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EFFICIENCY OF ALPHA-LIPOIC ACID IN METABOLIC SYNDROME TREATMENT IN CHILDREN

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Introduction.

The growing prevalence of obesity around the world is an important epidemiological problem, as it occurs in parallel with an increase in the prevalence of diabetes and cardiovascular diseases (CVD). In addition, it is well known that both conditions are associated with insulin resistance, an elevated level of free fatty acids, and a decrease in the level of adiponectin, which is considered a protective cytokine. Alpha-lipoic acid leads to weight loss, by activating AMPK in peripheral and brain tissue, and also inhibits the activity of adipocytes. Some studies show that ALA reduces insulin resistance. According to some researchers using of ALA for two weeks in obese patients with glucose intolerance resulted in improved insulin resistance, reduced levels of free fatty acids, and LDL cholesterol.

Aim. To determine the efficiency of alpha-lipoic acid (ALA) in metabolic syndrome (MS) treatment in children.

Materials and methods. 44 children with MS are observed. The diagnosis of metabolic syndrome is made on the base of obesity, arterial hypertension, disorders of carbohydrate and lipid metabolism according to the ADA III (2001) and IDF (2005) recommendations. All patients are randomized into 2 groups: 22 children (main group), who received diet, physical training and alpha-lipoic acid. The proposed course of therapy lasts for 2 months and the dose of ALA is 300 - 600 mg daily. 2nd group (22 children) is received diet and physical training. C-peptide is determined using the Immunoferment method and insulin resistance index HOMA-IR is calculated using the formula HOMA-IR=G (serum glucose level (mmol/L) x Ins (serum immune reactive insulin) (mcUnits/mL): 22,5; normal - less than 3,5. The rate of leptin and adiponectin is determined by the IFA method using reactives "Demeditec Adiponectin IFA DEE009". Statistic analysis was made using the Program Statistika (ver 2009 for Windows), criteria Mann-Whitney, Wilkinson and χ^2.

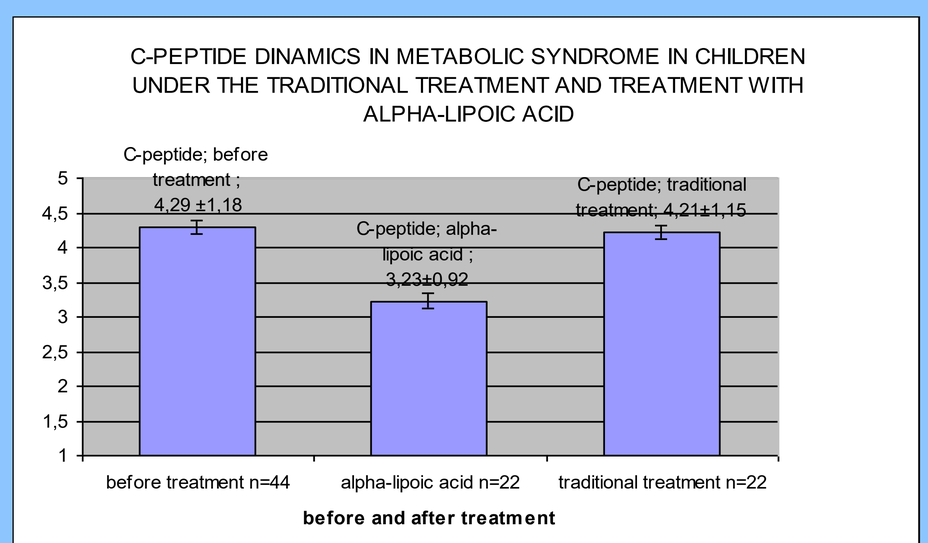
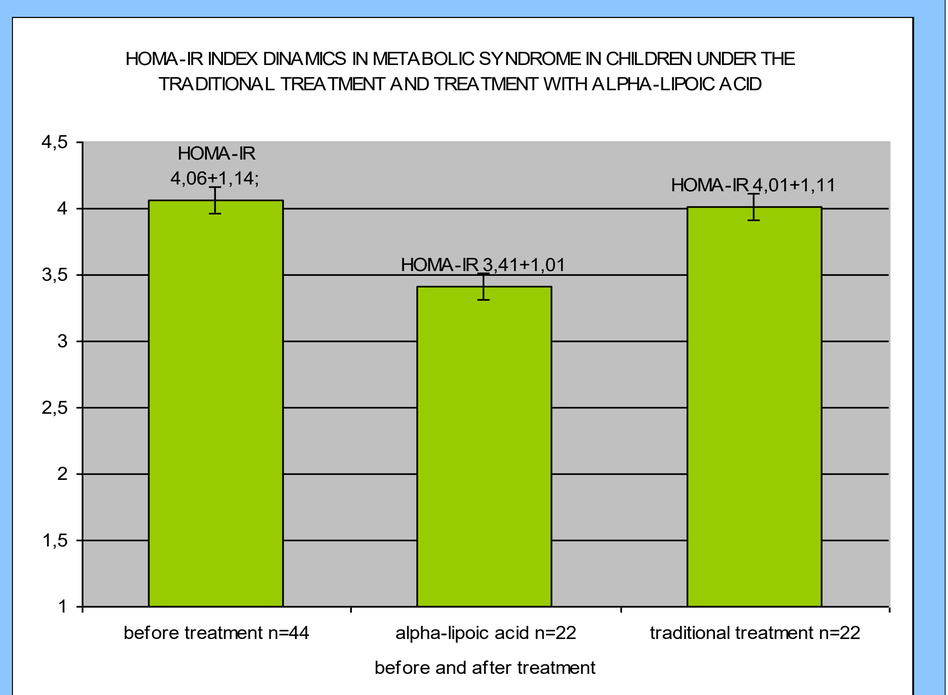


