Assessment of T-Wave Alternans for Prediction of Sudden Cardiac Death After Myocardial Infarction: Results of a Prospective, Japanese Multicenter Study

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Background: Stratification of patients at risk for sudden cardiac death (SCD) remains a clinical challenge. At present, various noninvasive indices including microvolt T-wave alternans (TWA) have been proposed as risk stratifiers after myocardial infarction (MI). This study reports the prognostic value for SCD of TWA in comparison with other 10 prognostic indices in large post-MI patients. Methods: We collected data on a prospective cohort of 834 consecutive infarct survivors (696 men, mean age: 63±11 years) at 7 Japanese centers. Of these patients, 95 patients were given antiarrhythmic drugs and 110 patients had beta-blockers during the follow-up period. Prognostic Indices for SCD involved TWA, late potentials (LP) determined by signal-averaged ECG, left ventricular ejection fraction (EF) <40%, nonsustained ventricular tachycardia (NSVT) detected on Holter monitoring, age >70 years, gender (male), anterior wall infarction, successful percutaneous coronary intervention, coronary bypass surgery, antiarrhythmic drug treatment, and beta-blocker treatment. The primary endpoint was SCD or resuscitated ventricular fibrillation (VF), and the secondary endpoint was any of primary endpoints plus sustained VT. Results: During a mean follow-up period of 25±13 months, 25 patients (3%) reached one of the primary endpoints; 12 patients died suddenly and 13 patients had resuscitated VF. Kaplan-Meier survival analysis revealed that TWA predicted primary events with a relative hazard of 11.4 (95%CI 3.4-37.9) and an abnormal EF, LP, NSVT, antiarrhythmic drug treatment, and anterior wall infarction had a relative hazard of 6.6, 5.2, 4.6, 4.0, and 3.2, respectively. To test the statistical significance of TWA in predicting SCD, multivariate Cox regression analysis was performed. Only TWA and an abnormal EF were significant predictors (relative hazard, 5.8 [95%CI 1.6-21.3] and 4.5 [95%CI 1.6-12.6], respectively), whereas other indices including LP and NSVT were not. With respect to the secondary endpoints, TWA, an abnormal EF, LP, and NSVT were significant predictors on

multivariate analysis. Conclusions: These findings from a large prospective study demonstrate that TWA is a strong risk stratifier for sudden cardiac death after myocardial infarction.