HYPOMAGNESEMIA AS IMPORTANT COMPONENT OF ATHEROSCLEROSIS PROGRESSION IN TYPE 2 DIABETIC PATIENTS WITH END-STAGE RENAL DISEASE

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Background: The processes of atherogenesis in end-stage renal disease (ESRD), especially in type 2 diabetic patients, are not fully understood. In this context, it is reasonable to comprehensively research the magnesium (Mg) homeostasis, since hypomagnesemia is a predictor of cardiovascular mortality in patients on chronic hemodialysis (HD). The purpose of the study was to determine the role of the Mg in mechanisms of atherosclerosis progression of carotid arteries (CA) in HD patients with diabetic nephropathy (DN), and to establish in these subjects the relationship between Mg content and indexes of endothelial damage and lipid profile.

Methods: The study included 121 patients with ESRD, who were on HD (male, 71; age, 53.2±1.1 years; HD duration, 52.2±4.8 month). According to presence/absence of type 2 diabetes mellitus, all HD patients were divided into two groups: 1st one (n=35) – subjects with DN; 2nd one (n=86) – subjects without DN. Diabetes duration was 176.0±8.1 month. Common carotid artery intima-media thickness (CCA IMT) as an index of the atherosclerosis severity was measured by ultrasound. Serum Mg content and cholesterol concentrations were determined. Plasma amount of circulating endothelial cells (CECs) was also examined. Data are presented as means±SEM. Mann-Whitney U-test, Spearman's rank R correlations were used.

Results: A group of HD patients with DN had higher CCA IMT (0.93±0.03 vs. 0.81±0.02 mm, Z=3.23, p=0.001) and lower Mg values (0.86±0.02 vs. 1.00±0.02 mmol/L, Z=4,64, p<0.001) compared to group without DN, and in 1st group indexes Mg and CCA IMT were closely related (Rs=-0.69, p<0.001). The character of dyslipid- and endothelemia in both groups is presented in the table. For the first time it was established that in type 2 diabetic ESRD patients Mg content was correlated with CECs number (Rs=-0.62, p<0.001), high-density lipoprotein cholesterol (Rs=0.39, p=0.022) and triglycerides (Rs=-0.47, p=0.005) concentrations.

Conclusions:
(1) Type 2 diabetic patients with ESRD are combined with the severity of atherosclerotic changes of CA.

(2) HD subjects with DN are characterized by the reduced content of Mg, which in turn are closely related with damaged endothelium and dyslipidemia. (3) Hypomagnesemia can be one of the factors of increased cardiovascular risk in type 2 diabetic HD patients.