NON INVASIVE LUNG IMPEDANCE MONITORING IN THE OUTPATIENT CLINIC FACILITATES THE PREDICTION OF HOSPITALIZATION OF PATIENTS WITH DECOMPENSATED HEART FAILURE AND ENABLES EARLY THERAPY TO PREVENT HOSPITALIZATIONS

ACC Poster Contributions
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Background: Implantable intra-thoracic impedance device has shown that lung fluid accumulation in patients with decompensated chronic heart failure (CHF) begins several days before admission, but predicts hospitalizations with only 50-76% accuracy. We evaluated the ability of a non-invasive impedance device to predict decompensation in CHF patients and to trigger early therapy in order to prevent hospitalizations.

Methods: Lung impedance (LI) was measured by a new non-invasive technique. Changes in the clinical status of patients, LI and NT-proBNP levels were concurrently recorded at each outpatient heart failure clinic visit (21±20 days).

Results: 120 CHF patients (71±11 years, LVEF=26±8%) at NYHA II/III/IV (60/41/19) were followed for 25±12 months in an outpatient clinic. Patients were treated with diuretics, beta blockers and ACE/ARB/aldosterone. An LI decrease>15% from normal baseline was used to initiate early preventive therapy since we have shown previously that clinical decompensation occurred at this level of LI decrease. 59 of 120 patients were treated by clinical evaluation (Group 1) and 61 according to LI (Group 2). LVEF and NT-proBNP in groups 1 and 2 were 29±7%, 5473±2570 pg/ml, and 28±6% and 5540±2610 pg/ml, respectively (p=NS). 121 episodes of LI decrease>15% occurred in group 1 with treatment administered according to clinical signs only. These LI decrease episodes included 108 hospitalizations and 23 deaths. Positive predictive value for hospitalization at level of LI decrease>15% was 89%. In group 2, 142 episodes of LI decrease>15% were recorded. Treatment was immediately intensified. In 113 cases LI increased as the result of treatment intensification and only 29 hospitalizations were required (p<0.01) and 10 patients died (p=0.01). LI decrease at admission in group 2 (27±5.5%) was similar to that in group 1 (26±5.4%). Time elapsed between LI decrease > 15% and hospitalization in both groups was 16±6 days.

Conclusions: Lung impedance monitoring of CHF patients in an outpatient clinic to predict decompensation and admission is feasible. Preventive early LI-guided treatment is effective and may prevent hospitalizations and deaths.