

The effect of restricted energy intake on the oxidative stress level and metabolic syndrome occurrence in obese adults

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Background: Metabolic syndrome (MetS) represents a set of markers associated with high cardiovascular morbidity and mortality. The aim of our study was to evaluate MetS occurrence and extent of oxidative stress by comparing obese adults after diet optimization with untreated ones.

Material/Methods: Oxidative stress markers (total amount of free radicals, malondialdehyde, allantoin, α_1 -antiproteinase, GSSG/GSH ratio), total antioxidant capacity and lipid standardized α -tocopherol were determined in 40 obese people and 48 healthy controls. The obese people were divided into two groups: obese patients with restricted energy intake with lowered dietary carbohydrates (A; n = 20) and those with the same grade of obesity but not following dietary recommendations (B; n = 20).

Results: The group of obese people with calorie restriction exhibited lower oxidative stress markers – free radicals (A: 5.18 ± 1.68 mmol/l vs B: 8.43 ± 3.66 mmol/l, $p < 0.01$), GSSG/GSH ratio (A: 11.74 ± 5.01 % vs B: 15.38 ± 5.93 %, $p < 0.05$) and higher antioxidants: lipid standardized α -tocopherol (A: 3.70 ± 0.51 μ mol/l vs B: 3.35 ± 0.60 , $p < 0.05$) and ceruloplasmin (A: 0.24 ± 0.08 g/l vs B: 0.21 ± 0.03 g/l, $p < 0.05$), in the course of the same grade of obesity. Simultaneously, statistically significantly lower MetS occurrence was found in this group.

Conclusion: The energy intake restriction by 2 000 kJ, mainly due to carbohydrate limitations, was associated with decreased oxidative stress and simultaneously increased lipid-standardized α -tocopherol and ceruloplasmin in obese people. These changes correlated with diminished MetS occurrence by about 50 %.

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