THE EFFECT OF REMOTE ISCHEMIC PRECONDITIONING ON THE RESISTANCE OF THE HEART AGAINST ISCHEMIA-REPERFUSION INJURY IN AGING RATS. STUDY OF MOLECULAR MECHANISMS

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The effect of age on reduced tolerance to ischemia-reperfusion (I/R) injury and adaptative mechanisms has been demonstrated in several studies in human and animal hearts. One of the most studied forms of cardioprotection is remote-ischemic preconditioning (RIPC), mainly for its possible clinical use. Positive effect of RIPC has already been found in elderly patients. However, little is known about its effect and molecular basis in elderly animals.

Our work focuses on clarifying the effect of RIPC on the resistance of heart against I/R injury and identifying proteins involved in protective pathways in aging 13 months old rats. In Langendorff-perfused hearts exposed to 30-min I/120-min R without or with prior RIPC. RIPC (3 cycles, 5-min I/5-min R) was applied on the hind limb of anesthetized rats. We measured infarct size (IS), susceptibility to ventricular arrhythmias and recovery of contractile function (LVDP). In parallel groups, LV tissue was sampled for the detection of protein levels of RISK and pro/anti-apoptotic pathways.

Application of RIPC caused decrease in myocardial IS and LVDP recovery was also improved in RIPC group after I/R. Positive effect of RIPC was associated with increased phosphorylation of GSK3β and expression of eNOS, and apoptotic activity of myocardial cells was decreased (Bax/Bcl-2). However, increasing age is likely to have caused a premature increase in Akt phosphorylation. As a result, RIPC provided protection of the heart against I/R injury in 13 months old rats. Therefore, even at this age, RIPC appears to be still an effective and clinically easy-to-use form of cardioprotection.

Keywords: remote preconditioning, aging, molecular mechanisms

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