Hypoxic and pharmacological preconditioning preserves vasomotor response of porcine coronary artery.

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Vasomotor response of the coronary artery depends on both endothelial and smooth muscle cells. Response is altered by hypoxia-reoxygenation-induced damages. Hypoxic preconditioning and pharmacological preconditioning as well can prevent these alterations. We compared the effectiveness of both types of preconditioning against hypoxia-reoxygenation-induced changes in vasomotor response of the isolated artery. Porcine arterial rings (3–4 mm wide) were cut from the left anterior descending porcine coronary artery and placed in Krebs-Henseleit solution. In order to obtain control response of the arteries, we contracted arterial rings with 20 mM KCl before ("standard contraction") and after 60-min hypoxia and 30-min reoxygenation. In other groups, nitric oxide-synthase and cyclooxygenase were inhibited. Then, the rings were pre-contracted with U46619 and relaxed by cumulative addition of the substance P. Contractions and relaxations of non-preconditioned and hypoxically or pharmacologically preconditioned rings were compared. Hypoxic preconditioning was performed by two periods of 5-min hypoxia and 10-min reoxygenation. For pharmacological preconditioning, we used application of adenosine, adrenaline, acetylcholine and angiotensin II. Analysis was performed with one-way ANOVA, followed by Dunnett's Multiple Comparison Test. After hypoxia-reoxygenation, in non-preconditioned rings KCl-induced contractions were significantly increased compared to standard contraction. Relaxations of hypoxically and pharmacologically preconditioned rings (expressed as percentages of U46619-induced pre-contraction) were significantly decreased (p < 0.01) compared to hypoxic but not to normoxic rings. Hypoxic and pharmacological preconditioning may preserve contraction and endothelium-dependent relaxation of porcine coronary artery after long-lasting hypoxia-reoxygenation.

Key words: preconditioning, porcine coronary artery, contraction, relaxation

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