Metabolic Aspects and Mechanisms

9.25 Evaluation of Appropriateness of Left Ventricular Mass in a Paediatric Population with Obesity

G. Tocci (1), A. Ferrucci (1), F. Ianniello (2), M. Evangelisti (2), A. Alterio (2), S. Sclafarella (1), F. Paneni (1), A. Macari (2), G.M. Ciavarella (1), L. De Biase (1), M.P. Villa (2), M. Volpe (1)

(1)UOC Cardiologia, Università di Roma "La Sapienza", Il Facoltà Medicina, Roma; (2)UOC Pediatria, Università di Roma "La Sapienza", Il Facoltà Medicina, Roma, Italy

Introduction. Recent studies demonstrated that the value of Left Ventricular Mass (LVM) which exceeds the individual haemodynamic workload (inappropriate LVM) may contribute to identify those subjects at high cardiovascular risk in adulthood.

Aim. To evaluate the prevalence of inappropriate LVM in a paediatric population with obesity and in otherwise healthy normal-weight control subjects.

Methods. A total of 106 individuals with paediatric obesity (39F and 67M, mean age 11.3 ± 3.0 years, BMI 27.5 ± 5.1 , clinic BP levels $110.9 \pm 9.1/71.0 \pm 7.3$ mmHg) and 53 control subjects (27M and 26F, mean age 11.1 ± 4.6 years, BMI 19.3 ± 2.8 , clinic BP levels $109.0 \pm 11.4/69.8 \pm 8.9$ mmHg) has been consecutively enrolled from September 2005 to December 2007. Obesity was defined as a Body Mass Index (BMI) over 90th percentile according for age and gender. All subjects underwent to complete physical examination, 2D-echocardiography and clinic and ambulatory BP measurements. In particular, LVM indexed by body surface area (LVMI), by height (LVMh) and height^{2.7} (LVMh^{2.7}) were evaluated. The appropriateness of LVM to cardiac workload may be calculated by the ratio of observed LVM (oLVM) to the value predicted (pLVM) for an individual's sex, height, and stroke work at rest.

Results. LVM was higher in paediatric obese than in normal weight control subjects (98.4 ± 33.1 vs. 85.7 ± 41.6 g; $P=0.057$). No significant differences were observed between these groups with respect to LVMI (62.7 ± 11.6 vs. 61.4 ± 15.3 g/m²; $P=0.58$), while LVMh (65.5 ± 17.0 vs. 55.9 ± 19.6 g/m; $P=0.004$) and LVMh^{2.7} (33.8 ± 7.4 vs. 28.8 ± 6.6 g/m^{2.7}; $P<0.0001$) were significantly higher in paediatric obese subjects as compared to normal weight control individuals, with a relative wall thickness (RWT) significantly higher in the former than in latter ones (0.35 ± 0.06 vs. 0.31 ± 0.04 ; $P<0.0001$). In 33 obese subjects (35.0%), the presence of inappropriate LVM has been recorded, with a mean oLVM/pLVM ratio of 149.3 ± 15.7 , which was significantly higher than that observed in those 73 obese subjects with appropriate LVM (84.5 ± 20.9 ; $P<0.0001$).

Conclusions. In our study, absolute LVM was higher in a paediatric obese population than in normal weight control subjects. As observed in adults, LVM indexed by H and H^{2.7} represents a more sensitive parameter for assessing cardiac organ damage in the presence of obesity. Finally, in relatively high percentage of individuals with paediatric obesity we found inappropriate LVM to haemodynamic workload. A more extensive use of non-invasive diagnostic technique, such as echocardiography, in paediatric populations may allow to better identify those obese subjects at higher risk for developing cardiovascular complications in adult age, in order to early and effectively implement life style modifications.