REDUCED HYPOXIC VENTILATORY RESPONSE IN MIDDLE-AGED SMOKERS DURING ABSTINENCE FROM CIGARETTES

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O2-sensitivity of peripheral arterial chemoreceptors (ChR) contributes significantly to control of ventilation and arterial pO2 in health and disease and may play a role in acclimatization to and physical performance at high altitude. While acute nicotine exposure has been shown to enhance the hypoxic ventilatory response (HVR) we hypothesized, that during abstinence to nicotine, in contrast, HVR may be found to be attenuated due to oxidative stress as a persisting long-term effect of smoking. We therefore compared the isocapnic HVR of 22 middle-aged long-term smokers with a smoking history >10 years but normal pulmonary function to 23 age-matched non-smokers after 12 h of smoke abstinence. Smokers revealed significantly higher vascular risks as indicated by higher plasma levels of total cholesterol, oxidized low-density lipoprotein, triglycerides and intercellular or vascular adhesion molecules compared to non-smokers. As a new finding, we detected a significantly lower HVR in 12-h-abstinent smokers compared to non-smokers (0.025 ± 0.002 vs 0.037 ± 0.003 l min-1 %-%-1 per body mass index, p=0.005). In contrast to our hypothesis this reduction in HVR in smokers was not associated with an oxidative shift in the plasma or intracellular thiol-disulfide redox state. Acute reexposure to smoking nicotine increased HVR to about the level of non-smokers. In conclusion, long-term smoking may attenuate HVR in non-smoking periods through presently unknown mechanisms. When present during overnight nicotine abstinence, this HVR reduction could enhance sleeping-related hypoxemia and contribute to the smokers’ well-known risk for hypopnea/apnea syndromes. The acute smoking-induced increase in HVR appears to mask this substantial HVR-attenuation that has not been previously reported.