
2DE free-wall longitudinal strain, n = 288	**1.090 [1.060 – 1.121]**	**<0.001**
PASP, n = 262	**1.029 [1.018 – 1.040]**	**<0.001**

The value after a variable's name indicates the number of patients with available data.

Supplementary Table VI

Factors associated with cardiac death and heart failure hospitalization in the entire study cohort

Including LEF or LEFi (entire study cohort):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.019 [1.006 – 1.032]	0.003				
Diabetes	2.456 [1.602 – 3.766]	<0.001	2.018 [1.277 – 3.190]	0.003	2.031 [1.285 – 3.209]	0.002
Atrial fibrillation	2.514 [1.653 – 3.824]	<0.001				
Cardiomyopathy	1.660 [1.067 – 2.583]	0.025				
Valvular heart disease	1.485 [0.994 – 2.217]	0.054	2.280 [1.426 – 3.646]	<0.001	2.301 [1.436 – 3.688]	<0.001
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001	0.973 [0.957 – 0.989]	0.001	0.964 [0.950 – 0.978]	<0.001
RV LEF	0.903 [0.873 – 0.933]	<0.001	0.948 [0.910 – 0.989]	0.013		
RV LEFi	0.960 [0.939 – 0.980]	<0.001			0.987 [0.964 – 1.011]	0.292

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for LEF and LEFi). LEF is an independent predictor!

The variables listed in this table contain no missing values; thus, each model includes data from 292 patients.

Supplementary Table VII

Factors associated with cardiac death and heart failure hospitalization in the entire study cohort

Including REF or REFi (entire study cohort):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.019 [1.006 – 1.032]	0.003				
Diabetes	2.456 [1.602 – 3.766]	<0.001	2.076 [1.312 – 3.285]	0.002	2.035 [1.288 – 3.218]	0.002
Atrial fibrillation	2.514 [1.653 – 3.824]	<0.001				
Cardiomyopathy	1.660 [1.067 – 2.583]	0.025				
Valvular heart disease	1.485 [0.994 – 2.217]	0.054	2.086 [1.294 – 3.360]	0.003	2.259 [1.404 – 3.634]	<0.001
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001	0.966 [0.952 – 0.980]	<0.001	0.962 [0.948 – 0.975]	<0.001
RV REF	0.947 [0.920 – 0.974]	<0.001	0.974 [0.944 – 1.006]	0.109		
RV REFi	1.014 [0.994 – 1.033]	0.167			1.002 [0.981 – 1.023]	0.878

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for REF and REFi).

The variables listed in this table contain no missing values; thus, each model includes data from 292 patients.

Supplementary Table VIII

Factors associated with cardiac death and heart failure hospitalization in the entire study cohort

Including AEF or AEFi (entire study cohort):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.019 [1.006 – 1.032]	0.003				
Diabetes	2.456 [1.602 – 3.766]	<0.001	2.074 [1.313 – 3.275]	0.002	2.080 [1.315 – 3.288]	0.002
Atrial fibrillation	2.514 [1.653 – 3.824]	<0.001				
Cardiomyopathy	1.660 [1.067 – 2.583]	0.025				
Valvular heart disease	1.485 [0.994 – 2.217]	0.054	2.081 [1.301 – 3.329]	0.002	2.156 [1.347 – 3.451]	0.001
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001	0.979 [0.963 – 0.995]	0.011	0.969 [0.954 – 0.984]	<0.001
RV AEF	0.893 [0.865 – 0.923]	<0.001	0.926 [0.887 – 0.967]	<0.001		
RV AEFi	0.946 [0.924 – 0.967]	<0.001			0.971 [0.945 – 0.997]	0.028

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for AEF and AEFi). AEF and AEFi are independent predictors!

The variables listed in this table contain no missing values; thus, each model includes data from 292 patients.

