

Supplementary material

Table S1. Uniformity tests (Repeated measures ANOVA and Rayleigh test). Non-uniformity for ANOVA: $F > 1$ $p < 0.001$ and Rayleigh test.

Analysis	Variable	ANOVA	
Time domain(3)		CR	Control
	SDNN	$F_{23,86} = 2.50, p < 0.001$	$F_{23,86} = 2.61, p < 0.001$
	RMSSD	$F_{23,86} = 2.80, p < 0.001$	$F_{23,86} = 3.73, p < 0.001$
	pNN50	$F_{23,86} = 2.89, p < 0.001$	$F_{23,86} = 4.95, p < 0.001$
Frequency domain(4)	HF _n	$F_{23,86} = 2.01, p = 0.003$	$F_{23,86} = 4.88, p < 0.001$
	LF _n	$F_{23,86} = 1.98, p = 0.003$	$F_{23,86} = 4.84, p < 0.001$
	VLF	$F_{23,86} = 0.86, p = 0.649$	$F_{23,86} = 1.65, p = 0.02$
	LF/HF	$F_{23,86} = 2.17, p = 0.001$	$F_{23,86} = 19.07, p < 0.001$
Non-linear(9)	SD1	$F_{23,86} = 2.82, p < 0.001$	$F_{23,86} = 3.73, p < 0.001$
	SD2	$F_{23,86} = 2.04, p = 0.002$	$F_{23,86} = 1.97, p = 0.03$
	SD2/SD1	$F_{23,86} = 1.00, p = 0.457$	$F_{23,86} = 3.68, p < 0.001$
	SamPEN	$F_{23,50} = 1.32, p = 0.14$	$F_{23,86} = 3.11, p < 0.001$
	AmpEN	$F_{23,86} = 1.94, p = 0.004$	$F_{23,86} = 1.68, p = 0.02$
	Alf1	$F_{23,86} = 1.14, p = 0.289$	$F_{23,86} = 3.79, p < 0.001$
	Alf2	$F_{23,86} = 1.73, p = 0.01$	$F_{23,86} = 3.75, p < 0.001$
	CorrDim	$F_{23,86} = 2.40, p < 0.001$	$F_{23,86} = 1.76, p = 0.01$
	REC	$F_{23,86} = 2.19, p < 0.001$	$F_{23,86} = 1.10, p = 0.32$
	DET	$F_{23,86} = 1.45, p = 0.07$	$F_{23,86} = 2.12, p = 0.001$
	ShannE	$F_{23,50} = 2.09, p = 0.001$	$F_{23,50} = 1.21, p = 0.223$
Autonomic indexes(3)	SNS	$F_{23,86} = 9.45, p < 0.001$	$F_{23,86} = 7.14, p < 0.0001$
	PNS	$F_{23,86} = 6.03, p < 0.001$	$F_{23,86} = 11.72, p < 0.0001$
	Stress index	$F_{23,86} = 2.68, p < 0.001$	$F_{23,86} = 2.52, p < 0.0001$
	Variable	Rayleigh	
Time domain(3)		CR	Control
	SDNN	A: $R = 0.15$ $p = 0.12$ Φ : $R = 0.42$ $p = 0$ M: $R = 0.09$ $p = 0.42$	A: $R = 0.16$ $p = 0.08$ Φ : $R = 0.37$ $p = 0$ M: $R = 0.09$ $p = 0.48$
	RMSSD	A: $R = 0.23$ $p = 0.08$	A: $R = 0.10$ $p = 0.38$

