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Pharmacological Preconditioning with Nicorandil attenuates Global Cerebral Ischemia/Reperfusion injury in mice

JOHP

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Abstract

Context: It has been reported that activation of mitochondrial ATP-sensitive potassium (mitoK_{ATP}) channels and nitric oxide donation play important role in neuroprotection and nicorandil is the drug having these property.

Aim: The present study was to investigate the effect of pharmacological preconditioning by nicorandil on cerebral ischemia.

Materials and methods: Occlusion of the bilateral-carotid artery for 17 min, followed by reperfusion for 24 h, was employed to produce ischemia and reperfusion (I/R) induced cerebral injury in mice. Cerebral infarct size was measured by using triphenyltetrazolium chloride staining. The concentration of thiobarbituric acid reactive substances (TBARS), lactate dehydrogenase (LDH) and total nitrate/nitrite were measured by spectrophotometry. Nicorandil (10 mg/kg, i.p) was administered seven days before surgery to induce pharmacological preconditioning.

Results: Bilateral carotid artery occlusion followed by reperfusion produced significant increase in cerebral infarct size, TBARS, LDH and total nitrate/nitrite concentration. Treatment with nicorandil (10 mg/kg, i.p) markedly reduced cerebral infarct size, TBARS, LDH and total nitrate/nitrite level was increased which was an indirect parameter of Nitric oxide (NO) estimation, suggesting a possible mechanism of pharmacological preconditioning by nicorandil on cerebral I/R injury.

Conclusion: pharmacological preconditioning by nicorandil was effective in protection against global cerebral I/R injury and the effect of nicorandil may be due to by activating k_{ATP} channels and through NO donation activity. This suggests that nicorandil could be useful clinically in the prevention of stroke.

Key words: pharmacological preconditioning, nicorandil, neuroprotection, nitric oxide.

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