SUPPLEMENTAL MATERIAL

Table S1. Baseline characteristics of different groups of subjects enrolled in 6-month spironolactone treatment study.

Parameters	Included in analysis (n=30)	Not complete PC CMR (n=5)*	Study not completed (n=10)†	P-Value
Demographics				
Age (Years)	53.6±6.7	55.8±9.2	57.4±8.3	0.487
Male	20 (66.7%)	3 (80%)	6 (60%)	0.899
African Americans	19 (63.3%)	2 (40%)	5 (50%)	0.478
Co-Morbidities				
Hypertension Duration (Years)	20.9±10.7	23.0±7.7	14.5±11.4	0.210
Hyperaldosteronism	18 (60.0%)	2 (40%)	8 (80%)	0.358
Obstructive Sleep Apnea	20 (66.7%)	4 (80%)	5 (50%)	0.572
Diabetes	9 (30.0%)	2 (40%)	2 (20%)	0.694
Coronary Artery Disease	1 (3.3%)	0 (0%)	1 (10%)	0.561
Measurements				
Body Mass Index (kg/m^2)	32.9±4.8	36.0±4.6	38.5±7.7	0.219
Fat Percentage	33.9±8.2	34.7±11.2	33.9±8.4	0.351
Neck (cm)	42.9±4.1	42.4±2.5	42.9±3.2	0.958
Waist (inch)	42.8±5.0	46.7±4.7	43.7±3.6	0.238
Biochemistry				
Serum Creatinine (mg/dL)	1.07±0.25	1.14±0.44	1.13±0.26	0.743
Serum Potassium (mMol/L)	3.77±0.36	3.70±0.23	3.98±0.36	0.214
B-Type Natriuretic Peptide (pg/mL)	33.7±34.3	34.0±49.0	41.6±30.7	0.824
PAC (ng/dL)	14.1±6.4	15.6±7.5	15.6±8.9	0.783
PRA (ng/mL/h)	0.6 (0.6-1.0)	2.3 (0.6-4.8)	0.6 (0.6-0.6)	0.062
PAC/PRA Ratio	21.7±19.5	13.7±8.8	25.0±14.7	0.510
24-h Urine Aldosterone (µg)	16.0±7.4	12.4±6.5	18.3±9.7	0.396
24-h Urine Protein (mg)	346±769	447±517	287±141	0.922
24-h Urine Cortisol (µg)	151±76	138±120	163±85	0.867
24-h Urine Sodium (mmol)	194±75	165±135	157±55	0.409
24-h Urine Potassium (mmol)	73.2±26.6	63.6±32.7	85.8±76.1	0.602
24-h Urine Calculated Creatinine (mg)	1622±464	1606±525	1592±360	0.982
Total Antihypertensive Medications*	4.4±1.2	5.2±1.3	5.1±0.9	0.155

(*to be continued*)

Table S1 (Continued).

Baseline characteristics of different groups of subjects enrolled in 6-month spironolactone treatment study.

Parameters	Included in analysis (n=30)	Not complete PC CMR (n=5)*	Study not completed (n=10)†	P-Value
Blood Pressure				
Systolic Blood Pressure (mmHg)	142±17	137±9	153±13	0.109
Diastolic Blood Pressure (mmHg)	83±12	83±11	88±11	0.559
Pulse Pressure (mmHg)	59.5±12.6	53.8±12.3	65.6±14.8	0.236
Mean Arterial Pressure (mmHg)	103±13	101±9	109±9	0.259
Heart Rate (beats/minute)	68.5±12.2	65.8±9.4	64.5±9.6	0.605
CMR LV Function				
LVEF	65.4±6.4	70.2±14.1	64.7±8.5	0.411
LVEDVI	74.5±14.1	58.0±15.1	75.0±11.6	0.048
LVESVI	25.5±6.8	17.2±8.2	26.6±7.5	0.046
LVSVI	49.1±10.4	40.9±13.3	48.4±9.2	0.271
CO	7.1±1.6	5.8±1.7	6.8±0.8	0.210
Estimates of Ascending Aorta Stiffness				
Asc. Aorta Pulsatility, %	15.9±5.3	-	14.5±5.7	0.471
Asc. Aorta Distensibility, %/mmHg	0.28±0.10	-	0.23±0.12	0.255
Asc. Aorta PWV, m/s	6.3±2.3	-	5.5±1.7	0.298

*****This group includes 5 subjects that did not complete phase-contact CMR study of Ascending Aorta flow either at baseline (n=1) or after 6-month spironolactone treatment (n=4).

