Application of the multiplexed immunoassays in the comprehensive assessment of cardiovascular biomarkers dynamics in patients with acute primary anterior myocardial infarction with ST segment elevation

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Aim. To study the dynamics of serum biochemical markers and its association with clinical and echocardiography parameters in patients with acute primary anterior myocardial infarction with ST segment elevation (STEMI).

Methods. 17 patients with STEMI (mean age 58.6±8.5 y.o.), admitted in the first 24 hours from the onset of the disease, were enrolled. Concentrations of cardiac markers in serum initially at hospitalization and in 6 months after STEMI were determined on Multiplex Instrument FLEXMAP 3D Luminex Corporation using MILLIPLEX map Human Cardiovascular Disease Panel 1 and Panel 5. Echocardiography was performed on the days 3, 7, 14 and in 6 months after STEMI.

Results. At the first day, the level of Troponin I (TnI) was 147 (18.65; 431.18) ng/ml, Nt-proBNP - 1127 (467.02; 1611.0) pg/ml, BNP - 90.27 (5.26; 279.07) pg/ml, CK-MB 213.63 (125.16; 239.69) ng/ml, FABP3 - 32155 (8058; 77051) pg/ml, OSM 46.9 (18.9; 75.73) pg/ml. The concentrations of obtained markers were higher compared to the reference values for patients with cardiovascular diseases, recommended by the manufacturer of the diagnostic panels. Correlation analysis showed strong positive connections between the values of TnI and CK-MB, FABP3, Nt-proBNP, BNP, ENDOCAN, LIGHT and OSM upon admission to hospital.

A statistically significant decrease of the TnI, Nt-proBNP, BNP, CK-MB, FABP3, OSM (p<0.0005) levels following 6 months was revealed. An inverse correlation was found between the Nt-proBNP, LIGHT, OSM measured at admission to hospital and the left ventricular ejection fraction (LVEF) at day 7 after MI. A positive relationship between the levels of markers HSP60, IGF1R and LVEF in six months after the MI were established.

Logistic regression analysis showed that the initial values of TnI, Nt-proBNP, BNP and CK-MB were highly informative for predicting an increase of the end-systolic volumes (ESV) in 6 months. The value of the OSM at day 1 of the MI was associated with an increase of ESV in 6 months of observation by more than 20% (p<0.05).

Conclusion. Complex assessment of biomarker dynamics using xMAP technology can be used to improve the efficiency of laboratory diagnostics and predict adverse remodeling in the long term in patients who have had the primary myocardial infarction with ST-segment elevation.