Association between heart rate recovery and severity of obstructive sleep apnea syndrome

Micha T. Maeder, Thomas Münzer, Hans Rickli, Otto Schoch, Wolfgang Korte, Christoph Hürny & Peter Ammann

BACKGROUND: Obstructive sleep apnea syndrome (OSAS) is associated with autonomic dysfunction and metabolic abnormalities including obesity, dyslipidemia, and insulin resistance. Heart rate recovery at 1 min after exercise termination (HRR-1) is a marker of vagal tone. We hypothesized that patients with more severe OSAS would have a lower HRR-1, either due to the co-existing metabolic abnormalities or OSAS. METHODS: Sixty-three patients with untreated OSAS (49.2 +/- 9.8 years) without glucose- or lipid-lowering or negatively chronotropic drugs underwent cardiopulmonary exercise testing including HRR-1 measurement and assessment of several metabolic parameters. Patients with severe OSAS (apnea-hypopnea index [AHI] > 30/h (-1); n=32) were compared to patients with mild to moderate OSAS (AHI 5-30/h(-1); n=31). RESULTS: Patients with severe OSAS were more likely to be male (25 vs. 3%; p=0.01) and to have hypertension (72 vs. 39%; p=0.01); they also had higher fasting glucose (5.4 +/- 0.5 vs. 5.1 +/- 0.4 mmol/l; p=0.016) and C-peptide [905 (651-1353) vs. 749 (597-919) pmol/l; p=0.028] levels compared to patients with mild to moderate OSAS. The groups did not differ with respect to peak heart rate (p=0.2) or peak oxygen consumption (p=0.9), but HRR-1 was significantly lower in patients with severe OSAS compared to patients with mild and moderate OSAS [20 (15-25) vs. 24 (18-34) bpm; p=0.022]. Higher AHI (p=0.01) and lower peak heart rate (p=0.02), but not body mass index or insulin resistance, were independently associated with lower HRR-1. CONCLUSIONS: The severity of OSAS expressed as higher AHI is independently associated with lower HRR-1, a measure of autonomic dysfunction.

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