

ORIGINAL ARTICLE

Left Ventricular Mass Index among young healthy Egyptians using Echocardiography

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Background	left ventricular mass is the result of complex interaction between genetic, environmental and life style factors and its determination had a central role in the prognosis of virtually all forms of heart diseases.
Aim	is to identify normal Egyptian left ventricular mass index as compared to other races.
Methods	500 healthy persons with an age range of 20-30 years; all patients underwent full history and clinical examination to exclude general and local diseases. All patients underwent transthoracic echocardiographic study using Devereux formula. The results were indexed to body surface area.
Results	the sample consisted of 248 males and 252 females with a mean age of 24 years, males had a larger left ventricular mass index (82.8 ± 20.9 vs. 75.5 ± 18.4 $p = 0.001$). Egyptian left ventricular mass was near to Hispanic race and was within the limits set for normal values (131gm/m ² for men and 100gm/m ² for women). Capital inhabitants had larger left ventricular mass index as compared to rural communities.
Conclusions	Egyptian left ventricular mass was near to Hispanic race with inhabitants of the capital had larger mass as compared to rural areas. Racial and environmental difference regarding left ventricular mass and LV remodelling should be taken into account when evaluating cardiovascular risk.
Keywords	LVMI, Echocardiography, Race, Rural, Urban. (Heart Mirror J 2010; 4(1): 80-85)

INTRODUCTION

The determination of left ventricular mass carries a substantial prognostic importance in virtually all forms of heart diseases. Epidemiological data from mainly white population of Framingham study defined upper normal left ventricular mass index as 131gm/m² for men and 100gm/m² for women. Whereas, in a racially mixed population, the upper normal limit was identified as 134gm/m² for men and 110 gm/m² for women (1). Aim of the study is to identify the normal Egyptian left ventricular mass index.

MATERIAL

We included 500 healthy Egyptians with an age range of 20-30 years old. All patients underwent: Full history taking that included: address, original residence, occupation (Heavy worker or not) special habits, and history of medical disorders or regular drug intake. Clinical examination: the height and weight were obtained to calculate body surface area and body mass index online <http://www.mcw.edu/calculators/bodymassindex.htm> Trans thoracic

echocardiography was done using GE vivid 5 apparatus. a 2-D targeted M-mode echocardiography tracing in the parasternal short axis view at the papillary muscle level according to criteria of the ASE. This was done to exclude cardiac diseases and to calculate left ventricular mass using Devereux regression equation: $LV\ mass = 0.83 \times \{(LVIDD + IVSD + PWTD)^3 - (LVIDD)^3\} + 0.6gm$ (2). The obtained result was indexed for body surface area in grams per square meter. LVIDD= Left ventricular internal dimension in diastole, IVSD= Interventricular septum dimension in diastole, PWTD= Posterior wall thickness in diastole.

STATISTIC

Data Management: Data were collected, verified, revised and then edited on the P.C. The data were then analyzed statistically by using SPSS statistical package version 15 to obtain Mean, Standard deviation (SD), T test for independent samples, Chi square test (X²).

Abbreviations and Acronyms

IVM : Left ventricular mass
 LVMI : Left ventricular mass index

RESULTS

There were 248 males (49.6%) and 252 females (50.4%) with a mean age of 24.1±5.4 years. All were healthy, non athletes and had no special habits of medical importance. They had a mean weight of 71.6±13.9 kg, a mean height of 1.67±0.1 m, a mean BSA 1.6±0.3m², BMI 25.6±4.8, a mean LVM 144.97±40.5 gm and LVMI 79.1±19.9 gm/m², LVMI percentile is shown in (Figure 1). Both males and females were comparable as regard demographic data. LVMI was significantly larger in males as compared to females (82.8±20.9 vs.75.5±18.4 p= 0.001). These data are shown in (Table 1). When the sample was divided based on the government of origin and residence, we had 3 subgroups. Group A that included 200 persons originating from Cairo. Group B that included 200 subjects originally from el Sharkia government and group C that included 100 persons originally from Gharbia government. The three groups were comparable as regards demographic data whereas LVMI, BMI showed significant variation as shown in (Table 2). We also compared LVM in Egyptian males and females with other races. Egyptian males were significantly smaller than African Americans, white Americans, rural Japanese and were near to Hispanics and urban Japanese. These data are shown in (Table 3) and (Figure 2). Whereas, our female left ventricular mass was significantly larger than African, Asian Americans and were near to Hispanic females. These data are shown in (Table 4) and (Figure 3).

