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Remote monitoring of Heart Failure patients with a Multisensor ICD Algorithm: value of an alert-based follow-up strategy

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Background: The HeartLogic algorithm measures and combines multiple parameters, i.e. heart sounds, intrathoracic impedance, respiration pattern, night heart rate, and patient activity, in a single index. The associated alert has proved to be a sensitive and timely predictor of impending heart failure (HF) decompensation, and the HeartLogic alert condition was shown to identify patients during periods of significantly increased risk of HF events.

Purpose: To report the results of a multicenter experience of remote HF management with HeartLogic algorithm and appraise the value of an alert-based follow-up strategy.

Methods: The HeartLogic feature was activated in 104 patients (76 male, 71 ± 10 years, left ventricular ejection fraction 29 ± 7%). All patients were followed according to a standardized protocol that included remote data reviews and patient phone contacts every month and at the time of HeartLogic alerts. In-office visits were performed every 6 months or when deemed necessary.

Results: During a median follow-up of 13[11-18] months, centers performed remote follow-up at the time of 1284 scheduled monthly transmissions (10.5 per pt-year) and 100 HeartLogic alerts (0.82 alerts/pt-year). The mean delay from alert to the next monthly remote data review was 14 ± 8 days. Overall, the patient time in the alert state (i.e. HeartLogic index above the threshold) was 14% of the total observation period. HF events requiring active clinical actions were detected at the time of 11 (0.9%) monthly remote data reviews and at 43 (43%, $p < 0.001$) HeartLogic alerts. Moderate to severe symptoms of HF were reported during 2% of remote visits when the patient was out of HeartLogic alert condition and during 15% of remote visits performed in alert condition ($p < 0.001$). Out of 100 alerts, 17 required an in-office visit and 5 a hospitalization to manage the clinical condition. Overall, 282 scheduled and 56 unscheduled in-office visits were performed during follow-up. Any HF sign (i.e. S3 gallop, rales, jugular venous distension, edema) was detected during 18% of in-office visits when the patient was out of HeartLogic alert condition and during 34% of visits performed in alert condition ($p = 0.002$).

Conclusions: HeartLogic alerts are frequently associated with relevant actionable HF events. Events are detected earlier and the volume of alert-driven remote follow-ups is limited when compared with a monthly remote follow-up scheme. The probability of detecting common signs and symptoms of HF at regular remote or in-office assessment is extremely low when the patient is out of HeartLogic alert state. These results support the adoption of an alert-based follow-up strategy.