EVALUATION OF THE EFFECTIVENESS OF IN-HOSPITAL TREATMENT OF CHRONIC HEART FAILURE PATIENTS DURING EXACERBATION BY NON-INVASIVE NET LUNG IMPEDANCE MONITORING DURING ADMISSION

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Background: Prediction and prevention of hospitalization for deceleration of chronic heart failure (CHF) patients is an unresolved issue. The accuracy of implantable and non invasive devices in predicting deterioration before hospitalization is only 38-76%. We evaluated the ability of a new non-invasive method for lung impedance monitoring to predict decompensation in CHF patients.

Methods: CHF patients were monitored by a device that derives the net lung impedance (LI) from measured trans-thoracic impedance. This device is 25-fold more sensitive than existing ones. A decreasing LI reflects accumulation of lung fluid. Changes in the clinical status of patients and LI were recorded at each monthly outpatient visit. On the basis of LI measurements, clinical assessment, and chest X-ray, the optimal LI was determined for each patient. LI changes from this value are represented as percentage change.

Results: 200 CHF patients (67±11 years-old, male- 85%, LVEF: 26±9%) at NYHA II/III/IV (77/90/33) were recruited after index hospitalization for acute heart failure (AHF) and followed in an outpatient clinic for 26±22 months. Initial NT-proBNP level was 3771±5185 pg/ml. Patients were treated according to current guidelines. During follow-up, 48 patients (24%) died of AHF. Of study patients, 106 were not hospitalized while 94 required 326 re-hospitalizations for AHF. At hospital admission for AHF, LI was -36.8±10.5% from optimal LI. During hospital stay (4.3±5.1 days) LI increased to -30.4±12.5%. Study patients were divided by LI %change into groups: A: 0< ΔLI< 5%; B: 5 < ΔLI < 10%; C: 10 < ΔLI < 20% and D: ΔLI > 20%. During the first month after hospitalization, re-hospitalization was required in 62.5% (100/160) of group A, in 16% (16/100) of group B, in 7.4% (4/54) of group C and 0% (0/12) of group D (p<0.001).

Conclusions: Noninvasive LI monitoring may be used to evaluate effectiveness of therapy in hospitalized decompensated CHF patients. Small (less 5%) improvement in LI during hospitalization is a very strong predictor for re-hospitalization during next month.