		Φ : R= 0.34 p=0 M: R= 0.15 p=0.11	Φ : R= 0.43 p=0 M: R= 0.12 p=0.26
	pNN50	A: R= 0.22 p=0.01 Φ : R= 0.38 p=0 M: R= 0.11 p=0.35	A: R= 0.27 p=0.001 Φ : R= 0.46 p=0 M: R= 0.17 p=0.07
Frequency domain(4)	HF_n	A: R= 0.26 p=0.002 Φ : R= 0.25 p=0.03 M: R= 0.05 p=0.77	A: R= 0.11 p=0.31 Φ : R= 0.60 p=0 M: R= 0.14 p=0.17
	LF_n	A: R= 0.25 p=0.03 Φ : R= 0.25 p=0.03 M: R= 0.05 p=0.78	A: R= 0.11 p=0.32 Φ : R= 0.59 p=0 M: R= 0.14 p=0.16
	VLF	A: R= 0.11 p=0.31 Φ : R= 0.46 p=0 M: R= 0.05 p=0.76	A: R= 0.09 p=0.43 Φ : R= 0.38 p=0 M: R= 0.09 p=0.43
	LF/HF	A: R= 0.72 p=0 Φ : R= 0.26 p=0.002 M: R= 0.32 p<0.001	A: R= 0.45 p=0 Φ : R= 0.50 p=0 M: R= 0.26 p=0.002
Non-linear(9)	SD1	A: R= 0.11 p=0.33 Φ : R= 0.34 p=0 M: R= 0.07 p=0.62	A: R= 0.32 p<0.001 Φ : R= 0.43 p=0 M: R= 0.24 p=0.05
	SD2	A: R= 0.16 p=0.09 Φ : R= 0.42 p=0 M: R= 0.08 p=0.57	A: R= 0.04 p=0.81 Φ : R= 0.34 p=0 M: R= 0.07 p=0.65
	SD2/SD1	A: R= 0.97 p=0 Φ : R= 0.08 p=0.57 M: R= 0.8 p=0	A: R= 0.99 p=0 Φ : R= 0.5 p=0 M: R= 0.8 p=0
	SamPEN	A: R= 0.99 p=0 Φ : R= 0.13 p=0.18 M: R= 0.91 p=0	A: R= 0.95 p=0 Φ : R= 0.1 p=0.3 M: R= 0.82 p=0
	AmpEN	A: R= 0.99 p=0 Φ : R= 0.19 p=0.04 M: R= 0.98 p=0	A: R= 0.90 p=0 Φ : R= 0.12 p=0.5 M: R= 0.88 p=0
	Alf1	A: R= 0.99 p=0	A: R= 0.99 p=0

		Φ : R= 0.14 p=0.18 M: R= 0.95 p=0	Φ : R= 0.58 p=0 M: R= 0.97 p=0
	Alf2	A: R= 0.99 p=0 Φ : R= 0.98 p=0 M: R= 0.98 p=0	A: R= 0.99 p=0.08 Φ : R= 0.53 p=0 M: R= 0.99 p=0.48
	CorrDim	A: R= 0.91 p=0 Φ : R= 0.17 p=0.07 M: R= 0.69 p=0	A: R= 0.92 p=0 Φ : R= 0.35 p=0 M: R= 0.63 p=0
	REC	A: R= 0.02 p=0.94 Φ : R= 0.27 p=0.01 M: R= 0.11 p=0.33	A: R= 0.05 p=0.7 Φ : R= 0.26 p=0.021 M: R= 0.60 p=0.7
	DET	A: R= 0.87 p=0 Φ : R= 0.18 p=0.06 M: R= 0.44 p=0	A: R= 0.95 p=0 Φ : R= 0.51 p=0 M: R= 0.8 p=0
	ShannE	A: R= 0.99 p=0 Φ : R= 0.29 p<0.001 M: R= 0.94 p=0	A: R= 0.99 p=0 Φ : R= 0.29 p<0.001 M: R= 0.98 p=0
Autonomic indexes(3)	SNS	A: R= 0.87 p=0 Φ : R= 0.57 p=0 M: R= 0.40 p=0	A: R= 0.86 p=0 Φ : R= 0.69 p=0 M: R= 0.48 p=0
	PNS	A: R= 0.81 p=0 Φ : R= 0.53 p=0 M: R= 0.07 p=0.62	A: R= 0.92 p=0 Φ : R= 0.73 p=0 M: R= 0.48 p=0
	Stress index	A: R= 0.36 p=0 Φ : R= 0.42 p=0 M: R= 0.05 p=0.78	A: R= 0.40 p=0 Φ : R= 0.43 p=0 M: R= 0.07 p=0.62

5

6

7 **Table S2. Clinical characteristics of CR patients.**

Variable	Cardiac remodeling (n=86)
Age (years: median-IQR)	58-17
Females (n: %)	38-32.7%
White ethnicity (n-%)	70-81.3%
BMI (median-IQR)	24.22-2.32
Self-reported smokers (n-%)	10-11.6%
Hypertension (n-%)	43-50%
Coronary Artery Disease (n-%)	29-33.7%
Stroke (n-%)	5-5.81%
Arrhythmias (n-%)	39-45.34%
Diabetes mellitus 2 (n-%)	11-12.7%
SAHOS (n-%)	7-8.1%
Heart Failure (n-%)	33-38.37%
Prescribed drugs	61-70.93%
Betablockers	33-38.4%
Amiodarone	14-16.2%
Calcium antagonists	35-40.69%
ARB	10-11.62%
ACEI	50-58.13%
Statin	17-19.76%
DOAC	2-2.32%
Warfarin	50-58.13%
AAS	30-34.88%
Clopidogrel	20-23.25%
Diuretic	21-24.41%
Echocardiogram (Mdn-IQR)	
Left ventricular end-diastolic diameter (mm)	4.8-1.17
Left ventricular end-systolic (mm)	3.2-1.2
Interventricular septal thickness (mm)	1.2-0.2
	216.17-112.3

