

Table 1. Arginine derivatives in genetically confirmed HCM-patients stratified by diastolic function.

	HCM No DD (n = 21)	HCM Mild DD (n = 10)	HCM Moderate/severe DD (n = 23)	p-Value for linear trend
ADMA (μmol/L)	0.62±0.16	0.65±0.10	0.73±0.19	0.035
SDMA (μmol/L)	0.47±0.15	0.52±0.27	0.60±0.30	0.090
hArg (μmol/L)	1.62±0.44	1.40±0.49	1.58±0.54	0.798

Mean±SD; ANOVA with post test for linear trend. ADMA indicates asymmetric dimethylarginine; Arg, arginine; DD, diastolic dysfunction; hArg, homoarginine; HCM, hypertrophic cardiomyopathy; SD, standard deviation; SDMA, symmetric dimethylarginine

Table 2. Logistic regression analyses for the arginine derivatives and diastolic dysfunction in genetically confirmed HCM-patients (moderate to severe DD vs. normal diastolic function).

	ADMA		SDMA		hArg	
	OR (95% CI)	p-Value	OR (95% CI)	P value	OR (95% CI)	p-Value
Model 1	2.72 (1.06-6.98)	0.038	1.82 (0.87-3.84)	0.113	0.94 (0.41-2.14)	0.882
Model 2	2.23 (0.82-6.06)	0.116	1.74 (0.72-4.16)	0.217	1.18 (0.46-3.03)	0.731
Model 3	2.32 (0.75-7.24)	0.146	2.33 (0.75-7.18)	0.142	0.71 (0.22-2.29)	0.565
Model 4	2.52 (0.74-8.57)	0.139	2.08 (0.56-7.71)	0.271	0.71 (0.22-2.33)	0.578

Logistic regression analyses with odds ratios (95% CI) per SD increase. Model 1 is unadjusted, model 2 is adjusted for age and sex, model 3 is additionally adjusted for body mass index, diabetes mellitus, coronary artery disease, and arterial hypertension, model 4 is additionally adjusted for estimated glomerular filtration rate. ADMA, asymmetric dimethylarginine; CI, confidence interval; hArg, homoarginine; OR, odds ratio; SD, standard deviation; SDMA, symmetric dimethylarginine

Table 3. Correlation analyses of arginine derivatives with echocardiographic and MRI parameters in HCM patients.

	ADMA						SDMA						Homoarginine					
	Spearman		Pearson		Partial correlation		Spearman		Pearson		Partial correlation		Spearman		Pearson		Partial correlation	
	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value	ρ	<i>p</i> -Value
E wave	0.18	0.008	0.07	0.531	0.06	0.574	0.15	0.032	0.07	0.500	0.10	0.338	-0.03	0.694	-0.01	0.904	0.04	0.743
A wave	0.13	0.072	0.04	0.694	-0.01	0.962	0.12	0.097	0.08	0.440	0.06	0.608	0.01	0.943	-0.01	0.886	-0.01	0.929
E/A	-0.03	0.709	0.02	0.860	0.05	0.659	-0.03	0.652	0.02	0.847	0.03	0.783	-0.01	0.857	-0.04	0.696	-0.04	0.702
Mean E'	-0.19	0.007	-0.04	0.706	0.03	0.779	-0.07	0.325	-0.07	0.492	0.00	0.995	0.17	0.019	0.16	0.117	0.10	0.357
Mean E/E'	0.23	<0.001	0.05	0.652	-0.04	0.727	0.17	0.019	0.08	0.453	0.08	0.468	-0.12	0.097	-0.15	0.140	-0.09	0.420
Mean IVRT	0.09	0.217	0.00	0.967	-0.03	0.813	0.03	0.706	-0.02	0.842	-0.05	0.660	-0.19	0.008	-0.16	0.124	-0.10	0.344
LA diameter	0.12	0.088	-0.02	0.866	-0.01	0.960	-0.08	0.238	-0.18	0.075	-0.10	0.362	-0.02	0.750	0.09	0.394	-0.04	0.705
SW thickness	-0.12	0.073	-0.15	0.145	-0.15	0.154	-0.13	0.061	-0.18	0.092	-0.13	0.240	-0.23	<0.001	-0.10	0.316	-0.18	0.096
LW thickness	0.05	0.517	-0.04	0.669	-0.12	0.286	0.03	0.719	0.04	0.673	-0.03	0.801	0.00	0.966	-0.05	0.628	-0.06	0.579
MCF (%)	-0.03	0,750	0.05	0.661	0.05	0.631	0,05	0,556	-0.08	0.437	-0.14	0.186	-0,02	0,818	-0.03	0.775	-0.01	0.925
LGE size (% LV)	-0.13	0.174	0.03	0.742	0.05	0.614	0.00	0.962	0.17	0.095	0.12	0.266	0.13	0.179	-0.08	0.420	-0.08	0.489

