

Serum Neurotrophins in Different Metabolic Types of Obesity

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Abstract : Background. Neuropathy is a common complication of obesity. In this regard, the content of neurotrophins in such patients is of particular interest. Neurotrophins are the proteins that regulate neuron survival and neuroplasticity and include brain-derived neurotrophic factor (BDNF) and nerve growth factor (NGF). However, the risk of complications depends on the metabolic type of obesity. Metabolically unhealthy obesity (MUHO) is associated with a high risk of complications, while this is not the case with metabolically healthy obesity (MHO). Therefore, the aim of our work was to study the effect of the obesity metabolic type on serum neurotrophins levels. Patients, materials, methods. The study included 134 healthy donors and 104 obese patients. Depending on the metabolic type of obesity, the obese patients were divided into subgroups with MHO (n=40) and MUHO (n=55). In the blood serum, the concentration of BDNF and NGF was determined. In addition, the content of adipokines (leptin, asprosin, resistin, adiponectin), myokines (irisin, myostatin, osteocrin), indicators of carbohydrate, and lipid metabolism were measured. Correlation analysis revealed the relationship between the studied parameters. Results. We found that serum BDNF concentration was not different between obese patients and healthy donors, regardless of obesity metabolic type. At the same time, in obese patients, there was a decrease in serum NGF level versus control. A similar trend was characteristic of both MHO and MUHO. However, MUHO patients had a higher NGF level than MHO patients. The literature indicates that obesity is associated with an increase in the plasma concentration of NGF. It can be assumed that in obesity, there is a violation of NGF storage in platelets, which accelerates neurotrophin degradation. We found that BDNF concentration correlated with irisin levels in MUHO patients. Healthy donors had a weak association between NGF and VEGF levels. No such association was found in obese patients, but there was an association between NGF and leptin concentrations. In MHO, the concentration of NHF correlated with the content of leptin, irisin, osteocrin, insulin, and the HOMA-IR index. But in MUHO patients, we found only the relationship between NGF and adipokines (leptin, asprosin). It can be assumed that in patients with MHO, the replenishment of serum NGF occurs under the influence of muscle and adipose tissue. In the MUHO patients only the effect of adipose tissue on NGF was observed. Conclusion. Obesity, regardless of metabolic type, is associated with a decrease in serum NGF concentration. We showed that muscle and adipose tissues make a significant contribution to the serum NGF pool in the MHO patients. In MUHO there is no effect of muscle on the NGF level, but the effect of adipose tissue remains.

Keywords : neurotrophins, nerve growth factor, NGF, brain-derived neurotrophic factor, BDNF, obesity, metabolically healthy obesity, metabolically unhealthy obesity

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