†This group includes 10 subjects that did not compete study protocol due to various reasons as follows: due to spironolactone intolerance (n=1), increased creatinine (n=1), hyperkalemia (n=1), uncontrolled BP (n=3), incompliance to the study protocol (n=2), claustrophobia to CMR study (n=1), and voluntary withdraw for adrenal venous sampling and adrenalectomy (n=1).

Based on distribution of continuous variables, parametric or non-parametric, one-Way ANOVA or Kruskal-Wallis test was used to compare means or medians of baseline variables of 3 groups of subjects enrolled in the study. Proportions of categorical variables in the groups were compared using Fisher's Exact test.

Table S2. Study subjects' demographic characteristics and CMR-related measurements of blood pressure, ascending aorta cross-section area, and pulse wave velocity.

Subjects	Age, yrs.	Race	Sex	Baseline					6-month of Spironolactone intake				
				SBP, mmHg	DBP, mmHg	$AscA_{max}$, mm^2	$AscA_{min}$, mm^2	PWV, m/s	SBP, mmHg	DBP, mmHg	$AscA_{max}$, mm^2	$AscA_{min}$, mm^2	PWV, m/s
1	55	AA	M	130	78.5	1292	1187	6	120.5	71.5	1032	833.8	4.4
2	45	AA	M	154.5	92	808.7	643.2	3.2	144	101.5	682.2	565.6	6.5
3	48	W	M	157	92	876.4	692.3	4.7	164	85	754	576.4	2.5
4	58	AA	M	135	81.5	1086	971.6	5.1	126	60.5	1056	960.8	5.2
5	61	AA	M	122	83.5	823.3	708.5	4.6	144	95.5	1050	836	4.8
6	48	W	F	123	55	496.1	408.5	4	146	75	586.6	420.2	3
7	52	AA	F	131	71	540.9	490.1	8	119.5	64	680.3	526.9	7
8	45	AA	M	153	103.5	978.1	803.8	8.8	112	79	1033	885.3	5.4
9	45	W	M	136	100.5	927.1	807.4	6.3	144.5	93	995.1	850.6	4
10	47	W	M	124	80	1444	1215	4	135.5	88.5	1328	1175	5
11	57	AA	M	138	77	727.4	595.2	4.8	132	75	995.1	850.6	3.7
12	64	AA	F	180	92	451	382	5.4	192.5	90.5	507.9	403.3	3.7
13	48	AA	M	128.5	67.5	886.4	736.4	7.7	125.5	78.5	756.4	630.4	4.7
14	57	AA	M	157	104	1083	926	7.1	97.5	63.5	887.5	786	6.5
15	47	AA	M	157.5	82.5	797.3	632	6.4	138	79	795	591.4	3.9
16	65	W	M	153	94	843.2	779.7	10.6	104	67	855.3	769.1	3.8
17	66	AA	F	164	89.5	549.9	488.8	7	136	74	694.6	631.6	6.1
18	57	W	M	120	76	678.2	589	5.5	135	68	897.6	709.9	3.45
19	49	AA	F	147	65	897.4	772.9	4.7	168.5	78	994.3	829.6	3.1
20	51	W	F	134	84	464.4	391.5	3.1	122	70	561	432.5	1.6
21	54	W	F	136	81	510.2	453	5.4	129	82	589.2	479.5	3.5
22	48	W	F	142	77	793.2	684.9	4	143	78	701.8	576.9	3.5
23	62	W	M	139	76	805.8	749.6	5.2	138	71	807.1	705.7	4.9
24	49	AA	M	137.5	85.5	1076	933.9	2.5	159.5	110.5	1100	876.4	4.2
25	57	AA	M	133	74	676.3	606.9	10.1	141	84.5	718.5	602.9	10.5
26	57	AA	F	130	74	960	871.3	10.2	126	77	1062.5	843.2	5.5
27	65	AA	M	143.5	77	662.1	558.4	9.3	162	97	650.3	514.2	3.2
28	56	AA	M	140	84.5	836.4	753.5	8.5	170	117	1068	881	2
29	51	W	F	127.5	76	505.2	450.8	7.4	118.5	65.5	614	445.9	2.9
30	45	AA	M	196	111	829.7	739.9	10	156.5	93.5	684.7	604.1	6.2
Average	*53.6*	-	-	*142*	*83*	*810*	*701*	*6.3*	*138*	*81*	*838*	*693*	*4.5*
SD	*6.7*	-	-	*17*	*12*	*240*	*212*	*2.3*	*21*	*14*	*203*	*188*	*1.8*

