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Title: Impact of diabetes mellitus on functional capacity and cardiac autonomic control: Spectral and non linear indices analysis

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Body: Background: Heart rate variability (HRV) is a non-invasive method to measure cardiac autonomic function. Diabetes Mellitus (DM) is a chronic disease is one of the most important risk factors for developing cardiovascular disease. Objective: To evaluate and correlate functional capacity and HRV in DM patients. Materials and Methods: 16 patients (49.4±6.2 years) were evaluated. R-R intervals (RRi) were obtained by the Polar S810i heart rate (HR) monitor on rest. Linear (mean heart rate, mean HR, standard deviation of RRi, mean RR, triangular index, RR-Tri, standard deviation of RR, STD-RR and nonlinear (short-term correlation properties of RRi, DFA α 2, approximate entropy- AE and Shannon entropy- SE) indices of HRV were analyzed. Pulmonary gas exchange breath-by-breath was measured during an incremental exercise testing on a cycle. Oxygen uptake (VO₂), carbon dioxide production (VCO₂), minute ventilation (V_E), end tidal carbon dioxide tension (PetCO₂) and V_E/VCO₂ were compared. Data analysis was used to test for normality Shapiro-Wilk test and Pearson correlation. Results: We found that VO₂ peak presented correlation with mean RRi (r=0.59) and with mean HR (r=0.60). In addition, VCO₂ was correlated with mean RR (r=0.65) and mean HR (r=-0.65). PetCO₂ was correlated with STD-RR (r=-0,54), RR-Tri (r=-0.56), DFA α 2 (r=-0.63), SE (r=0.64) and AE (r=0.67). Finally, we observed correlation between V_E/VCO₂ with STD-RR (r=0.54), RR-Tri (r=0.58) and DFA α 2 (r=0.59), SE (r=-0.63) and AE (r=-0.79). Conclusion: The results suggest that linear and nonlinear analyses of HRV are associated to maximal functional capacity in DMII. Financial support: CNPq and FAPESP 2009/01842-0.