

## A multiparametric ICD algorithm for heart failure risk stratification: an analysis in clinical practice

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**Purpose:** A novel multiparametric algorithm based on implantable cardioverter defibrillator (ICD) sensors has been recently developed. The HeartLogic index combines multiple parameters, i.e. heart sounds, intrathoracic impedance, respiration pattern, night heart rate, and patient activity, in a single index. In the validation study, the HeartLogic alert condition was shown to identify patients during periods of significantly increased risk of heart failure (HF) events. We sought to evaluate the risk stratification ability of the algorithm in a group of patients who received the system in clinical practice.

**Methods:** The HeartLogic feature was activated in 257 ICD and cardiac resynchronization therapy ICD patients (186 male, 70±11 years, left ventricular ejection fraction 30±8%) at 11 centers. The median follow-up duration was 14 months [25–75 percentile: 7–19]. The HeartLogic algorithm automatically calculates a daily HF index and identifies periods in or out of an alert state relative to a configurable threshold (in this analysis set to 16).

**Results:** Patients experienced 40 HF hospitalizations requiring at least 1 overnight stay (0.14/patient-year) during the observation period (285 patient-years). The HeartLogic index crossed the threshold value 191 times in 105 patients. The time in the alert state was 27 patient-years, i.e. 9.5% of the total observation period. HF hospitalization rate while in alert was 0.96/patient-year and 0.05/patient-year while out of alert. The occurrence of  $\geq 1$  index crossing during follow-up was associated with the risk of HF hospitalization (odds ratio: 4.70, CI 95%: 1.79–12.4,  $p=0.002$ ), independently from other baseline clinical variables.

**Conclusions:** Our analysis of data collected in clinical practice confirms that the multiparametric ICD algorithm is an independent predictor of higher risk of HF. In particular, it allows dynamic identification of time-intervals when patients are at significantly increased risk of worsening HF. This potentially helps better triage resources to a more vulnerable patient population.