Supplementary Table IX

Factors associated with cardiac death and heart failure hospitalization in the entire study cohort

Including RV EDVi or RV ESVi (entire study cohort):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.019 [1.006 – 1.032]	0.003	1.014 [1.000 – 1.028]	0.047	1.015 [1.001 – 1.030]	0.032
Diabetes	2.456 [1.602 – 3.766]	<0.001	2.214 [1.392 – 3.522]	<0.001	2.220 [1.399 – 3.525]	<0.001
Atrial fibrillation	2.514 [1.653 – 3.824]	<0.001				
Cardiomyopathy	1.660 [1.067 – 2.583]	0.025				
Valvular heart disease	1.485 [0.994 – 2.217]	0.054	2.124 [1.326 – 3.401]	0.002	2.052 [1.282 – 3.284]	0.003
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001	0.968 [0.954 – 0.982]	<0.001	0.975 [0.959 – 0.992]	0.003
RV EDVi	1.015 [1.008 – 1.023]	<0.001	1.011 [1.001 – 1.020]	0.029		
RV ESVi	1.025 [1.017 – 1.033]	<0.001			1.018 [1.006 – 1.029]	0.003

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for RV EDVi and RV ESVi). RV EDVi and ESVi are independent predictors!

The variables listed in this table contain no missing values; thus, each model includes data from 292 patients.

Supplementary Table X

Factors associated with cardiac death and heart failure hospitalization in the entire study cohort

Including TAPSE, FAC or 2DE free-wall longitudinal strain (entire study cohort):

	Multivariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age, n = 292			1.014 [1.001 – 1.028]	0.041		
Diabetes, n = 292	2.066 [1.304 – 3.274]	0.002	2.157 [1.358 – 3.427]	0.001	2.220 [1.383 – 3.565]	<0.001
Atrial fibrillation, n = 292					1.591 [1.011 – 2.503]	0.045
Cardiomyopathy, n = 292						
Valvular heart disease, n = 292	2.059 [1.283 – 3.305]	0.003	2.019 [1.258 – 3.239]	0.004	2.086 [1.282 – 3.393]	0.003
LV ejection fraction, n = 292	0.971 [0.957 – 0.985]	<0.001	0.972 [0.957 – 0.987]	<0.001	0.971 [0.956 – 0.986]	<0.001
TAPSE, n = 291	0.948 [0.911 – 0.986]	0.008				
FAC, n = 292			0.971 [0.949 – 0.993]	0.009		
2DE free-wall longitudinal strain, n = 288					1.050 [1.015 – 1.085]	0.004

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for TAPSE, FAC and 2DE free-wall longitudinal strain). TAPSE, FAC and 2DE free-wall longitudinal strain are independent predictors!

The value after a variable's name indicates the number of patients with available data.

ROC analysis (optimal cutoff identified by Youden's index) to show the discriminatory power of key RV functional parameters with regards to the composite endpoint

Supplementary Table XI

AUC-ROC in the entire study cohort (full length of follow-up):

	AUC [95% CI]	Optimal Cutoff	Sensitivity	Specificity
RV AEF, = 292	0.712 [0.649 – 0.776]	14.9	0.82	0.57
RV EF, n = 292	0.696 [0.631 – 0.761]	43.7	0.86	0.49
RV LEF, n = 292	0.685 [0.619 – 0.75]	17.3	0.66	0.64
2DE free-wall longitudinal strain, n = 288	0.683 [0.618 – 0.749]	-24.0	0.60	0.71
TAPSE, n = 291	0.672 [0.606 – 0.739]	16.0	0.89	0.40
RV AEFi, n = 292	0.668 [0.603 – 0.733]	0.35	0.73	0.57
FAC, n = 292	0.656 [0.588 – 0.725]	38.1	0.76	0.54
RV LEFi, n = 292	0.622 [0.554 – 0.69]	0.31	0.86	0.36
RV REF, n = 292	0.594 [0.524 – 0.665]	21.9	0.74	0.46
RV REFi, n = 292	0.563 [0.495 – 0.632]	0.49	0.76	0.39

The value after a variable's name indicates the number of patients with available data.

Supplementary Table XII

Clinical and echocardiographic characteristics of the patients with preserved right ventricular ejection fraction according to outcome.