Table 1. **Clinical study with ALA in children with Metabolic Syndrome (MS)**

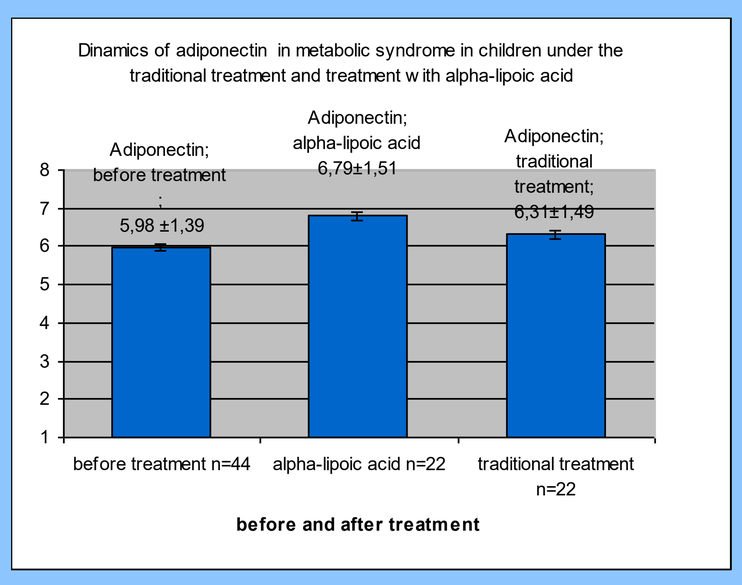
ALA dose	Analyzed parameters	Total participants	Duration of MS (years)	Follow up (weeks)	Results
300 - 600 mg Daily	Weight,	22	4.07 ± 1.26	8 w	< waist
	Waist				< weight
	HOMA-IR				<HOMA-IR
	C-peptide				<C-peptide
	leptin				< leptin
	adiponectin				>adiponectin

ALA - alpha-lipoic acid; IRI - immune reactive insulin; HOMA - homeostasis model assessment, IR - insulin resistance