LVMI PERCENTILES



Figure 1: Egyptian LVMI percentile.

Table 1: Demographic data of male and female Egyptians:

VARIABLE	MALE	FEMALE	P VALUE
	N= 248	N= 252	
Age	24.7±5.6	23.4±5.2	p >0.05
Height	1.7±0.15	1.6±0.1	p >0.05
Weight	73.6±12.9	69.6±14.7	p >0.05
BSA	1.8±0.18	1.7±0.18	p >0.05
BMI	25.2±4.5	26.1±5.1	p >0.05
LVMI	82.8±20.9	75.5±18.4	p >0.05

Table 2: left ventricular mass index in male and female Egyptians of different governments:

VARIABLE		CAIRO N= 200	SHARKIA N= 200	GHARBIA N= 100	P VALUE
LVMI	M	88.4±17.5	82.8±20.9	84.13±13.9	<0.001
	F	84.9±18.8	75.5±18.4	78.7±13.9	<0.001
BSA	M	1.5±0.4	1.8±0.2	1.8±0.1	<0.001
	F	1.4±0.2	1.6±0.1	1.7±0.3	<0.001
BMI	M	24.2±4.1	25.2±4.5	24.04±4.9	>0.05
	F	25.8±4.2	26.1±5.1	27.11±6.4	>0.05

Table 3: LVM of Egyptian males as compared to other races:

RACE	MALE LVM	P VALUE
Egyptian	156±39	
African Americans	181.6±36	0.001
White Americans	170±32	0.001
Rural Japanese	187±33	0.001
Urban Japanese	162±27	0.005
Hispanics	163±26	0.001



Figure 2: compares Egyptian LVM in males with other races.

Table 4: LVM of Egyptian females as compared to other races:

RACE	FEMALE LVM	P VALUE
Egyptian	133.5 ±38	
African Americans	129 ±28	0.05
Asian Americans	89 ±13	0.001
Hispanics	116 ±24	0.001



Figure 3: compares egyptian LVM in m females with other races.

CONCLUSION

Egyptian left ventricular mass lies beneath the limits set for normal values, and is near to Hispanic race. Further studies that include larger numbers of desert and costal communities are recommended.

DISCUSSION

Left ventricular mass is the result of complex interaction between genetic, environmental and life style factors (3). In the present study, males had significantly left ventricular mass index as compared to females, this finding is supported by (4) who reported that Boys had higher LVM/BSA, and that gender had an independent effect on LVM/height in a cohort of children and adolescents from the Medical College of Virginia Twin Study (5). Our male left ventricular mass index was significantly smaller than the value set for normal males (83 ± 21 vs. 89 ± 21 $p = 0.001$) whereas, our female mass index was significantly larger than the value set for normal females by Devereux (6) (76 ± 18 vs. 69 ± 19 gm/m^2 $p = 0.001$). On the other hand, Egyptian left ventricular mass lies beneath the cut off value for normal mass index set by Framingham study ($131g/m^2$ in males and $100g/m^2$ in females) (1). As regards race difference, Egyptian male left ventricular mass was significantly smaller than Americans, Japanese and was near to Hispanic. Whereas Egyptian females showed a significantly larger left ventricular mass when compared to Americans and Hispanic. These racial differences were attributed to different environmental and genetic factors. Rodriguez, et al. (7) found that Caribbean-origin Hispanics had a higher prevalence of LVH and abnormal LV remodeling compared with non-Hispanic whites. A higher prevalence of LVH and abnormal LV remodeling was also observed among Mexican-origin Hispanics, despite a lower prevalence of hypertension. This racial difference regarding LVH and LV remodeling should be

taken into account when evaluating cardiovascular risk. Even within the same country, the inhabitants of the capital showed a significantly larger left ventricular mass index as compared to relatively rural areas. These differences are due to different dietary habits and physical activities.

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