Variable	Cardiac death or heart failure hospitalization (N=53)	No events (N=149)	p value
Age, years	64±17	56±16	**0.002**
Gender, male (%)	37 (69.8)	100 (67.1)	0.849
Body surface area, m^2	1.80±0.19	1.83±0.20	0.324
BMI, kg/m^2	25.6±3.7	25.1±3.3	0.389
Systolic blood pressure, mmHg	129±21	126±16	0.720
Diastolic blood pressure, mmHg	74±10	76±10	0.247
Smoking (%)	14 (26.4)	55 (36.9)	0.224
Diabetes (%)	13 (24.5)	11 (7.4)	**0.002**
Dyslipidemia (%)	23 (43.4)	65 (43.6)	1.000
Obesity (%)	6 (11.3)	11 (7.4)	0.393
Family history of CAD (%)	11 (20.8)	44 (29.5)	0.292
History of atrial fibrillation (%)	13 (24.5)	11 (7.4)	**0.002**
Hypertension (%)	37 (69.8)	80 (53.7)	0.060
CAD (%)	21 (39.6)	69 (46.3)	0.496
Valvular heart disease (%)	20 (37.7)	37 (24.8)	0.106
Cardiomyopathies (%)	8 (15.1)	17 (11.4)	0.648
LV end-diastolic volume index, ml/m^2	88.8±28.4	76.2±20.8	**<0.001**
LV end-systolic volume index, ml/m^2	45.3±20.5	35.3±16.0	**0.001**
LV ejection fraction, %	50.2±11.7	54.8±9.9	**0.015**
LV mass index, g/m^2	104.3±20.9	97.3±21.3	**0.026**
2DE LV GLS, %	-15.0±4.8	-16.2±4.2	0.087

2DE left atrial volume index, ml/m²	53.1±22.9	38.8±15.1	**<0.001**
RV end-diastolic volume index, ml/m²	79.7±19.1	74.6±17.4	0.067
RV end-systolic volume index, ml/m²	39.2±9.9	35.9±9.7	**0.032**
RV ejection fraction, %	50.9±4.1	51.7±4.5	0.252
RV longitudinal ejection fraction, %	19.3±5.8	20.8±5.4	0.093
RV radial ejection fraction, %	28.6±4.9	27.3±5.5	0.061
RV anteroposterior ejection fraction, %	18.5±4.8	20.5±4.4	**0.008**
RV LEFi	37.7±10.4	40.1±8.7	0.110
RV REFi	56.6±9.7	52.9±9.4	**0.018**
RV AEFi	36.3±7.9	39.5±6.9	**0.005**
TAPSE, mm	21.0±4.2	22.6±4.4	**0.038**
FAC, %	40.9±8.7	43.5±6.4	0.063
2DE free-wall longitudinal strain, %	-26.8±5.6	-28.4±4.8	0.059
PASP, mmHg	33.7±11.1	26.6±8.9	**<0.001**

Values are reported as mean ± standard deviation (SD) or n (%).

Supplementary Table XIII

Factors associated with cardiac death and heart failure hospitalization in patients with preserved right ventricular ejection fraction

	Hazard Ratio [95% Confidence Interval]	p value
Age, n = 202	**1.028 [1.009 – 1.048]**	**0.004**
Male, n = 202	1.092 [0.607 – 1.963]	0.770
Body surface area, n = 202	0.451 [0.114 – 1.777]	0.255
BMI, n = 202	1.029 [0.953 – 1.112]	0.462
Smoking, n = 202	0.641 [0.348 – 1.180]	0.153
Diabetes, n = 202	**2.829 [1.512 – 5.294]**	**0.001**
Dyslipidemia, n = 202	0.996 [0.579 – 1.715]	0.989
Obesity, n = 202	1.421 [0.607 – 3.324]	0.418
Family history of CAD, n = 202	0.689 [0.355 – 1.339]	0.272
History of atrial fibrillation, n = 202	**2.720 [1.452 – 5.094]**	**0.002**
Hypertension, n = 202	1.730 [0.962 – 3.110]	0.067
CAD, n = 202	0.776 [0.447 – 1.348]	0.368
Valvular heart disease, n = 202	1.637 [0.939 – 2.854]	0.082
Cardiomyopathy, n = 202	1.256 [0.592 – 2.665]	0.552
LV end-diastolic volume index, n = 202	**1.017 [1.008 – 1.027]**	**<0.001**
LV end-systolic volume index, n = 202	**1.023 [1.011 – 1.035]**	**<0.001**
LV ejection fraction, n = 202	**0.967 [0.944 – 0.990]**	**0.005**
LV mass index, n = 183	**1.013 [1.001 – 1.026]**	**0.039**
2DE LV GLS, n = 187	1.055 [0.990 – 1.125]	0.100
2DE left atrial volume index, n = 158	**1.029 [1.016 – 1.043]**	**<0.001**
RV end-diastolic volume index, n = 202	**1.014 [1.000 – 1.029]**	**0.050**
RV end-systolic volume index, n = 202	**1.030 [1.005 – 1.057]**	**0.021**
RV ejection fraction, n = 202	0.958 [0.898 - 1.022]	0.194
RV longitudinal ejection fraction, n = 202	0.955 [0.907 – 1.005]	0.079
RV radial ejection fraction, n = 202	1.037 [0.987 – 1.088]	0.147
RV anteroposterior ejection fraction, n = 202	**0.919 [0.864 – 0.976]**	**0.006**
RV LEFi, n = 202	0.974 [0.944 – 1.005]	0.097