Left ventricular mass index (g/m²)	0.48-0.11
Posterior wall thickness (mm)	55-14.7
Left ventricular ejection fraction (%)	4.2-1.1
Left atrial diameter (mm)	3.3-0.6
HF classification by EF	
HFrEF	18–21%
HFimpEF	10–11.6%
HFpEF	58–67.4%

8

9

Table S3. Watson-Williams circular test for acrophases

Variable	N_Healthy	N_CR	Mean Φ _Healthy	Mean Φ _CR	F_WW	p_WW
PNSi	86	86	2.53	1.71	2.91	0.090
SNSi	86	86	1.11	23.10	8.83	0.003
Sti	86	86	0.41	22.79	5.00	0.027
SDNN	86	86	1.44	0.76	1.09	0.297
MinHR	86	86	1.39	0.14	3.88	0.051
MaxHR	86	86	1.36	23.25	14.78	0.000
RMSSD	86	86	2.27	0.35	9.62	0.002
PNN	86	86	2.46	1.92	0.75	0.387
VLFab	86	86	0.64	0.56	0.01	0.916
LFfab	86	86	1.16	0.51	0.93	0.336
Hfab	86	86	1.97	1.17	1.85	0.176
LFn	86	86	0.98	0.30	1.23	0.268
HFn	86	86	1.80	0.64	4.40	0.038
TPw	86	86	1.20	1.25	0.00	0.944
LFHF	86	86	0.76	0.40	0.32	0.572
SD1	86	86	2.27	0.34	9.64	0.002
SD2	86	86	1.25	0.33	2.01	0.158
SD2SD1	86	86	1.09	0.40	1.22	0.271
AmpEN	86	86	23.31	23.78	0.38	0.541
SampEN	86	86	0.79	23.56	4.37	0.038
Alf1	86	86	0.87	0.33	0.66	0.417
Alf2	86	86	0.44	0.05	0.49	0.484
CorrDimD2	86	86	2.07	1.66	0.43	0.515
REC	86	86	0.31	0.00	0.24	0.626
DET	86	86	23.82	0.53	1.17	0.282
ShannE	86	86	0.08	23.91	0.07	0.789

- 13 **Table S4. Group comparison after excluding subjects with high non-NN intervals**
- 14 Values are expressed as mean $\pm$ SD. Comparisons between Healthy and CR groups of MESOR were
- 15 performed using the Mann–Whitney U test.

Variable	Healthy_mean	Healthy_sd	CR_mean	CR_sd	p_value
AlfI	1.249131638	0.232325313	0.878493	0.310148	1.14E-13
SD2SD1	2.535909366	0.673549394	1.628774	0.661565	4.59E-13
LFn	71.54897219	12.20441818	49.28131	20.138939	7.36E-13
HFn	28.39430804	12.13753015	50.54344	20.010503	7.55E-13
LFHF	4.70465189	2.52162226	2.250752	2.082747	7.43E-11
PNSi	-0.932494622	0.822966402	0.589347	2.2269353	7.33E-09
RMSSD	27.92921042	16.54575583	64.98205	70.301192	4.88E-06
SD1	19.77854296	11.71822037	46.02067	49.791132	4.88E-06
Hfab	337.6431912	368.8143336	2136.357	4871.8459	5.63E-05
SNSi	1.618078101	1.355812354	0.886745	2.0290488	5.97E-05
MaxHR	90.85891279	10.05018846	83.50637	17.050143	6.14E-05
AmpEN	1.097491764	0.067178026	1.017089	0.1699668	0.000902
Alf2	0.489703391	0.085640786	0.438427	0.1642796	0.00175
MinHR	67.24300921	8.768335285	62.53893	11.96021	0.002302
Sti	14.79421904	5.177619663	13.68015	9.0293552	0.00515
PNN	7.340039244	7.343893967	15.68674	18.375987	0.005427
SDNN	32.86972297	11.95105898	50.50755	43.371983	0.024979
DET	98.12543711	0.671032534	97.60728	1.5166615	0.046114
CorrDimD2	1.227497868	0.900539623	1.030345	0.9461313	0.089862
TPw	1225.878702	846.2772232	4922.369	12316.079	0.158109
LFfab	755.7009439	563.5119722	2126.597	5899.5793	0.180149
REC	35.52032563	7.02073675	38.07496	12.577609	0.238944
SD2	41.19519849	13.95917175	51.99336	37.88036	0.305301
VLFab	131.8613932	78.1294122	654.1271	3146.9441	0.675564
SampEN	1.45533813	0.187236092	1.36178	0.4068721	0.819065
ShannE	3.224162403	0.166927052	3.206226	0.2935663	0.906927