

Original Article

Protective effect of levothyroxine with oxidative stress reduction mechanism in ischemic preconditioning model in rat heart

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Abstract

Background and Objective: A brief and short duration episode of ischemia is recorded in ischemic preconditioning (IPC). This latter condition provides a status in which large region of heart is protected when prolonged ischemia occurred. Levothyroxine play a protective role in IPC induction, and simultaneously with stress oxidative. This study was conducted to determine the protective effect of levothyroxine with oxidative stress reduction mechanism in ischemic preconditioning model in rat heart.

Methods: This experimental study was performed on 30 male Wistar rats in three groups of 10, as follows. In the reperfusion ischaemia group (IR), the heart of the animal was placed in a Langendorff apparatus. In the ischemic preconditioning group (IPC), prior to major ischemia, was exposed to 4 periods of 5-minute ischemia with reperfusion. In the intraperitoneally administered group, levothyroxine at a dose of 25 microgram per 100 g of body weight, the heart was exposed to reperfusion ischemia. The area of infarct and the level of malondialdehyde in the heart tissue were measured.

Results: The volume of Infarcted region in IR and IPC groups was 26.55 and 11.11 respectively. The same index for the Levothyroxine receiver was 12.56. Based on these findings it was demonstrated that Levothyroxine injection reduced the Infarcted region significantly similar with IPC ($P < 0.05$). The MDA Levels in IR and IPC were 1328 and 777, respectively and in Levothyroxine group it was determined as 762. The size of Infarcted region in both IPC and treated with Levothyroxine groups significantly reduced in compared to IR group ($P < 0.05$).

Conclusion: Injection of levothyroxine with ischemic preconditioning reduced the effect of reperfusion maladaptive ischemia in rat heart.

Keywords: Heart, Ischemia, Levothyroxine, Ischemic Preconditioning, Oxidative Stress

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