Anthropometric, Biological and Imagistic Methods For Assessing the Cardiovascular Risk in Obese Children

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Abstract

- **Background: Pediatric obesity has increased worldwide over the last decades, being diagnosed at ever-younger ages.**
- **Objective and hypotheses: Evaluation of clinical and biological parameters and changes that occur in children with obesity; metabolic syndrome (MetS) identification in the studied groups; identification, evaluation, analysis and correlation of the adipogenic factors with the carotid intima media thickness (CIMT).**
- **Method: A cross-sectional study was conducted over a period of 1 year (April 2014–April 2015). 68 obese patients with mean age 11.83 years were included, distributed as follows: 17 (25%) were aged between 5 and 9, 35 (51%) between 10–14 and 16 (24%) between 15 and 18. Blood pressure, lipids, glucose, leptin, adiponectin and high-sensitivity C-reactive protein (hs-CRP) were determined. Oral glucose tolerance test was performed in all children. Insulin resistance (IR) was assessed by HOMA. CIMT was measured in all patients.**
- **Results: MetS was present in 18 patients (26.14%), with a higher prevalence among the 15–18 age group (11.76% vs 22.85% vs.50%). A strong correlation between CIMT and other metabolic factors has been observed (r=0.83). Lower levels of adiponectin, higher levels of leptin, high sensitive CRP and CIMT values have been observed in the 15–18 age group.**
- **Conclusion: Metabolic risk increases with age. There is a correlation between CIMT and adiponectin, leptin, hs-CRP. CIMT is a known marker for subclinical atherosclerosis; it is a cheap and noninvasive method. Extensive population studies are required to establish threshold values for CIMT in children.**

Key words: cardiovascular risk, obesity, child

Introduction:

Pediatric obesity has increased worldwide over the last decades, being diagnosed at ever-younger ages.

Noninvasive and inexpensive methods of detecting subclinical atherosclerosis are useful in preventing cardiovascular diseases.

Figure 1-Obesity and its complications

Aim:

- Evaluation of clinical and biological parameters and changes that occur in children with obesity;
- MetS identification in the studied groups;
- Identification, evaluation, analysis and correlation of the adipogenic factors with CIMT.

Material & Methods:

- **A cross-sectional study**
- **Period : 1 year (April 2014–April 2015)**
- **68 obese patients with mean age 11.83 years were included**

Table 1 Patients distribution

Age	Boys	Girls	Total
5-9	8 (24%)	9 (26%)	17 (25%)
10-14	16 (48%)	19 (54%)	35 (51%)
15-18	9 (27%)	7 (20%)	16 (24%)
Total	**33**	**35**	**68**

Analysed variables:

- *Presence of MetS or its components (according to Weiss criteria)*
- *HOMA-IR*
- *Adiponectin*
- *Leptin*
- *Hs-CRP*
- *CIMT – determined by B Mode ultrasound*

Results:

MetS was present in 18 patients (26.14%), with a higher prevalence among the 15–18 age group (11.76% vs 22.85% vs.50%).

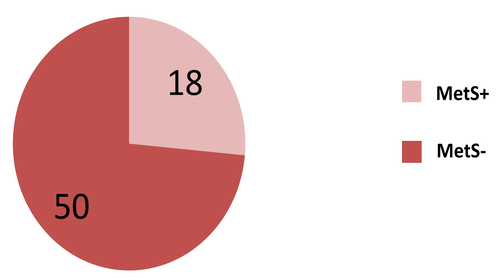

Figure 2- Prevalence of MetS in the study group

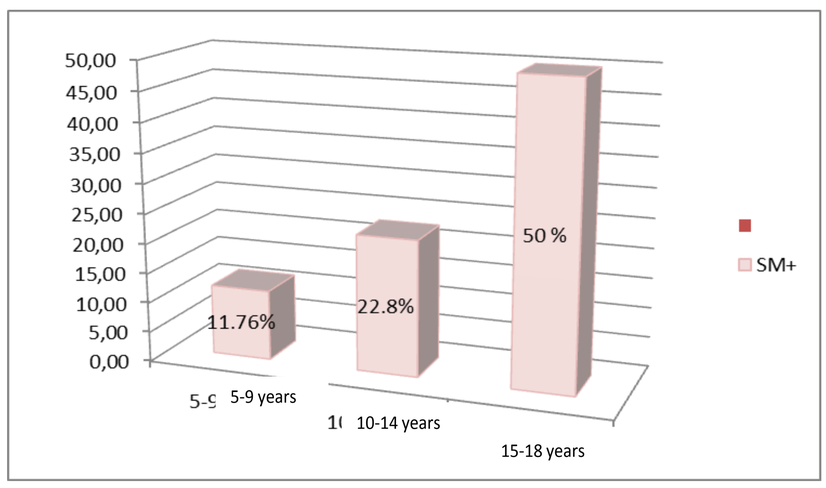

Figure 3- Prevalence of MetS by age

CIMT in the MetS group was significantly increased as compared with non MetS group (0.0624 cm vs. 0.05694 cm)

