

Intermittent Hypoxic Exposure Plus Exercise Training Reduces Blood Pressure in Essential Hypertension: A Preliminary Study

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Abstract

Introduction: This study was designed to test the hypothesis that intermittent hypoxic conditions at rest or during exercise are a sufficient stimulus to elicit changes in physiological measures associated with improved blood pressure, heart rate variability (HRV) and oxidative stress marker (MDA) in hypertensive patients.

Methods: Fourteen hypertensive stage 1 patients (aged 30–59 years) were assigned into 3 groups, intermittent hypoxic exposure (IHE), intermittent hypoxic training (IHT), and control group (CT). All groups were received antihypertensive medications. IHE and IHT groups were performed 3 minutes on-off of hypoxic gas (14.1% O₂) interspersed with normoxic gas (21% O₂) for 48 minutes, 2 days a week for 6 weeks. IHT group performed light exercise during breath hypoxic gas while CT was not received both hypoxic gas and exercise.

Results: Compared with CT, IHT significantly reduced in systolic blood pressure (SBP) 143.1 ± 9.46 vs. 118.6 ± 2.25 ($P < 0.01$) and mean arterial pressure (MAP) 109.4 ± 5.36 vs. 95.0 ± 4.88 ($P < 0.05$). In both hypoxic training groups, SBP were significantly decreased when compared to baseline IHE 138.3 ± 18.44 vs. 126.6 ± 2.25 ($P < 0.05$) and IHT 140.8 ± 6.36 vs. 118.6 ± 2.25 ($P < 0.01$) after training. However, HRV and MDA showed no substantial improvement in all groups after six-week of experimental period.

Conclusion: Six-week hypoxic training protocol revealed therapeutic effect on SBP and MAP in hypertensive patients. Hypoxic training plus light exercise may help improve these effects, however, further investigation need to be confirmed.

Keywords: Systolic blood pressure, Hypoxic training, Light exercise, Hypertensive patients