

Performance of the multisensory cardiac implantable electronic device algorithm HeartLogic in a real-world ambulant chronic heart failure population

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Background: Early detection of an upcoming episode of decompensated heart failure (HF) and timely adjustment of medical therapy may prevent a HF hospitalization. The novel multisensory cardiac implantable electronic device (CIED) based algorithm entitled HeartLogic™ (HL) aims to alert in case of upcoming fluid retention. This study investigates the performance of an HL alert in chronic HF patients in an ambulant HF care-path.

Methods: All chronic HF patients with a CIED and an activated HL algorithm implanted in our centre since 2018 were included. Patients were followed from 01–01–2018 until 01–02–2021 according to the HL-based care-path (Figure 1). The HL index was automatically generated from sensors assessing S3, S3/S1, thoracic impedance, respiratory- and night heartrate. Indexes were monitored continuously and an alert was issued when the pre-set threshold of 16 was surpassed. An alert was classified as true positive when the patient had at least two symptoms and/or signs of congestion during the alert episode. An alert was considered false positive when the

patient had not more than one symptom or sign of congestion during the alert episode. If a patient had at least two symptoms and/or signs of congestion without an HL alert, the episode was classified as false negative.

Results: In total, 100 patients (median age 69 years [IQR 60–77], 78% male) were included. The etiology of HF was ischemic in 45% and 71% had a CRT-D device. Median follow-up was 13 months [IQR 6–23] and in total the follow-up comprised 126 patient-years. In 56 patients, there were 132 alerts, mean alert rate was 1.05 per patient-year. As it was unfeasible to strictly follow the specific HL care-path in 13 alert episodes, these alerts were excluded from further analyses. Based on the remaining 119 alert episodes, the positive predictive value for early detection of congestion was 77% and the negative predictive value was 97%. Sensitivity was 79% and specificity 97%.

Conclusion: In a real-world HF population, the HL algorithm can accurately predict an upcoming episode of decompensated heart failure.