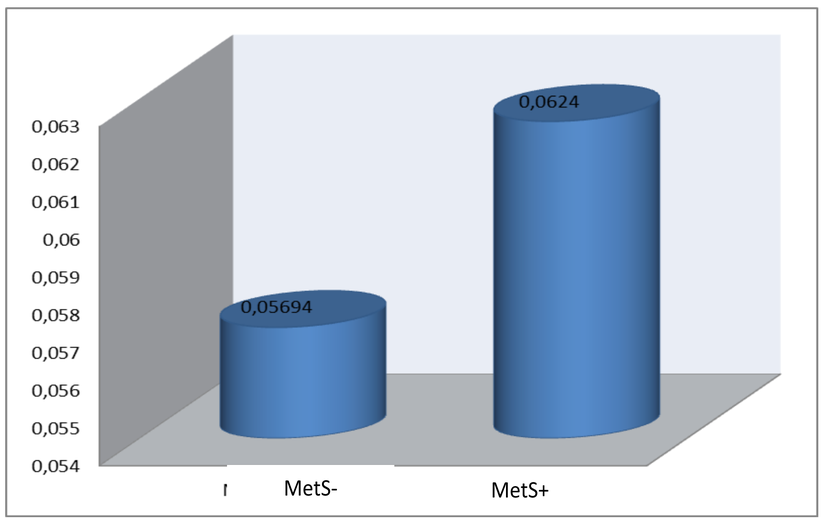

Figure 4 CIMT values in the MetS+ group and Mets- group

Adiponectin, leptin and hsCRP were analysed in MetS+ group and MetS- group.

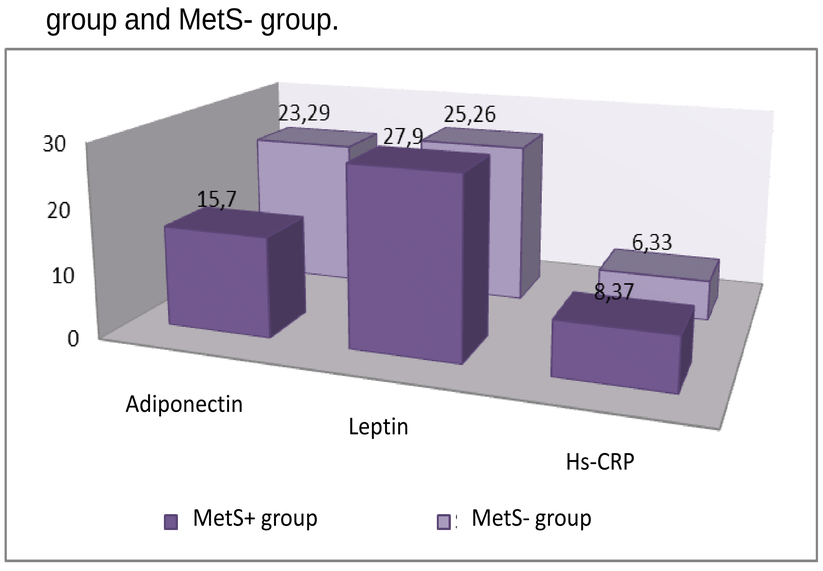

Figure 5 Representation of adiponectin , leptin and hs-CRP values based on the presence or absence of MetS

Table 2-Statistical analysis of adiponectin,leptin and hs- CRP

MetS	MetS+	MetS-	p
ADIPONECTIN	15.7	23.29	0.179
Leptin	27.9	25.26	0.408
hs-CRP	8.37	6.33	0.006
CIMT	0.062	0.056	0.031

Using multiple regression analysis we demonstrated how individual variations of the metabolic factors contribute to arterial changes objectified by measuring CIMT

Table 3- Statistical analysis of adiponectin,leptin and hs- CRP by age in the two groups MetS= vs MetS-

	Adiponectin	Leptin	hsCRP	CIMT	Age group
p	0.067	0.270	0.105	0.05	10-14 years
p	0.04	0.035	0.03	0.03	15-18 years

Table 4- Multiple regression CIMT – metabolic factors (leptin, adiponectin, hsCRP)

R^2	0,83
P	<0.001

Discussion:

- MetS is directly correlated with leptin and hs-CRP, and indirectly correlated with adiponectin; these relationships strengthen with age;
- Multiple regression analysis demonstrated a statistically relevant influence of leptin, adiponectin and hs-CRP on CIMT;
- Statistical analysis identified hs-CRP and CIMT as important markers in establishing cardiovascular risk;
- CIMT was higher in obese children with MetS, suggesting that vascular lesions may be present since childhood.

Conclusions:

- **Metabolic risk increases with age.**
- **There is a correlation between CIMT and adiponectin, leptin, hs-CRP.**
- **CIMT is a known marker for subclinical atherosclerosis; it is a cheap and noninvasive method.**
- **Extensive population studies are required to establish threshold values for CIMT in children.**

Disclosure statement: No conflict of interest

References:

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