

CLINICAL RESEARCH

Clinical Trial

The ABCD (Alternans Before Cardioverter Defibrillator) Trial

Strategies Using T-Wave Alternans to Improve Efficiency of Sudden Cardiac Death Prevention

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Objectives

Because risk stratification with electrophysiological study (EPS) improves efficiency but is invasive, we sought to determine whether noninvasive microvolt T-wave alternans (MTWA) testing could identify patients who benefit from implantable cardioverter-defibrillators (ICDs) as well as EPS.

Background

Prevention of sudden cardiac death on the basis of left ventricular ejection fraction (LVEF) alone is inefficient, because most ICDs never deliver therapy.

Methods

The ABCD (Alternans Before Cardioverter Defibrillator) trial is a multicenter prospective study that enrolled patients with ischemic cardiomyopathy (LVEF \leq 0.40) and nonsustained ventricular tachycardia. All patients underwent MTWA and EPS. ICDs were mandated if either test was positive.

Results

Of 566 patients followed for a median of 1.9 years, 39 (7.5%) met the primary end point of appropriate ICD discharge or sudden death at 1 year. As hypothesized, primary analysis showed that MTWA achieved 1-year positive (9%) and negative (95%) predictive values that were comparable to EPS (11% and 95%, respectively). In addition, secondary analysis showed that at the pre-specified 1-year end point, event rates were significantly higher in patients with both a positive MTWA-directed strategy (hazard ratio: 2.1, $p = 0.03$) and a positive EPS-directed strategy (hazard ratio: 2.4, $p = 0.007$). Moreover, the event rate in patients with both negative MTWA test and EPS was lower than in those with 2 positive tests (2% vs. 12%; $p = 0.017$).

Conclusions

The ABCD study is the first trial to use MTWA to guide prophylactic ICD insertion. Risk stratification strategies using noninvasive MTWA versus invasive EPS are comparable at 1 year and complementary when applied in combination. Strategies employing MTWA, EPS, or both might identify subsets of patients least likely to benefit from ICD insertion. (Study to Compare TWA Test and EPS Test for Predicting Patients at Risk for Life-Threatening Heart Rhythms [ABCD Study]; [NCT00187291](#)) (J Am Coll Cardiol 2009;53:471-9) © 2009 by the American College of Cardiology Foundation

Primary prevention trials using risk stratification with electrophysiological study (EPS) to identify patients at high risk

for sudden cardiac death (SCD) have demonstrated significant reductions in mortality after implantable cardioverter-defibrillator (ICD) insertion (1,2). Despite the high therapeutic efficiency (4 ICDs/life saved) of this approach, concerns were raised that a negative EPS was not sufficient

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See page 480

evidence to avoid ICD insertion (3). Moreover, it is impractical to screen all patients at risk for SCD with EPS, because it is invasive, expensive, and requires specialized technology and personnel. Recent randomized trials that selected patients for ICD insertion on the basis of reduced left ventricular ejection fraction (LVEF) alone (4,5) also