Background: Recent guidelines have stated that reduced left ventricular ejection fraction (LVEF) is the gold standard marker for identifying patients at risk for cardiac mortality. Although reduced LVEF identifies patients at an increased risk of cardiac arrest, sudden cardiac deaths (SCDs) occur considerably more often in patients with relatively preserved LVEF. Current guidelines on SCD risk stratification do not adequately cover this general population pool. Several noninvasive electrocardiographic (ECG) risk stratifiers that reflect depolarization abnormality, repolarization abnormality, and autonomic imbalance have been evaluated so far. With current therapeutic advances using new medicines or devices, an LVEF is often preserved in patients with structural heart disease (SHD). However, the usefulness of noninvasive ECG markers for risk stratification in such a patient population has not yet been elucidated.

Purpose: This study aimed to assess clinical indices and ECG markers based on 24-hour Holter ECG recordings for predicting cardiac mortality in patients with SHD who have left ventricular dysfunction (LVD) but relatively preserved LVEF.

Methods: In total, 1,829 patients were enrolled into the Japanese Multicenter Observational Prospective Study (JANIES study). In this study, we analyzed data of 719 patients (569 men, age 64±13 years) with SHD including mainly ischemic heart disease (65.8%). As ECG markers based on 24-hour Holter recordings, nonsustained ventricular tachycardia (NSVT), ventricular late potentials, and heart rate turbulence (HRT) were assessed. The primary endpoint was all-cause mortality, and the secondary endpoint was fatal arrhythmic events.

Results: During a mean follow-up of 21±11 months, all-cause mortality was eventually observed in 39 patients (5.4%). Among those patients, 32 patients (82%) suffered from cardiac causes such as heart failure and arrhythmia. Multivariate Cox regression analysis showed that after adjustment for age and LVEF, documented NSVT (hazard ratio=2.82, 95% confidence interval [CI]: 1.38-5.76, P=0.005) and abnormal HRT (hazard ratio=2.31, 95% CI: 1.15-4.65, P=0.02) were significantly associated with the primary endpoint. These two
ECG markers also had significant predictive values with the secondary endpoint. The combined assessment documented NSVT and abnormal HRT improved predictive accuracy.

Conclusion: This study demonstrated that combined assessment of documented NSVT and abnormal HRT based on 24-hour Holter ECG recordings are recommended for predicting future serious events in SHD patients who have relatively preserved LVEF.