

Skeletal muscle mass reference values based on body mass index in healthy children : A new approach

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Background: Sarcopenia is associated with poor clinical outcome in patients with chronic diseases. BIA (Bioimpedance Analysis) is a widely accessible, easy to use measure of muscle mass based on whole-body electrical conductivity, and eligible for the diagnosis of sarcopaenia, however no recommendation to adjust for body size has yet available in pediatric population. Standard Deviation (SD) score are frequently used in growth follow-up and to compare anthropometrical variables to detect the presence of malnutrition in children with chronic wasting disease.

Our aim was to characterize the body composition parameters in patients with inflammatory bowel disease and to compare muscle mass (SMM) parameters with general pediatric population.

Methods: Body composition of normal population (n=307, aged between 9.9 and 19.3 years; 143 males) and of patients with Inflammatory Bowel Disease (IBD) (n=57, aged between 6.7 and 18.7 years; with Crohn's disease, n=31, with ulcerative colitis n=26) were measured via bioelectrical impedance (In Body 720 device) in a cross-sectional manner. Effect of sex, age, height, weight and BMI were assessed.

Reference tables from body composition parameters were generated using a maximum-likelihood curve-fitting technique for calculating SD scores in accordance with the skewed distribution of the raw data (LMS method) using the Statistic Software.

Results: SMM was higher in patients (24.4+-6.34 vs 22.34+-8.38kg; p=0.03) compared to healthy controls. SMM showed a moderately strong correlation with age (R= 0.65; p p<0.05) and a strong correlation with weight (R= 0.9; p<0.05, respectively) and height (R= 0.87; p<0.05). There was a moderately strong correlation between SMM and BMI (R=0.66 p<0.05). In multivariate stepwise, ridge regression analysis, sex and BMI remained the major predictors of SMM (sex: β = -0.17 p<0.05; BMI: -0.6p<0.05), but not height. SMM of gender-age and BMI adjusted controls did not differ from patients, therefore BMI SD score based reference charts were generated for SMM values. SMM SDS was 0.00±0.08 in the patient population.

Conclusion: SMM could be an easy to measure biomarker of sarcopenia in patients with chronic inflammatory bowel disease. Calculation of BMI based SMM SD score serves as an objective estimation of loss in muscle mass in children with wasting diseases. Further follow up studies are needed to determine cut-off values and to prove the predictive role of this novel approach of SMM SDS for sarcopenia diagnostic.

7th World Congress on Public Health and Nutrition

April 25-26, 2022

25th Euro-Global Summit on Food and Beverages

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Importance of research: As sarcopenia is associated with poor clinical outcomes, measuring body composition, especially muscle mass, will get a high importance in clinical care. There is a lack of uniform definition and diagnostic criteria of sarcopenia in children; therefore we hope this BMI based SMM SD score may contribute to the more precised diagnosis among pediatric patients.

Biography

Kriszta Katinka Boros is a Pediatrics residence Doctor, Ph.D. student, was born in Budapest, Hungary. At 2010 she started the Semmelweis University in Budapest, Hungary. As a medical student she joined to a research group at the Ist Department of Pediatrics, Semmelweis University, investigating the role of micro-RNAs in inflammatory bowel disease. After graduating from university at 2016, she started her Ph.D. studies with main interest in body composition and body composition analysis. At 2018 she started the pediatrician training.

Received: March 01, 2022; **Accepted:** March 04, 2022; **Published:** April 25, 2022
