

Increases in Left Ventricular Mass is More Pronounced in Low Ejection Fraction Versus Normal Ejection Heart Failure

Ramzan M Zakir MD, Rajiv J Patel DO, Samir Ahuja MD, Muhamed Saric MD, PhD, and Marc Klapholz, MD
 UMDNJ-New Jersey Medical School. Newark, New Jersey

ABSTRACT

Background: Normal ejection fraction (EF) heart failure (HF) has typically been associated with increases in left ventricular (LV) mass without change in LV volume. The possibility that LV mass is similarly increased in low EF HF is sometimes obscured by the appearance of a dilated and thin walled LV. **Methods:** LV mass was measured in 100 consecutive patients hospitalized for decompensated (volume overloaded) HF with a non-ischemic etiology. LV septal and posterior wall thickness and LV end diastolic dimension (LVEDD) was measured by M-mode echocardiography. LV mass was calculated: $0.832[(PW + S + LVEDD) \div 3 LVEDD] + 0.6$ (ASE formula / Deveruex correction) and indexed to $h2.7$ (meters). **Results:** Patients were evenly divided between normal EF HF and low EF HF in this consecutive series. Demographic, clinical and echocardiographic results are listed in Table 1. Patients with normal EF HF were significantly older and tended to have more hypertension and worse renal function. LV mass however was significantly greater in the low EF HF group compared to the normal EF HF group. **Conclusion:** In our population, patients hospitalized with non-ischemic decompensated HF were predominately African Americans with a history of hypertension. LV mass was increased in both groups but was significantly greater in the low EF HF compared to the normal EF HF group. No differences in background clinical characteristics or co-morbid conditions could be identified to explain the differences in LV remodeling between groups. Further studies including a search for genetic polymorphisms appear warranted. The effect of gender on the development of normal EF HF versus low EF HF remains unclear.

BACKGROUND

- Normal ejection fraction (EF) heart failure (HF) has typically been associated with increases in left ventricular (LV) mass without change in LV volume.
- The possibility that LV mass is similarly increased in low EF HF is sometimes obscured by the appearance of a dilated and thin walled LV. (Figure 1)

OBJECTIVE

- We sought to determine if LV mass is similarly increased in patients with low EF HF compared to those with normal EF HF.

METHODS

Study Group

- LV mass was measured in 100 consecutive patients hospitalized for decompensated (volume overloaded) HF with a non-ischemic etiology.
- Inclusion Criteria**
 - Age > 18 hospitalized for Decompensated HF
 - Evidence of Volume Overload
 - Echocardiogram within one week of admission
- Exclusion Criteria**
 - Serum Cr ≥ 3.0 mg/dL
 - Moderate to Severe Valvular Disease
 - CAD (MI, PCI, CABG, + Stress Test)

Echocardiography Measurements

- LV septal and posterior wall thickness and LV end diastolic dimension (LVEDD) was measured by M-mode echocardiography.
- LV mass was calculated: $0.832[(PW + S + LVEDD) \div 3 LVEDD] + 0.6$ (ASE formula / Deveruex correction) and indexed to $h2.7$ (meters).

RESULTS

- Patients were evenly divided between normal EF HF and low EF HF in this consecutive series.
- Demographic, clinical and echocardiographic results are listed in Table 1.
- Patients with normal EF HF were significantly older and tended to have more hypertension and worse renal function.
- LV mass however was significantly greater in the low EF HF group compared to the normal EF HF group

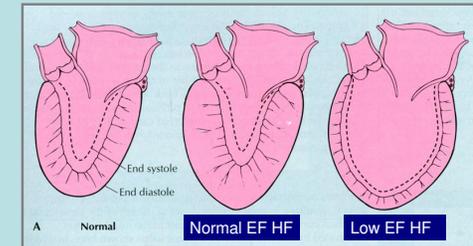
FIGURES

Table 1. Results

	Normal EF HF (n=50)	Low EF HF (n=50)	p-value
Age (years)	64 ± 14	60.9 ± 13	0.04
Sex (male)	36% (18/50)	58% (29/50)	NS
African American	82% (41/50)	82% (41/50)	NS
Serum Creatinine (mg/dl)	1.37 ± 0.99	1.22 ± 0.55	NS
Diabetes	22% (11/50)	22% (11/50)	NS
Hypertension	90% (45/50)	78% (39/50)	NS
LVEF (%)	65.5 ± 10	22.1 ± 8	< 0.001
LV septal thickness (cm)	1.35	1.27	NS
LV posterior wall thickness (cm)	1.27	1.25	NS
LVEDD (cm)	4.99 ± 1	6.19 ± 1	<0.001
LV mass (g/m ^{2.7})*	32.41	27.2	<0.003

*normal LV mass = 49.2 and 46.7 g/m^{2.7} in males and females respectively

Figure 1 Traditional Understanding Of LV Mass in Normal and Low EFHF



CONCLUSION

- In our population, patients hospitalized with non-ischemic decompensated HF were predominately African Americans with a history of hypertension.
- LV mass was increased in both groups but was significantly greater in the low EF HF compared to the normal EF HF group.
- No differences in background clinical characteristics or co-morbid conditions could be identified to explain the differences in LV remodeling between groups.
- Further studies including a search for genetic polymorphisms appear warranted.
- The effect of gender on the development of normal EF HF versus low EF HF remains unclear.