Effect of Acute Ischemic Preconditioning on Lowering Blood Pressure in Prehypertensive People: A Pilot Study

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Ischemic preconditioning (IPC) has been shown to lower blood pressure after several days of intervention, however the results of acute intervention have been inconsistent. The purpose of this study was to understand the effect of acute ischemic preconditioning on reducing blood pressure in prehypertensive patients, and to preliminarily explore its effect. Ten prehypertensive male adults (age: 31.2 ± 3.5 years; BMI: 25.8 ± 1.1 kg/m²; SBP: 134.7 ± 2.5 mm Hg; DBP: 78.1 ± 2.2 mm Hg) were recruited for this study. Ischemic conditioning (IPC) and control treatment (CON) were performed on two separate days. Immediately after each experimental treatment, a submaximal exercise test was performed, during which changes in blood pressure and heart rate were recorded throughout. Repeated measure two-way ANOVA was used to analyze difference at each time point during the submaximal exercise test and recovery period. Descriptive statistics were expressed as mean ± standard deviation, and the level of significance was set at $p < .05$. Data of IPC vs. CON showed mean systolic blood pressure (157.0 ± 3.9 mm Hg vs. 162.6 ± 4.4 mm Hg), mean diastolic blood pressure (86.9 ± 3.0 mm Hg vs. 89.0 ± 3.4 mm Hg), and mean heart rate (125.7 ± 4.3 mm Hg vs. 128.7 ± 3.3 mm Hg). Difference between treatments at all time points during the submaximal exercise test and during the 5-minute post-test recovery period were significantly different ($p < .05$). Acute IPC resulted in significantly lower blood pressure and heart rate during subsequent submaximal exercise testing and recovery. According to Poiseuille law, blood pressure = cardiac output (= heart rate x stroke volume) x peripheral vascular resistance, it is speculated that one of the reasons for the decrease in blood pressure caused by IPC may be that IPC activate parasympathetic activity and causes to a decrease in heart rate, together with vascular resistance. The combined effect results in a drop in blood pressure.

Keywords: ischemic preconditioning (IPC), lower blood pressure, Poiseuille law

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