Partial correlation analyses are adjusted for age and sex, body mass index, diabetes mellitus, coronary artery disease, and arterial hypertension, and estimated glomerular filtration rate. ADMA indicates asymmetric dimethylarginine; hArg, homoarginine; HCM, hypertrophic cardiomyopathy; IVRT, isovolumetric relaxation time; LA, left atrium; LGE, late-gadolinium-enhancement; LW, lateral wall; MCF, myocardial contraction fraction; SDMA, symmetric dimethylarginine; SW, septal wall

Table 4. Linear regression analyses of arginine derivatives (independent variables) with echocardiographic parameters of diastolic function (dependent variables).

	ADMA		SDMA		hArg	
	Beta coefficient (95% CI)	<i>p</i> -Value	Beta coefficient (95% CI)	<i>P</i> value	Beta coefficient (95% CI)	<i>p</i> -Value
E wave						
Model 1	4.90 (0.79-9.01)	0.020	3.61 (-0.36-7.57)	0.075	-0.24 (-4.24-3.75)	0.904
Model 2	4.58 (0.35-8.80)	0.034	2.91 (-1.27-7.09)	0.172	1.57 (-2.51-5.65)	0.448
Model 3	4.72 (0.43-9.01)	0.031	3.14 (-1.10-7.39)	0.146	1.39 (-2.83-5.60)	0.518
Model 4	4.67 (0.37-8.98)	0.034	4.10 (-0.41-8.61)	0.074	1.40 (-2.84-5.65)	0.515
A wave						
Model 1	0.83 (-6.97-8.64)	0.833	4.00 (-4.20-12.19)	0.338	0.34 (-7.26-7.95)	0.929
Model 2	-2.78 (-10.74-5.18)	0.492	-0.33 (-8.88-8.23)	0.940	1.32 (-6.37-9.00)	0.735
Model 3	-2.15 (-10.09-5.78)	0.593	-0.51 (-9.09-8.07)	0.907	-0.19 (-7.98-7.60)	0.962
Model 4	-2.18 (-10.15-5.79)	0.590	0.79 (-8.30-9.87)	0.865	-0.20 (-8.04-7.64)	0.959
E/A						
Model 1	0.05 (-0.05-0.15)	0.284	0.00 (-0.11-0.10)	0.948	-0.05 (-0.14-0.05)	0.330
Model 2	0.10 (0.00-0.20)	0.053	0.05 (-0.06-0.16)	0.402	-0.04 (-0.14-0.05)	0.367
Model 3	0.09 (-0.01-0.20)	0.067	0.05 (-0.06-0.16)	0.404	-0.02 (-0.12-0.08)	0.657
Model 4	0.10 (0.00-0.20)	0.061	0.02 (-0.09-0.14)	0.689	-0.02 (-0.12-0.08)	0.684
Mean E'						
Model 1	-0.36 (-0.68-0.05)	0.024	-0.19 (-0.50-0.12)	0.237	0.21 (-0.10-0.53)	0.188
Model 2	-0.14 (-0.44-0.17)	0.378	0.13 (-0.17-0.43)	0.396	0.00 (-0.30-0.30)	0.993
Model 3	-0.16 (-0.46-0.14)	0.303	0.10 (-0.20-0.40)	0.519	0.11 (-0.20-0.41)	0.491
Model 4	-0.17 (-0.47-0.13)	0.272	0.12 (-0.21-0.44)	0.475	0.09 (-0.21-0.39)	0.557
Mean E/E'						
Model 1	2.24 (1.17-3.31)	<0.001	0.85 (-0.23-1.92)	0.122	-0.24 (-1.34-0.87)	0.673
Model 2	1.80 (0.77-2.83)	<0.001	0.10 (-0.96-1.16)	0.854	0.67 (-0.38-1.73)	0.208
Model 3	1.76 (0.73-2.79)	<0.001	0.10 (-0.96-1.17)	0.850	0.49 (-0.57-1.55)	0.362
Model 4	1.77 (0.74-2.80)	<0.001	0.36 (-0.77-1.49)	0.532	0.48 (-0.59-1.54)	0.379
Mean IVRT						
Model 1	2.32 (-2.66-7.31)	0.359	-0.60 (-5.45-4.25)	0.808	-4.03 (-8.94-0.89)	0.108
Model 2	0.05 (-5.07-5.16)	0.985	-3.79 (-8.85-1.26)	0.140	-3.16 (-8.18-1.86)	0.215
Model 3	0.20 (-5.01-5.41)	0.941	-3.63 (-8.80-1.53)	0.167	-3.82 (-8.96-1.32)	0.144
Model 4	0.18 (-5.07-5.42)	0.947	-4.34 (-9.84-1.16)	0.121	-3.87 (-9.07-1.33)	0.144
LA diameter						
Model 1	0.78 (-0.67-2.23)	0.289	0.40 (-1.00-1.80)	0.573	-0.32 (-1.75-1.11)	0.660
Model 2	0.21 (-1.29-1.70)	0.786	-0.29 (-1.77-1.18)	0.697	-0.32 (-1.78-1.15)	0.672
Model 3	0.76 (-0.71-2.23)	0.307	0.30 (-1.15-1.75)	0.685	-0.76 (-2.21-0.69)	0.304
Model 4	0.87 (-0.60-2.33)	0.244	0.05 (-1.48-1.58)	0.948	-0.58 (-2.03-0.88)	0.435