RV REFi, n = 202	**1.033 [1.005 – 1.062]**	**0.021**
RV AEFi, n = 202	**0.949 [0.915 – 0.984]**	**0.004**
TAPSE, n = 201	**0.932 [0.877 – 0.989]**	**0.020**
FAC, n =202	**0.956 [0.920 – 0.994]**	**0.024**
2DE free-wall longitudinal strain, n = 199	**1.056 [1.001 – 1.115]**	**0.048**
PASP, n = 185	**1.045 [1.026 – 1.065]**	**<0.001**

The value after a variable's name indicates the number of patients with available data.

Supplementary Table XIV

Factors associated with cardiac death and heart failure hospitalization in patients with preserved right ventricular ejection fraction

Including LEF or LEFi (only patients with preserved RV EF):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.028 [1.009 – 1.048]	0.004				
Diabetes	2.829 [1.512 – 5.294]	0.001	2.134 [1.110 – 4.101]	0.023	2.134 [1.111 – 4.098]	0.023
Atrial fibrillation	2.720 [1.452 – 5.094]	0.002	2.204 [1.146 – 4.238]	0.018	2.204 [1.147 – 4.236]	0.018
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001				
RV LEF	0.955 [0.907 – 1.005]	0.079	0.990 [0.935 – 1.048]	0.721		
RV LEFi	0.974 [0.944 – 1.005]	0.097			0.993 [0.960 – 1.027]	0.683

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for LEF and LEFi).

The variables listed in this table contain no missing values; thus, each model includes data from 202 patients.

Supplementary Table XV

Factors associated with cardiac death and heart failure hospitalization in patients with preserved right ventricular ejection fraction

Including REF or REFi (only patients with preserved RV EF):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.028 [1.009 – 1.048]	0.004				
Diabetes	2.829 [1.512 – 5.294]	0.001	2.110 [1.001 – 4.046]	0.025	2.101 [1.100 – 4.015]	0.025
Atrial fibrillation	2.720 [1.452 – 5.094]	0.002	2.207 [1.151 – 4.232]	0.017	2.254 [1.172 – 4.334]	0.015
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001	0.976 [0.953 – 0.999]	0.040		
RV REF	1.037 [0.987 – 1.088]	0.147	1.032 [0.981 – 1.086]	0.229		
RV REFi	1.033 [1.005 – 1.062]	0.021			1.022 [0.978 – 0.993]	0.137

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for REF and REFi).

The variables listed in this table contain no missing values; thus, each model includes data from 202 patients.

Supplementary Table XVI

Factors associated with cardiac death and heart failure hospitalization in patients with preserved right ventricular ejection fraction

Including AEF or AEFi (only patients with preserved RV EF):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.028 [1.009 – 1.048]	0.004				
Diabetes	2.829 [1.512 – 5.294]	0.001	2.221 [1-161 – 4.247]	0.016	2.291 [1.197 – 4.387]	0.012
Atrial fibrillation	2.720 [1.452 – 5.094]	0.002	2.264 [1.171 – 4.379]	0.015	2.260 [1.167 – 4.376]	0.016
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001				
RV AEF	0.919 [0.864 – 0.976]	0.006	0.942 [0.883 – 1.004]	0.067		
RV AEFi	0.949 [0.915 – 0.984]	0.004			0.960 [0.925 – 0.997]	0.032

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for AEF and AEFi). AEFi is an independent predictor!

