Cardiac Power at Rest by Echocardiogram in “Grey Zone” Athletes with Mildly Reduced Left Ventricular Ejection Fraction

Brandon Francis, MD; Gary Parizher, MD; Michael S. Emery, MD, MS, FACC

Cleveland Clinic, Cleveland, OH

BACKGROUND

Evaluating exercise-induced cardiac remodeling (EICR) in athletes with mildly reduced left ventricular ejection fraction (LVEF) can be challenging. We hypothesized that cardiac power (CP) at rest would help distinguish healthy “grey zone” (GZ) athletes with mildly reduced LVEF from athletes with early dilated cardiomyopathy (DCM).

METHODS

54 athletes were divided into 3 groups: LVEF ≥ 55% (n = 40), LVEF < 55% with EICR (GZ, n = 7), and LVEF < 55% with DCM (n = 7). Cardiac output was determined using LV outflow tract pulsed wave Doppler and 2D area. CP was calculated from resting echo normalized to LV mass (area-length method):

$$\frac{Power}{Mass} = 0.222\ x\ Cardiac\ Output\ x\ \frac{Mean\ Blood\ Pressure}{Left\ Ventrical\ Mass}$$

Comparison between groups was performed using Kruskal-Wallis and Dunn’s post hoc testing, with $p < 0.05$ indicating statistical significance.

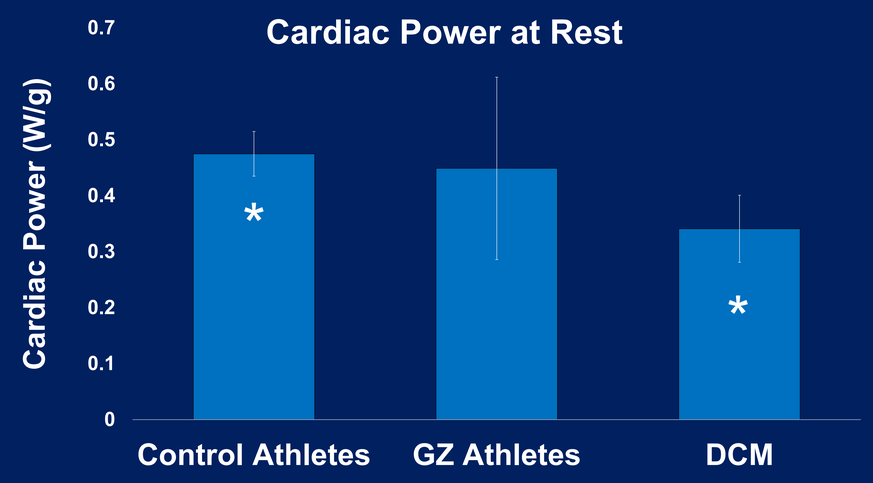
RESULTS

Kruskal-Wallis testing indicated a significant difference ($p = 0.01761$) in CP at rest between the control (0.475 +/- 0.040 W/g), GZ (0.449 +/- 0.163 W/g), and DCM groups (0.341 +/- 0.060 W/g). Dunn’s post hoc testing demonstrated a significant difference between the control and DCM groups ($p = 0.0081$) without statistical significance between the control and GZ ($p = 0.1617$) or GZ and DCM groups ($p = 0.0844$).

CONCLUSION

CP can be a valuable tool to differentiate between control athletes and those with DCM. Further investigations are required to demonstrate its potential utility in differentiating GZ athletes from those with early DCM.

Echocardiographic estimated resting cardiac power is a potentially simple method to differentiate exercise-induced cardiac remodeling from dilated cardiomyopathy.



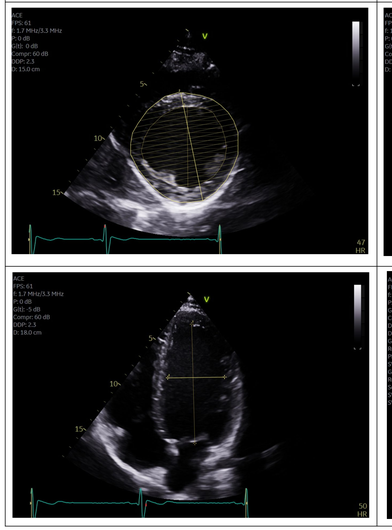
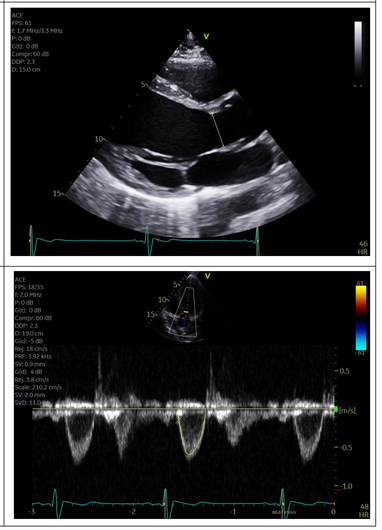
CONTACT INFO:
For more information, please email *francib6@ccf.org* or reach out on social media *@bzfrancisMD*

ACC.24

Patient Characteristics

	Athlete Controls (n=40)	GZ Athletes (n=7)	DCM (n=7)	P Value
Age (y)	32.4 +/- 5.3	34.7 +/- 14.7	29.9 +/- 15.9	0.4996
Gender (Male)	29	4	7	0.186
Mean Arterial Pressure (mmHg)	92.2 +/- 3.6	86.3 +/- 8.9	86.9 +/- 8.5	0.3972
Heart Rate (bpm)	59 +/- 3.1	67 +/- 18.2	61 +/- 11.4	0.6328
Ejection Fraction (%)	63 +/- 1.7	52 +/- 2.6	46 +/- 4.4	<0.0001*†
Stroke Volume (ml)	65.372 +/- 4.166	61.946 +/- 19.370	64.874 +/- 8.614	0.7782
Cardiac Output (L/min)	3.825 +/- 0.273	4.186 +/- 1.585	3.868 +/- 0.437	0.7775
Interventricular Septum (cm)	0.909 +/- 0.064	0.946 +/- 0.263	0.951 +/- 0.120	0.7415
Left Ventricle Internal Diameter (cm)	4.79 +/- 0.155	5.046 +/- 0.646	5.357 +/- 0.427	0.02499*
Posterior Wall Thickness (cm)	1.011 +/- 0.066	0.947 +/- 0.198	1.073 +/- 0.179	0.2206
LV Mass by Linear Method (g)	162.481 +/- 12.610	174.637 +/- 56.234	208.463 +/- 42.903	0.07277
LV Mass by Area-Length Method (g)	169.826 +/- 11.889	180.432 +/- 53.386	221.25 +/- 27.628	0.01793*
Cardiac Power (W/g)	0.475 +/- 0.040	0.449 +/- 0.163	0.341 +/- 0.060	0.01761*

*Statistically significant difference between control and DCM groups
†Statistically significant difference between control and GZ groups
‡Statistically significant difference between GZ and DCM groups

LV Mass by Area-Length Method	Stroke Volume by VTI
	

DISCLOSURE INFORMATION

No relevant disclosures.

Cleveland Clinic

Poster Session Online
ACC.24 ATLANTA APRIL 6–8, 2024
1424: Heart Failure and Cardiomyopathies: Special Populations 12
Brandon Francis
1424–141
ACC2024