

Amplitude Alterations Between Sinus Rhythm And Ventricular Tachycardia Or Ventricular Fibrillation In Surface And Intracardiac Leads In Human Subjects

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This study was performed to quantify the electrocardiographic amplitude alterations that occur in the transition from sinus rhythm (SR) to ventricular tachycardia (VT) or ventricular fibrillation (VF) in human subjects. Measurements were made of QRS complexes on surface ECGs and of intraventricular depolarizations. Data were acquired from patients undergoing clinical electrophysiology studies in which ventricular arrhythmias were induced. Surface QRSs were acquired from two of the three leads (I, III, V1) at a standard ECG bandwidth of 0.05-100 Hz; ventricular electrograms were recorded (1-500 Hz) from a bipolar catheter (1 cm) located in the right ventricular apex. Amplitude and gain settings were held constant throughout the SR, VT, and VF passages. Amplitude measurements were performed via a custom software package (AAELView) on 12-bit data sampled at 1000 Hz. Patients were studied in three categories: Group A (no drugs), Group B (Amiodarone), and Group C (Procainamide). The percentage increase (+ percentage) or decrease (- percentage) of signal amplitude is given using the SR passage as the baseline.

RESULTS

For VT, Lead I: Group A (n=10) +48%, Group B(n=10) +9%, Group C (n=12) +52%; Lead III: Group A (n=10) +79%, Group B(n=11) +48%, Group C (n=10) +129%; Lead V1: Group A (n=11) +51%, Group B(n=11) +28%, Group C (n=10) +54%; Lead RVA-Bipolar: Group A (n=11) +55%, Group B(n=12) +30%, Group C (n=11) +23%. For VF, Lead I: Group A (n=11) +19%, Group B (n=3) -18%, Group C (n=1) +8%; Lead III: Group A (n=10) +45%, Group B(n=4) +36%, Group C (n=0) NA; Lead V1: Group A (n=11) -9%, Group B(n=4) +13%, Group C (n=1) -2%; Lead RVA-Bipolar: Group A (n=12) +18%, Group B(n=4) -16%, Group C (n=1) -55%. Results of VF for Amiodarone and Procainamide are inconclusive due to the small patient sample size.

CONCLUSIONS

The data show that there is a significant increase in VT amplitude over SR, however no significant relationship was demonstrated in VT signal amplitude between patients with and without drugs. Also, increase in amplitude during VF is markedly less than during VT.