The assessment of anthropometric and bioimpedance parameters in children with obesity

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Introduction

Obesity is a major public health problem with an increasing incidence, resulting in different comorbidities such as nonalcoholic fatty liver disease (NAFLD), cirrhosis or end-stage liver disease. NAFLD is the most frequent form of chronic hepatitis in child and teenager. Children’s obesity has become an epidemics, and therefore the incidence of chronic hepatic disease is no longer limited to adults.

The aim of this study was to establish correlations between paraclinical, anthropometric parameters and bioimpedance parameters in obese children.

Methods. We performed a prospective study on 52 children admitted in a tertiary Pediatric Clinic, who were divided into 2 groups according to their body mass index (BMI)::

- group 1 – obese and overweight – 38 children and
- group 2 – 14 normal weoght children.

In both groups we assessed different paraclinical parameters, but also anthropometric and bioimpedance parameters.

Inclusion criteria:

For the control group - healthy children, with normal nutritional status, without any comorbidities;

For the overweight/obese group patients with anthropometric parameters such as BMI, weight, MUAC, TST, hip, and abdomen circumference >1 SD for overweight, and >2 SD for obese children;

For both groups: age between 5-18 years, due to the limitations of the bioimpedance device.

Exclusion criteria: children with obesity caused by genetic factors, chronic diseases, secondary hypercholesterolemia, children whose parents did not sign the informed consent; children under the age of 5 years due to the limitations of the bioimpedance device.

The mother/father/care-giver gave written informed consent for their children prior to inclusion in the study and the research was performed in compliance with the principles of the Helsinki Declaration

The study was approved by the Ethics Committee of the University of Medicine and Pharmacy of Tîrgu Mureș (No 329/17th of November 2017)

Results

The median age of the entire group was 11.38 ± 3.273 years.
The BMI median value of the hole group was 24.47 ± 4.544 (Table no 1).

Table no. 1. The demographic parameters

	Control group	Study group – Overweight and obese	‘p’ value
Age (years)	12.57 ± 2.901 (13.00)	10.95 ± 3.328 (11.00)	0.1133
BMI	20.16 ± 2.933 (19.50)	26.10 ± 3.949 (25.50)	<0.0001
Percentiles	56.36 ± 24.31 (59.50)	96.55 ± 3.418 (98.10)	*<0.0001

We noticed that cholesterol, triglycerides, AST, ALT and albumin were significantly higher in obese children versus control group (p=0.043/0.048/0.006/0.036), while AST/ALT did not present any statistical significance in the same group (Table no. 2).

Table no. 2. The laboratory parameters

	Normal weight	Overweight and obese	‘p’ value
Total cholesterol (mg/dl)	145.9 ± 36.18 (138.1)	166.2 ± 29.21 (157.1)	0.043
Triglycerides (mg/dl)	88.19 ± 49.69 (71.95)	116.2 ± 61.78 (100.2)	*0.048
AST (U/l)	17.79 ± 5.341 (16.00)	24.92 ± 10.62 (22.00)	*0.006
ALT (U/l)	12.37 ± 4.002 (11.55)	25.00 ± 20.54 (16.40)	*0.036
AST/ALT	1.503 ± 0.431 (1.445)	1.262 ± 0.5239 (1.180)	0.1326
Albumin	4.771 ± 0.3617 (4.675)	4.999 ± 0.3279 (4.980)	0.0360
T prot	12.08 ± 18.14 (7.175)	7.522 ± 0.4219 (7.490)	*0.065
Glyceamia	86.57 ± 8.762 (86.10)	84.01 ± 9.368 (83.80)	0.3800

Regarding the bioimpedance parameters we observed that fat mass (FM), muscle mass (MM), and bone mass (BM) were higher in obese/overweight children, being positively correlated with BMI (p<0,05), while total body water (TBW) was negatively correlated with BMI.

Conclusions.

Transaminases, cholesterol, triglycerides, MUAC, abdominal perimeter, FM, MM and BM seem to be higher in obese/overweight children, representing important parameters for assessing children with this type of nutritional disorder. Further studies are needed in order to establish an assessment score in these children.

Disclosure of interest: “None Declared”.

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