Asymmetric dimethylarginine impacts on carbohydrate metabolism in patients with myocardial infarction and type 2 diabetes mellitus

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According to modern research, insulin resistance, hyperinsulinemia and hyperglycemia are key links in the development of fatal consequences of acute coronary syndrome on the background of type 2 diabetes mellitus (DM type 2). Asymmetric dimethylarginine (ADMA) is an endogenous competitive inhibitor of NO synthesis. There is a link between an increase in ADMA levels and an increased risk of coronary heart disease, hypercholesterolemia, high blood pressure, and impaired glucose tolerance. It is known that the increasing of asymmetric dimethylarginine is due to the effect of glucose and glycation products on the enzyme responsible for the degradation (hydrolysis) of ADMA, namely DDAG - dimethylargininedimethylaminohydrolase, inactivating the catalytic center of this enzyme. Based on this, we analyzed the correlations between ADMA and levels of glucose, glycosylated hemoglobin, serum insulin and QUICKI insulin resistance index in patients with acute myocardial infarction (AMI) with ST-segment elevation and concomitant type 2 diabetes.

Aim: to analyze the association between asymmetric dimethylarginine and carbohydrate metabolism (glucose, glycosylated hemoglobin, insulin and QUICKI insulin resistance index) in patients with acute myocardial infarction and type 2 diabetes mellitus.

Materials and methods: the study included 73 patients with AMI and type 2 DM (among them 43 men and 30 women, mean age 62.73 ± 1.39 years), 57 patients with AMI without type 2 DM (among them 43 men and 14 women, mean age 63.97 ± 1.47 years). Level of ADMA was carried out by immunoassay using commercial test systems Xpress ELISA Kit (Austria). Mathematical computer processing of results was carried out using the software package "Statistica 6.0" (StatSoft Inc., USA).

Results: a direct correlation was found between the level of ADMA and blood insulin (r = 0.51; p˂0.05), glucose (r = 0.51; p˂0.05), glycosylated hemoglobin (r = 0.60; p˂0.05) and feedback with the QUICKI index (r = -0.27; p˂0.05).

Conclusions: our results suggest the need to monitor not only blood glucose levels but also insulin resistance parameters and level of asymmetric dimethylarginine in plasma in patients with acute myocardial infaction and type 2 diabetes mellitus, which in the future will reduce the manifestations of endothelial dysfunction, given their negative impact on the endothelium, the mediator of which can be considered ADMA.