The Evaluation of Fat-to-Muscle Ratio, a New Anthropometric Index, from the Cardiometabolic Risk Perspectives in Morbid Obese Children

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Abstract : Fat mass/percentage is a valuable parameter commonly used in obesity studies. Muscle mass is a component of lean body mass and negatively associated with the degree of obesity. These features make body's fat mass-to-skeletal muscle mass ratio, a strong anthropometric marker giving an information about two opposing body compartments. Combination of this ratio and alanine aminotransferase-to-aspartate aminotransferase (ALT/AST) ratio, a recently suggested marker for cardiometabolic risk, may give meaningful information during the evaluation of morbid obese children both from cardiometabolic risk point and about their tendency towards MetS development. The aim of this study was to determine the possible involvement of fat-to-muscle ratio (FMR) as a predictor into the studies performed to prevent the development of MetS while children in their morbid obese state. One hundred and thirty-two children, who are composed of children with normal body mass index (N-BMI) (n=35) and morbid obesity (n=97), participated in the study. Institutional Ethical Committee Approval as well as informed consent forms were taken. World Health Organization tables were used for the constitution of two groups. None of the participants had MetS findings. Anthropometric measurements, blood pressure measurements, biochemical analysis, bioelectrical impedance analysis were performed. Within this context, body weight, height, waist / hip / head / neck circumferences, systolic (SBP) and diastolic (DBP) blood pressures, alanine transaminase (ALT), aspartate transaminase (AST), insulin, fasting blood glucose, triglycerides, high density lipoprotein cholesterol as well as fat and muscle percentages were determined.. Fat-to-muscle ratio, body mass index, ALT/AST ratio, advanced diagnostic obesity notation model assessment cardiac index (ADCI) were calculated. Statistical analysis was performed using SPSS software. There were two fold increases for FMRs obtained from total, trunk, upper and lower extremities in MO group compared to the values given for children with N-BMI. A great performance difference was observed between ALT/AST ratio and ADCI. In MO group, twice and five times the values were obtained for ALT/AST ratio and ADCI, respectively, in comparison with the values found for N-BMI group. Positive correlations were calculated between total FMR and SBP, DBP as well as ADCI. In conclusion, these findings may point out the possible danger of future MetS and cardiovascular diseases in children with morbid obesity.

Keywords : advanced diagnostic obesity notation model assessment cardiac index, diastolic blood pressure, metabolic syndrome, morbid obese children, systolic blood pressure

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