Introduction:
The aim of the experiment was to study the efficacy of preconditioning, based on changes in inspiratory oxygen fraction on endothelial function in a model of myocardial ischemia/reperfusion injury in conditions of cardiopulmonary bypass (CPB).

Methods:
The prospective study included 32 rabbits divided into four equal groups: hypoxic preconditioning; hyperoxic preconditioning (HyperP); hypoxic-hyperoxic preconditioning (HHP); control group. Animals were anesthetized and mechanically ventilated. We provided preconditioning, then started CPB, and then induced acute myocardial infarction by ligation of left anterior descending artery. After 45 minutes of ischemia we performed 120 minutes of reperfusion. We investigated endothelial function markers (endothelin-1 (ET-1), asimmetric dimethylarginine (ADMA), nitric oxide metabolites) at stages before ischemia (after preconditioning in study groups), after ischemia and after reperfusion.

Results:
The level of ET-1 after the stage of ischemia increased in all groups, a significant difference was between HHP and control group (p=0.006), then ET-1 increased even more after the stage of reperfusion (p=0.003 HHP vs control group). The concentration of nitrite decreased after the stages of ischemia and reperfusion in comparison with the baseline in all groups. However, the level of nitrite after all types of preconditioning was higher than in the control group (p=0.016; 0.046; 0.009). The total concentration of nitric oxide metabolites in the study groups was higher than in the control group: before ischemia (after preconditioning) p=0.034; after ischemia p=0.014; after reperfusion, p=0.022. Concentration of ADMA was lower in the HHP comparing with the control group at the stages after ischemia (p=0.006) and after reperfusion (p=0.027).

Conclusion:
HyperP and HHP maintain endothelial function: the balance of nitric oxide metabolites and the reduction of ET-1 hyperproduction in a model of myocardial ischemia/reperfusion injury in conditions of CPB.