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EFFECT OF ALTITUDE TRAINING ON BLOOD PRESSURE REGULATION: RESULTS FROM THE ARARAT EXPEDITION OF 2010

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Introduction: Altitude-induced hypoxia is related to several functional adaptations including tachycardia and hypertension. Immediately after exposure to hypoxia, cardiac output increases by an increase in heart rate, in part for the increased plasma and urinary catecholamine levels. There is evidence that hypoxia-induced blood pressure rise in response to exercise is through an increase in asymmetric dimethylarginine (ADMA) production. Elevated plasma levels of ADMA have been found in patients with hypertension. Considering the possible role played by altitude hypoxia on heart rate and blood pressure, the aim of this study was to evaluate urinary excretion of epinephrine, norepinephrine, 8-iso-$PGF_{2?}$ and ADMA in ten male mountain climbers staying at an altitude ranging from 2000 and 5150 metres above sea level for 6 days. **Materials And Methods:** Blood pressure, heart rate, blood oxygen saturation were recorded at rest in normoxic (sea level) conditions, in hypoxic conditions (at 4000 m altitude, soon after 3 days acute exposure at 5150 m altitude) and in post-hypoxic conditions (at sea level, 2 days after descending from the expedition). Urinary samples were obtained in pre-hypoxic, hypoxic and post-hypoxic conditions, stored at -20 °C and finally assayed by radioimmunoassay for 8-iso-$PGF_{2?}$, HPLC-EC for norepinephrine and epinephrine, and HPLC-UV for ADMA and creatinine determination. Data are expressed as means ? SEM and analyzed by analysis of variance (ANOVA) followed by Newman-Keuls comparison multiple test, using GraphPad Prism software, version 5.0 (GraphPad Software, San Diego, CA, USA). The level of statistical significance was set at P=0.05. **Results:** The percentage of blood oxygen saturation at high altitude (4000 m) was significantly lower compared to sea level; on the other hand heart rate and blood pressure were significantly higher at high altitudes compared to sea level. Respect to pre-exposure levels, urinary epinephrine, norepinephrine, 8-iso-$PGF_{2?}$ and ADMA, indexed to creatinine as nanograms or picograms per milligram creatinine, were significantly higher after 3 days hypoxic exposure at high altitudes, and returned to basal levels soon after returning to sea level. **Discussion:** 3 days hypoxic exposure at high altitude (5150 m) temporarily stimulated blood pressure possibly by enhancing the production of different biochemical mediators such as catecholamines, 8-iso-$PGF_{2?}$ and ADMA. In particular, our work shows for the first time, a direct correlation of ADMA excretion with blood pressure and heart rate during high altitude hypoxic exposure, pointing to a possible involvement of ADMA in transient hypertension induced by exposure to hypoxia.