Impact of atrial fibrillation on the voltage of bipolar signals acquired from the left and right atria.

Abstract:

A detailed analysis of the impact of atrial fibrillation (AF) on the voltage of the atrial signals acquired from various right and left atrial regions has not been reported. Thirteen patients (mean age 55 +/- 11 years, range 39-67 years, 5 women) with AF were included in this study. Mapping of the left and the right atrium was performed with 64-electrode basket catheters. AF cycle lengths were calculated over 10-second time intervals using a custom-made software. Voltage of the bipolar signals during AF was calculated by measuring the amplitudes of 30 consecutive signals in the left and the right atria. During sinus rhythm voltage differences between the left (3 +/- 2.9 mV) and the right atrium (2.8 +/- 2.4 mV, P = 0.15) were insignificant. During AF, as compared to sinus rhythm, voltages of the bipolar signals were significantly reduced in the left (0.9 +/- 0.6 mV) and the right (1.3 +/- 1.1 mV) atria (P< 0.001 compared with sinus rhythm). In the left atrium, the posterior wall showed the most pronounced voltage reduction (1.1 +/- 0.8 mV vs 5.3 +/- 4.6 mV, P< 0.001). In the right atrium the septal wall showed the greatest reduction in voltage amplitude (0.8 +/- 0.6 mV vs 2.5 +/- 1.5 mV, P< 0.001). There was a close correlation between the voltage values and the AF cycle length. The smallest voltage values and greatest amplitude reductions were observed during faster and more disorganized AF activity. It is concluded that during AF, the voltage
of bipolar signals is significantly reduced as compared to sinus rhythm. The reduction in voltage expresses atrial and regional disparity and correlates strongly with local AF cycle lengths and the degree of AF disorganization.

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