SCD-HEFT: FRACTAL INFORMATION FROM BASELINE HOLTER MONITORING MAY BE USED IN AVOIDING ICD THERAPY DESPITE HEART FAILURE

ACC Poster Contributions
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Background: The SCD-HeFT trial included 2,521 patients with NYHA class II or III HF and EF ≤ 35 %. We hypothesized that fractal content of the RR intervals, a mathematical measure of cardiac system electrical variability, obtained from baseline Holter monitor (HM), is a dynamic marker of ventricular fibrillation risk. As such, it can be correlated directly to arrhythmic mortality risk and the necessity of ICD therapy.

Methods: HM were obtained before randomization to placebo, amiodarone, or ICD. The variations in RR intervals from the HM of 258 patients, randomly selected from the SCD-HeFT population, and 54 healthy subjects were analyzed using Detrended Fluctuation Analysis to obtain the short and long-term fractal exponents, $\alpha_1$ and $\alpha_2$.

Results: All controls and 45% of alive patients after 45.5 months of follow-up who had not received any appropriate shock had $\alpha_1 > 0.7$. In contrast, 7 % of the deaths (11% tachyarrhythmic and 5% other) and none of the alive with appropriate shock had $\alpha_1 > 0.7$. The figure shows each patient in the $\alpha_1$ and $\alpha_2$ space.

Conclusions: Patients with mathematical markers of cardiac electrical system variability of $\alpha_1 > 0.7$ appear not to need an ICD as they appear to have no risk of developing ventricular fibrillation over the nearly 4 years of study follow-up. This would, according to the SCD-HeFT base line data, eliminate 37 % of the population from ICD consideration.