Age is at the time of study enrollment; AA= African American; W= Whites; M= male; F= female; SBP= systolic blood pressure; DBP= diastolic blood pressure; $AscA_{max}$= maximum (systolic) area of the Ascending Aorta; $AscA_{min}$= minimum (diastolic) area of the Ascending Aorta; PWV= pulse wave velocity.

Table S3. Estimates of ascending aorta stiffness after 6-month of spironolactone treatments in subjects included in vs. excluded from the primary study analysis.

Parameters	Included in analysis (n=30)		Excluded from analysis (n=15)		T-test P-value
	Baseline (n=30)	6-month SPL (n=30)	Baseline (n=11)*	6-month SPL (n=4)†	
Ascending Aorta Pulsatility, %	15.9±5.3	22.1±7.9	13.8±5.9	24.4±10.9	0.271 (unpaired) 0.584 (unpaired)
T-Test P-value	<0.001 (paired)		0.027 (unpaired)		
Ascending Aorta Distensibility, %/mmHg	0.28±0.10	0.40±0.14	0.23±0.11	0.49±0.24	0.199 (unpaired) 0.272 (unpaired)
T-Test P-value	<0.001 (paired)		0.012 (unpaired)		
Ascending Aorta PWV, m/s	6.3±2.3	4.5±1.8	5.4±1.7	3.8±2.2	0.213 (unpaired) 0.481 (unpaired)
T-Test P-value	<0.001 (paired)		0.166 (unpaired)		

SPL=spironolactone.

*****This group includes subjects that had only baseline phase-contrast CMR study of ascending aorta flow (10 subjects that did not compete 6-month treatment study protocol and were withdrawn and 1 subject that did not have phase-contact CMR study after 6-month spironolactone treatment).

†This group includes 4 subjects that had only follow-up phase-contrast CMR study of ascending aorta flow (they completed the treatment study but did not have phase-contact CMR study of ascending aorta flow at baseline).

Depending on groups of comparison, paired or unpaired T-test was used as specified in the table.

FIGURE S1

Multivariable linear regression model (demographic variables).

Dependent variables:
A) difference in aortic pulsatility (d_AP), **B**) difference in aortic distensibility (d_AD), and **C**) difference in pulse wave velocity (d_PWV).

where difference = value after 6 months of spironolactone intake – value at baseline

Independent variables:
Age, Sex, Race, HyperAldosteronism.

Collinearity Statistics for model with dependent variables d_AP, d_AD, or d_PWV.

Independent Variables	Tolerance	Variance inflation factor (VIF)
Age	0.962	1.04
Sex	0.941	1.063
Race	0.936	1.069
HyperAldosteronism	0.966	1.035

A) Outcome = Difference in aortic pulsatility

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	-5.703	11.591	-0.492	0.627
Age	-0.123	0.206	-0.596	0.556
Sex	7.842	2.901	2.703	0.012
Race	-2.509	2.845	-0.882	0.386
HyperAldosteronism	3.019	2.754	1.096	0.283

B) Outcome = Difference in aortic distensibility

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	-0.238	0.225	-1.061	0.299
Age	0	0.004	0.051	0.96
Sex	0.129	0.056	2.298	0.03
Race	0.028	0.055	0.512	0.613
HyperAldosteronism	0.015	0.053	0.274	0.787

C) Outcome = difference in PWV

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	-3.144	3.702	-0.849	0.404
Age	0.073	0.066	1.111	0.277
Sex	0.166	0.927	0.179	0.859
Race	0.379	0.909	0.417	0.681
HyperAldosteronism	1.352	0.88	1.536	0.137

Units of change in the predictor variables: Age (1 year), Sex (1 (M)/0 (F)), Race (1 (African American)/0 (White)), Hyperaldosteronism: (1 (yes)/0 (no)).

