Journal of Cardiovascular Magnetic Resonance

Meeting abstract

136 Left ventricular mass and dimensions: determining the most appropriate index to account for body size using MRI

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from 11th Annual SCMR Scientific Sessions
Los Angeles, CA, USA. 1–3 February 2008

Published: 22 October 2008

Journal of Cardiovascular Magnetic Resonance 2008, **10**(Suppl 1):A37 doi:10.1186/1532-429X-10-S1-A37

This abstract is available from: http://jcmr-online.com/content/10/S1/A37

Background

Scaling left ventricular (LV) mass and other cardiac variables to account for individual body size is important. The traditional method of simple ratio scaling, using indices such as body surface area, assumes a linear relationship between LV mass and the index, and accurate measurement of each. These assumptions can be questioned so we sought to examine the appropriateness of potential indices using highly accurate magnetic resonance imaging (MRI).

Methods

Cardiac and whole body MR scans were performed in 172 young, healthy, male subjects (age range 17–28) to assess left ventricular mass, left ventricular cavity dimensions, lean body mass and fat mass. Height, body mass (weight) and body surface area (BSA) were determined anthropometrically. Relationships were examined for linearity and closeness of fit using log-log least squares linear regression to determine the slope exponent b (where 1.0 indicates linearity). The ability of each index to remove the effect of body size was checked via Pearson's correlation with the relevant body size variable. Finally, the potential indices were examined for geometric consistency with LV mass.

Results

The strongest relationship was between left ventricular mass and lean body mass (b = 0.90 ± 0.15; r2 = 0.66), which was both linear and geometrically consistent. The relationships between left ventricular mass and other variables (including height, weight & body surface area) were not linear or geometrically consistent and did not remove the effect of body size.

Left ventricular dimensions (internal diameters, wall thickness) did not demonstrate any linear relationships and in particular, the relationship with body surface area was extremely poor (r2 = 0.02–0.09) (Figure 1)

Conclusion

The traditional scaling of left ventricular measurements to body surface area does not involve a linear relationship, does not remove the influence of body size and is not geometrically consistent. It's use should be questioned and other techniques considered. Lean body mass was the most appropriate variable for simple indexing of left ventricular mass, and may be a better index. No body size variable had a linear relationship with left ventricular linear dimensions and the use of simple ratio scaling for these is seriously questioned.

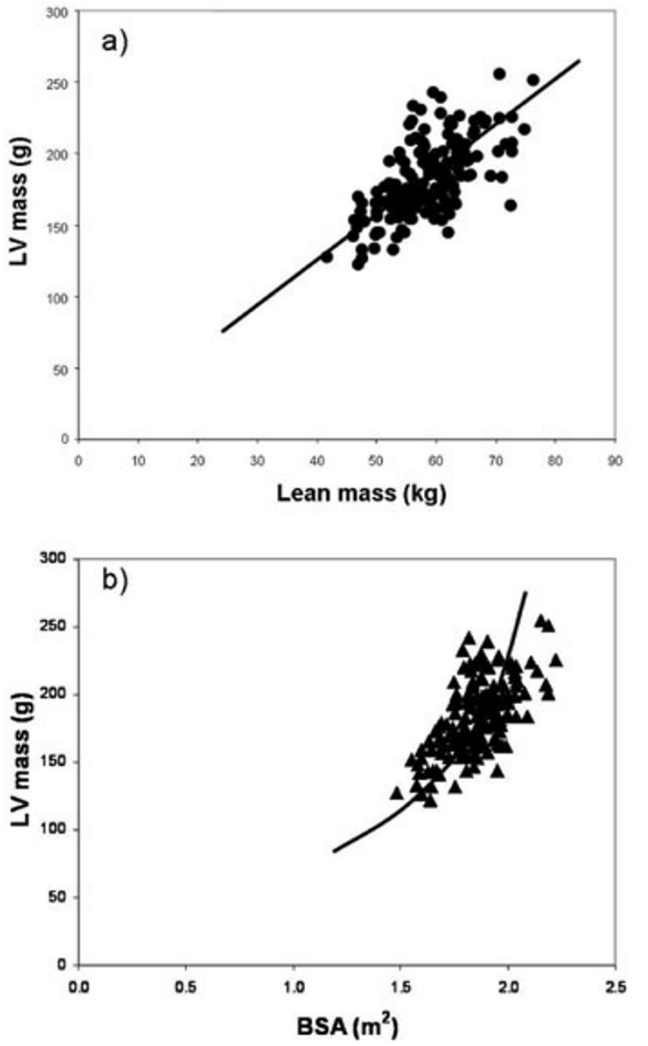

Figure 1
Lean body mass was the best index for LV mass and dimensions. Body surface area did not have a linear relationship, did not remove the effect of body size and should be questioned. Linear dimensions had no appropriate indices.