

# **The influence of superoxide dismutase activity on the extent of myocardial injury and left ventricular remodeling in patients with acute myocardial infarction**

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**Background.** Superoxide dismutase (SOD) is an important representative of enzymatic antioxidant system and its low levels are considered to be an independent predictor of cardiac death.

**The purpose** of this study was to determine the influence of SOD activity on the extent of myocardial injury and subsequent left ventricular (LV) remodeling in patients with acute myocardial infarction (AMI).

**Methods.** A total of 42 patients with AMI were examined, mean age  $61.82 \pm 7.65$  years; 11 women, 31 men. Patients were divided into 2 groups: 1<sup>st</sup> - SOD level  $< 3$  U/mgHb, 2<sup>nd</sup> -  $\geq 3$  U/mgHb. Groups were comparable in age and gender. Cardiac ultrasound was performed in all patients on 3<sup>rd</sup> and 28<sup>th</sup> day after AMI. The amount of troponin I (TnI) and transaminases was determined in blood of all patients. SOD activity was assessed on admission by spectrophotometric method.

**Results.** Patients of the group 1 demonstrated significantly higher levels of TnI ( $+23.9\%$ ,  $29.6 \pm 3.12$  ng/ml,  $p=0.005$ ) than the ones of group 2. In both groups activity of SOD negatively correlated with the level of TnI: ( $r=-0.48$ ,  $p=0.005$ ) and ( $r=-0.39$ ,  $p=0.006$ ) respectively. Patients of the group 1 had the following dynamics of LV parameters from 3<sup>rd</sup> to 28<sup>th</sup> day: left ventricular end-diastolic volume (LVEDV) and left ventricular end-systolic volume (LVESV) showed a tendency to increase ( $+5.2\%$ ;  $65.78 \pm 4.92$  mm;  $+13.6\%$ ;  $56.72 \pm 7.13$  mm, respectively) as well as the ejection fraction (EF)  $+13.4\%$ ;  $45.78 \pm 3.02\%$ . However, the mentioned above changes weren't statistically significant ( $p \geq 0.05$ ). Patients of the group 2 demonstrated significant decrease of LVEDV ( $-14.9\%$ ;  $53.64 \pm 4.86$  mm;  $p=0.025$ ), as well as LVESV ( $-19.4\%$ ;  $39.83 \pm 3.72$  mm;  $p=0.034$ ); EF increased to 22% ( $48.65 \pm 3.12\%$ ;  $p=0.009$ ). The analysis of indexes on 28<sup>th</sup> day showed increase of EF in both groups (66.9% and 84.7% of patients respectively,  $p = 0.035$ ); the decrease of contractile ability was determined in 27.3% and 13.54% of patients respectively,  $p = 0.037$ ).

**Conclusion.** Low activity of serum SOD in patients with AMI is associated with high levels of TnI and unfavorable dynamics of left ventricular parameters, which suggests greater extent of myocardial injury and increased probability of the left ventricle remodelling/heart failure development than in patients with sufficient SOD levels.