FIGURE S2

Multivariable linear regression model (basic cardiac function and hemodynamic variables).

Dependent variables:
A) difference in aortic pulsatility (d_AP), **B**) difference in aortic distensibility (d_AD), and **C**) difference in pulse wave velocity (d_PWV).

Independent variables:
Difference in left ventricular ejection fraction (d_LVEF), stroke volume (d_SV), heart rate (d_HR), mean arterial pressure (d_MAP), and pulse pressure (d_PP).

where difference = value after 6 months of spironolactone intake – value at baseline

Collinearity Statistics for model with dependent variables d_AP, d_AD, or d_PWV.

Independent Variables	Tolerance	Variance inflation factor (VIF)
d_LVEF	0.49	2.04
d_SV	0.431	2.323
d_HR	0.708	1.413
d_MAP	0.771	1.298
d_PP	0.754	1.326

A) Outcome = Difference in aortic pulsatility

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	-6.778	1.443	-4.699	0.000
d_LVEF	0.147	0.218	0.677	0.505
d_SV	0.112	0.091	1.234	0.229
d_HR	0.179	0.153	1.168	0.254
d_MAP	0.095	0.086	1.096	0.284
d_PP	0.069	0.128	0.535	0.597

B) Outcome = Difference in aortic distensibility

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	-0.122	0.027	-4.442	0.000
d_LVEF	0.002	0.004	0.380	0.707
d_SV	0.002	0.002	1.233	0.229
d_HR	0.003	0.003	0.988	0.333
d_MAP	0.002	0.002	0.950	0.352
d_PP	-0.005	0.002	-1.973	0.060

C) Outcome = difference in PWV

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	1.416	0.419	3.378	0.002
d_LVEF	-0.129	0.063	-2.035	0.053
d_SV	0.023	0.026	0.887	0.384
d_HR	-0.066	0.044	-1.477	0.153
d_MAP	-0.001	0.025	-0.044	0.965
d_PP	0.039	0.037	1.040	0.309

Units of change in the predictor variables: LVEF (1 %), SV (1 ml), HR (1 bpm), MAP (1 mmHg), PP (1 mmHg).

FIGURE S3

Multivariable linear regression model (biochemical variables).

Dependent variables:
A) difference in aortic pulsatility (d_AP), **B**) difference in aortic distensibility (d_AD), and **C**) difference in pulse wave velocity (d_PWV).

Independent variables:
Difference in serum creatinine (d_SCr), serum potassium (d_SK+), plasma renin activity (d_PRA), brain natriuretic peptide (d_BNP).

where difference = value after 6 months of spironolactone intake – value at baseline

Collinearity Statistics for model with dependent variables d_AP, d_AD, or d_PWV.

Independent Variables	Tolerance	Variance inflation factor (VIF)
d_SCr	0.914	1.094
d_SK+	0.981	1.02
d_PRA	0.87	1.15
d_BNP	0.925	1.081

A) Outcome = Difference in aortic pulsatility

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	-8.546	2.735	-3.125	0.005
d_SCr	0.794	8.608	0.092	0.927
d_SK+	-1.334	3.528	-0.378	0.709
d_PRA	-0.241	0.123	-1.963	0.061
d_BNP	-0.009	0.106	-0.082	0.936

B) Outcome = Difference in aortic distensibility

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	-0.123	0.05	-2.457	0.022
d_SCr	-0.041	0.158	-0.259	0.798
d_SK+	0.003	0.065	0.051	0.960
d_PRA	-0.003	0.002	-1.489	0.150
d_BNP	-0.002	0.002	-1.181	0.249

C) Outcome = difference in PWV

Parameter	Beta Estimate	Standard Error	t Value	Pr > |t|
Intercept	1.349	0.784	1.719	0.098
d_SCr	-3.192	2.469	-1.293	0.208
d_SK+	0.503	1.012	0.497	0.624
d_PRA	-0.014	0.035	-0.404	0.690
d_BNP	0.031	0.03	1.023	0.317

Units of change in the predictor variables: Scr (1 mg/dL), SK+ (1 mMol/L), PRA (1 ng/mL/h), BNP: (1 pg/mL).