Results and discussion

The comparing of insulin resistance indexes is established that after 2 months in main group C-peptide decreases from 4.29±1.18 ng/ml to 3.23±0.92 ng/ml ($p<0,001$), and at 2nd group this index decreases to 4.21±1.15 ng/ml. Insulin resistance index at the 1 group decreased from 4.06±1.14 to 3.41±1.01 ($p<0,001$), and at the 2nd group to 4.01±1.11. After 2 months treatment with ALA the rate of leptin at the main group became 11.02±2.09 ng/ml ($p<0,001$), and at the 2nd group this index decreases to 18.12±3.11 ng/ml. The rate of adiponectin at the main group became 6.79±1.51, and in the 2nd group – 6.31±1.49 ($p>0,001$). It should be noted that there were no side effects of ALA in children.



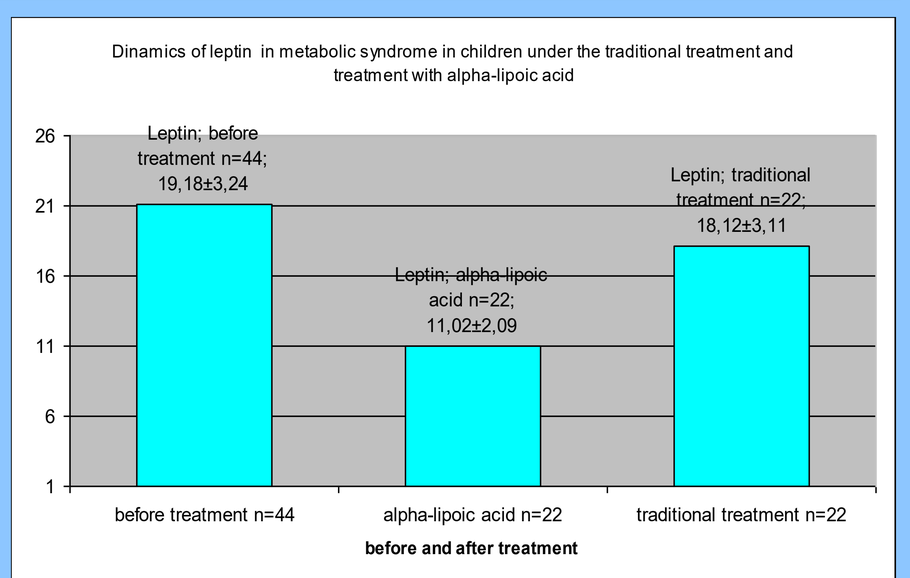


Table2. **Indexes in children with metabolic syndrome before and after treatment**

Characteristics of the study population	Control group (n=22)	Before treatment (n=44)	Main group (n=22)	Comparative group (n=22)
C-peptide, ng/ml	**3.01±0.68**	**4.29±1.18**	**3.23±0.92***	**4.21±1.15**
HOMA-IR	**2.41±0.51**	**4.06±1.14**	**3.41±1.01***	**4.01±1.11**
Leptin (ng/ml)	**7.22±0.36**	**19.18±3.24**	**11.02±2.09***	**18.12±3.11**
Adiponectin (µg/ml)	**12.45±2.96**	**5.98±1.39**	**6.79±1.51**	**6.31±1.49**

Data are presented as mean ± SD,
Main group (n=22) children, who received diet, physical training and α-lipoic acid for 2 months
Comparative group (n=22) children, who received only diet and physical training
*is $p < 0.001$ determined by paired Wilcoxon Signed-Rank test

Conclusions

Our data confirmed statistically significant reduction in the level of C-peptide, insulin resistance and leptin under the influence of treatment with alpha-lipoic acid. It is well tolerated and can be regarded as a pathogenesis factor in the treatment of metabolic syndrome in children.

References:
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Conflict of Interest: The authors declare no conflict of interest.

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