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The diagnostic significance of toll-like receptors-4 and heat-shock protein 70 assay in acute myocardial infarction and ischemic stroke

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Introduction. Atheroma damage in the coronary or carotid artery with the development of acute focal myocardial or brain ischemia is accompanied by activation of innate immunity receptors, in particular Toll-like receptors-4 (TLR4) and an increase in the synthesis of stress-inducible proteins, in particular heat shock protein 70 (HSP70).

Purpose. To estimate diagnostic role of TLR4 and HSP70 testing in myocardial infarction (MI) and ischemic atherothrombotic stroke (IS).

Methods and materials. TLR4 expression and intracellular HSP70 concentration were tested in circulating mononuclear cells and granulocytes by flow cytometry analysis on day 1 of the disease onset in 94 patients with MI, 93 patients with IS, and 62 age and gender comparable control-group patients in whom preliminary diagnosis of MI or IS was rejected (CG). Tests sensitivity and specificity for the chosen nosology were evaluated using receiver operating characteristic (ROC) curve analysis.

Results. TLR4 mononuclear cells levels were found to be higher on the first day of ischemic damage in patients with IS (94.3±13.5 units; p<0.05) and MI (136.7±11.4 units; p<0.05) than in CG patients (60.3±6.6 units), whereas TLR4 granulocytes values were not significantly different in IS (50.8±4.6 units) or MI (52.4±5.7 units) and CG patients (44.7±5.3). HSP70 mononuclear cells levels also were found to be higher in patients with IS (76.1±15.9 units) and MI (87.3±11.4 units) than in CG patients (41.7±7.6 units). ROC curves analysis showed that TLR4 measurement in circulating mononuclear cells was more diagnostically valuable in MI than in IS, and oppositely HSP70 measurement in circulating mononuclear cells was more diagnostically valuable in IS than in MI.

Conclusion. TLR4 and HSP70 elevated values in peripheral blood mononuclear cells may serve as additional diagnostic markers of ischemic cardiac or brain damage in diagnostically unclear cases. Further investigation of new approaches to verify primary focuses of ischemic damage using peripheral blood tests for TLR4 and HSP70 in peripheral blood mononuclear cells may be of interest.