

Galectin-3: association with oxidative stress, inflammation and endotoxemia in patients with chronic heart failure

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Topic(s):

Basic mechanisms

Citation:

European Heart Journal (2015) 36 (Abstract Supplement), 363

Purpose: To evaluate the connection between plasma level of galectin-3 and biomarkers for oxidative stress, inflammation and endotoxemia in patients with chronic heart failure (CHF).

Methods: 176 patients (age, 65.3±3.2 years) with documented prior myocardial infarction were included in the study. Patients were divided into 3 basic groups according functional class (FC) NYHA. 1 group (n=65) - patients with II FC CHF, 2–59 patients with III FC, and 3 group (n=52) - IV FC. The control group (CG) – 42 healthy people (age, 54.7±4.4 years). We measured the level of galectin-3, NT-proBNP, oxidized low density lipoproteins (ox-LDL), 3-nitrotyrosine (3-NT), interleukin-6 (IL-6) by enzyme immunoassay. Limulus amebocyte lysate (LAL) test was used to determine the level of endotoxemia.

Results: Galectin-3 values increased in parallel with the clinical severity of CHF (NYHA classification): II FC - 9.8 ng/ml, III FC - 18.6 ng/ml, the highest levels being reached in class IV patients 37.1 ng/ml. We observed significant difference between groups ($p<0.001$). We found an increase in level of 3-NT in patients (2.4, 3.3 and 4.8 nmol/ml accordingly) in comparison with CG (1.8 nmol/ml). There was a significant positive correlation between levels of galectin-3 and 3-NT in all groups of patients: $r_1=0.59$, $r_2=0.64$, $r_3=0.71$ ($p<0.01$). Plasma levels of ox-LDL were significantly elevated in all groups compared with healthy control ($p<0.01$). We also demonstrated a significant positive correlation between galectin-3 and ox-LDL in groups: $r_1=0.520$, $r_2=0.560$, $r_3=0.61$ ($p<0.01$). We found a significant increase in the level of IL-6 in the 1st (8 pg/ml), 2nd (18 pg/ml) and 3d (39 pg/ml) groups in comparison with CG (4 pg/ml). We observed a positive correlation between levels of galectin-3 and IL-6 in all groups of patients ($r_1=0.49$, $r_2=0.61$, $r_3=0.65$, $p<0.01$). The intensity of endotoxemia significantly increased with the severity of CHF. The plasma level of galectin-3 was closely connected with endotoxemia: $r_1=0.33$, $r_2=0.41$, $r_3=0.48$ ($p<0.05$).

Conclusion: Galectin-3 serum concentrations in heart failure patients with prior myocardial infarction were highly associated with indicators of oxidative stress, inflammation and endotoxemia beyond NYHA functional class.