Factors influencing heart rate variability in patients with severe aortic valve disease.

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BACKGROUND AND HYPOTHESIS: Heart rate variability (HRV) is an accepted tool for the assessment of cardiovascular autonomic tone. There are no sufficient data concerning its application to patients with severe aortic valve disease (AVD) requiring cardiac surgery. METHODS: It was the aim of this study to examine HRV and its physiologic correlates in patients with severe aortic valve disease requiring cardiac surgery. The correlates of time domain indices of HRV obtained from 24-h Holter electrocardiographic recordings were analyzed in 36 consecutive patients (23 men and 13 women, mean age 62 +/- 11 years) with AVD prior to cardiac surgery (aortic stenosis: 17 patients, aortic valve regurgitation: 3 patients, combined aortic valve disease: 16 patients). RESULTS: Low values of HRV were found in the entire study group: SDNN 96.8 +/- 30.9 ms, SDNNI 39.3 +/- 14.4 ms, SDANN 86 +/- 28.9 ms, and RMSSD 30 +/- 18.1 ms. In a univariate analysis, there was no significant correlation between the time domain measures of HRV and age, gender, medication, left ventricular ejection fraction, peak aortic pressure gradient, fraction of aortic valve regurgitation, and left ventricular mass assessed by echocardiography. Patients in advanced functional classes of heart failure [New York Heart Association (NYHA) III or IV] had significantly lower values for SDNN (83.8 +/- 33.6 vs. 107.3 +/- 24.7 ms; p < 0.05) and SDANN (72.7 +/- 29.4 vs. 96.6 +/- 24.3 ms; p < 0.05) than patients in NYHA class I or II. Reassessment of HRV 1 week after aortic valve replacement was performed in 17 patients and showed a significant further decrease of SDNN (102.4 +/- 29.7 vs. 61.5 +/- 23.5 ms; p < 0.001), SDNNI (40.7 +/- 13.6 vs. 23.4 +/- 12.4 ms; p < 0.001) and SDANN (91.8 +/- 29.2 vs. 54.2 +/- 22.8 ms; p < 0.001). CONCLUSION: Patients with AVD requiring cardiac surgery reveal reduced time domain indices of HRV. This observation is pronounced in patients with a progressed clinical class of heart failure, whereas hemodynamic and echocardiographic parameters seem to have no significant influence on HRV parameters in this population. In addition, there is evidence of a further reduction of HRV time domain indices 1 week after uncomplicated aortic valve replacement.

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