Higher Order Spectra for Heart Rate Variability and QT Interval Variability Analysis: A Comparison between Heart Failure and Normal Control Groups

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Recent studies on heart rate variability (HRV) and QT interval variability (QTV) have shown that HRV and QTV might be related to some cardiac diseases. This study used higher order spectra (HOS) method and constructed a normalized bispectrum amplitude histogram, from which two quantitative indices: bispectrum amplitude entropy (BAEn) and high-low amplitude ratio (HLAr) were defined. A total of 49 subjects (29 heart failure subjects and 20 normal control subjects) were enrolled and the results showed that the histogram distributed differently in the two groups and both BAEn and HLAr for QTV in heart failure group were significantly lower than that in normal control group ($p<0.001$ for both of them), while all of them for HRV had no significant difference in the two groups. These findings pointed out that HOS analysis of QTV might give valuable information for the classification of heart failure and normal control groups.