Abstract

A bivariate electrocardiogram (ECG)/arterial blood pressure processing procedure is described which aims at extracting a few parameters from the relevant variability series directly quantifying the complex relationship inside the neural controlling system relative to the two signals. Variability signals are detected from patients in resting conditions and during a treadmill stress test with various levels of stress, as well as before and after tilt stimulation. The power spectral density of the variability series is then carried out (autospectra, cross-spectra and coherence) through autoregressive techniques. Besides the usual spectral and cross-spectral analyses, two other parameters, LH and alpha, are obtained, which are functions of the powers associated with the low frequency peak (congruent 0.1 Hz) and the high frequency peak (0.25-0.35 Hz) calculated in the tachogram (heart rate variability signal derived from ECG), and the systolic discrete series values. The proposed parameters seem to be relevant to the beat-to-beat balance of sympathetic and vagal mechanisms in various pathophysiological conditions.