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Title: Impact of obesity on linear and nonlinear heart rate variability indices in response to postural changes and physical exercise

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Body: Background: Obesity is a chronic disease that impacts negatively on the heart rate variability (HRV) and on the functional capacity. Objectives: To evaluate and compare cardiac autonomic modulation in obese and eutrophic women in response to active postural changes (APC) as well as to a 70-80% of maximal oxygen uptake physical exercise (PE) on a treadmill. Methods: Fourteen women were allocated in obese group (OG), and 15 in eutrophic group (EG). The heart rate (HR) and R-R intervals (RRi) were recorded during APC (supine (S), standing (St) and sitting positions (Si)) and PE. Linear (mean HR; standard deviation of RRi, SDNN; high frequency (HF) and low frequency (LF)) and nonlinear (standard deviation of the Poincaré plot along the line of identity, SD2; short-term correlation properties of RRi, DFA α 1) indices of HRV were analyzed. Results: Compared to EG, OG presented a significant impaired response from S to St in LF (34 \pm 24 vs 43 \pm 10un; p=0.03) and HF (-30 \pm 24 vs -41 \pm 12un; p=0.04) and from St to Si in HF (17 \pm 14 vs -25 \pm 20un; p<0.05). During the PE, overall variability indexes were depressed in OG compared to EG (mean HR: 156 \pm 18 vs 141 \pm 17bpm, p=0.04; SDNN: 3 \pm 2 vs 8 \pm 4ms, p=0.01; and, SD2: 8 \pm 6 vs 15 \pm 9, p=0.02). DFA α 1 showed lower values in the OG than in EG (0.7 \pm 0.4 vs 1.1 \pm 0.3, p<0.05). There is a negative moderate correlation between the walking work (the product of body weight and walking distance) and DFA α 1 (r=-0.56, p<0.05). Conclusions: Obesity is associated to a reduced HRV response to APC and PE. In addition, nonlinear index of HRV is negatively related to walking work in this population. Financial Support: FAPESP: 2009/01842-0; CNPq 141331/2011-9.