The variables listed in this table contain no missing values; thus, each model includes data from 202 patients.

Supplementary Table XVII

Factors associated with cardiac death and heart failure hospitalization in patients with preserved right ventricular ejection fraction

Including RV EDVi or RV ESVi (only patients with preserved RV EF):

	Univariable		Multivariable		Multivariable	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age	1.028 [1.009 – 1.048]	0.004				
Diabetes	2.829 [1.512 – 5.294]	0.001	2.293 [1.193 – 4.409]	0.013	2.268 [1.183 – 4.346]	0.014
Atrial fibrillation	2.720 [1.452 – 5.094]	0.002	2.034 [1.053 – 3.929]	0.035	2.028 [1.047 – 3.926]	0.036
LV ejection fraction	0.967 [0.944 – 0.990]	<0.001				
RV EDVi	1.014 [1.000 – 1.029]	0.050	1.012 [0.997 – 1.027]	0.130		
RV ESVi	1.030 [1.005 – 1.057]	0.021			1.022 [0.994 – 1.051]	0.120

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for RV EDVi and RV ESVi).

The variables listed in this table contain no missing values; thus, each model includes data from 202 patients.

Supplementary Table XVIII

Factors associated with cardiac death and heart failure hospitalization in patients with preserved right ventricular ejection fraction

Including TAPSE, FAC or 2DE free-wall longitudinal strain (only patients with preserved RV EF):

	Multivariable		**Multivariable**		**Multivariable**	
	HR [95% CI]	**p-value**	**HR [95% CI]**	**p-value**	**HR [95% CI]**	**p-value**
Age, n = 202						
Diabetes, n = 202	2.125 [1.104 – 4.091]	0.024	2.073 [1.078 – 3.987]	0.029	2.395 [1.237 – 4.636]	0.010
Atrial fibrillation, n = 202	2.217 [1.146 – 4.289]	0.018			2.379 [1.228 – 4.610]	0.010
LV ejection fraction, n = 202						
TAPSE, n = 201	0.954 [0.899 – 1.013]	0.122				
FAC, n = 202			0.972 [0.932 – 1.014]	0.193		
2DE free-wall longitudinal strain, n = 199					1.027 [0.973 – 1.084]	0.331

NOTE: If the p-value was not significant, HR + 95% CI is not included in the table (except for TAPSE, FAC and 2DE free-wall longitudinal strain).

The value after a variable's name indicates the number of patients with available data.

ROC analysis (optimal cutoff identified by Youden's index) to show the discriminatory power of key RV functional parameters with regards to the composite endpoint

Supplementary Table XIX

AUC-ROC in patients with preserved RV EF (full length of follow-up):

	AUC [95% CI]	Optimal Cutoff	Sensitivity	Specificity
RV AEFi, n = 202	0.624 [0.533 – 0.716]	0.35	0.77	0.47
RV AEF, n = 202	0.617 [0.525 – 0.709]	19.1	0.63	0.60
RV REFi, n = 202	0.608 [0.520 – 0.696]	0.48	0.83	0.36
2DE free-wall longitudinal strain, n = 199	0.598 [0.504 – 0.692]	-26.5	0.54	0.69
TAPSE, n = 201	0.596 [0.508 – 0.684]	13.0	1.00	0.02
RV REF, n = 202	0.587 [0.499 – 0.675]	28.8	0.55	0.64
FAC, n = 202	0.575 [0.479 – 0.672]	38.1	0.84	0.36
RV LEFi, n = 202	0.566 [0.475 – 0.658]	0.46	0.28	0.85
RV LEF, n = 202	0.558 [0.466 – 0.650]	22.6	0.35	0.79
RV EF, n = 202	0.553 [0.463 – 0.643]	49.7	0.63	0.51

The value after a variable's name indicates the number of patients with available data.