Clinical applications

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Could baseline electrical parameters be a marker of arrhythmia occurrence and poorer prognosis in implantable cardioverter defibrillator patients?

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Background/Introduction: Parameters routinely measured during cardiac devices implantation also depend on bioelectrical properties of the myocardial tissue.

Purpose: To explore the potential association of electrical parameters with clinical outcomes in implantable cardioverter-defibrillator (ICD) and cardiac resynchronization therapy defibrillators (CRT-D) recipients.

Methods: In the framework of the Home Monitoring Expert Alliance, baseline electrical parameters for all implanted leads were compared by occurrence of all-cause mortality, adjudicated ventricular arrhythmia (VA) and atrial high rate episode lasting ≥7 days (7day-AHRE).

Results: In a cohort of 2,976 patients (58.1% ICD) with a median follow-up of 25 months, events rates were 3.1/100 patient-years for all-cause mortality, 18.1/100 patient-years for VA and 8.9/100 patient-years for 7day-AHRE.

At univariate analysis baseline shock impedance was consistently lower in groups with events than in those without, with a 40 Ohm cut-off better identifying patients at high risk, but at multivariable analysis the adjusted-hazard ratios (HRs) lost statistical significance for any end-point.

Baseline atrial sensing amplitude during sinus rhythm was lower in patients with 7-day AHRE as compared to those without (2.40 [IQ: 1.62-3.71] Vs 3.50 [IQ: 2.35-4.66] mV, $p < 0.01$). The adjusted-HR for 7-day AHRE in patients with atrial sensing >1.5 mV versus those with values ≤1.5 mV was 0.44 (95% CI:0.27-0.72), $p = 0.001$.

Conclusion: Despite in patients with events a lower baseline shock impedance was observed at univariate analysis, the association lost statistical significance at multivariable analysis. Conversely, low sinus rhythm atrial sensing (≤1.5 mV) measured with standard transvenous leads could identify subjects at high risk of long-lasting atrial arrhythmia.

Abstract Figure. AHRE occurrence by atrial sensing