Linear regression analyses with beta coefficients (95% CI) per SD Arg derivatives increase. Model 1 is unadjusted, model 2 is adjusted for age and sex, model 3 is additionally adjusted for body mass index, diabetes mellitus, coronary artery disease, and arterial hypertension, model 4 is additionally adjusted for estimated glomerular filtration rate. ADMA, asymmetric dimethylarginine; CI, confidence interval; hArg, homoarginine; IVRT, isovolumetric relaxation time; LA, left atrium; SD, standard deviation; SDMA, symmetric dimethylarginine.

Table 5. Logistic regression analyses of arginine derivatives and atrial fibrillation in genetically confirmed HCM-patients.

	ADMA		SDMA		hArg	
	OR (95% CI)	<i>p</i> -Value	OR (95% CI)	<i>p</i> -Value	OR (95% CI)	<i>p</i> -Value
Model 1	1.85 (0.85-4.05)	0.123	2.00 (1.05-3.79)	0.034	0.53 (0.23-1.23)	0.137
Model 2	1.64 (0.70-3.83)	0.256	2.00 (0.97-4.13)	0.060	0.60 (0.25-1.45)	0.260
Model 3	1.63 (0.64-4.18)	0.306	2.06 (0.86-4.92)	0.105	0.44 (0.16-1.25)	0.125
Model 4	1.67 (0.65-4.29)	0.289	1.78 (0.70-4.50)	0.223	0.51 (0.18-1.48)	0.215

Logistic regression analyses with odds ratios (95% CI) per SD increase. Model 1 is unadjusted, model 2 is adjusted for age and sex, model 3 is additionally adjusted for body mass index, diabetes mellitus, coronary artery disease, and arterial hypertension, model 4 is additionally adjusted for estimated glomerular filtration rate. ADMA, asymmetric dimethylarginine; CI, confidence interval; hArg, homoarginine; OR, odds ratio; SD, standard deviation; SDMA, symmetric dimethylarginine.