Abstract: P1071

Cardiac acoustic biomarkers reflect disease status and cardiac functions in patients with acute decompensated heart failure: the ACTOR-HF trial

Authors:
J Shitara¹, T Kasai¹, S Yatsu², A Kurita¹, H Matsumoto¹, M Hiki¹, H Daida¹, Juntendo University, Circulation - Tokyo - Japan, ²Juntendo University Shizuoka Hospital, Circulation Department - Izunokuni - Japan,

Topic(s):
Acute Heart Failure: Biomarkers

Citation:

Introduction: Biomarkers reflecting rapid changes in disease status and cardiac function are important for patient care of heart failure (HF), whereas only a few biomarkers are available and most of them have limitations for daily use. Cardiac acoustic biomarkers (CABs), which are acoustic and temporal metrics incorporating heart sounds and electrocardiographic signals, can be recorded noninvasively and easily, and can be assessed on daily basis using an ambulatory acoustic cardiography device on the chest. The aim of this study is to assess temporal changes of CABs and their association with disease status and cardiac functions in patients hospitalized for acute decompensated HF (ADHF).

Methods: We prospectively enrolled 60 patients hospitalized for ADHF. Echocardiographic parameters and CABs were evaluated at admission, pre-discharge and the first clinic visit following discharge. The following CABs were recorded by an ambulatory acoustic cardiography device for 5 minutes at rest: electromechanical activation time (EMAT, time-interval from Q wave onset to S1) and total electromechanical systolic interval (QoS2, time-interval from Q wave onset to S2), both of which are generally regarded as an indicator of left ventricular systolic performance; and S3 Intensity (peak-to-peak amplitude of S3).

Results: A total of 60 patients with ADHF enrolled from April, 2017, to December, 2018 in this trial. The mean age was 70±13 years, and 76.7% were men. One third of them have HFpEF (defined as ejection fraction > 50%). The mean hospitalization period was 20±11 days. The prolonged EMAT (i.e. EMAT=120msec) was detected in 17 patients (28%) and the increased S3 Intensity (i.e. S3 Intensity=2.0) was observed in 15 patients (25%) at admission. From admission to the pre-discharge and to the first clinic visit, S3 Intensity significantly decreased (P<0.001 and P<0.001, respectively)and QoS2 significantly increased (P=0.002 and P<0.001, respectively) while EMAT was not changed. Correlations between changes in CABs and echocardiographic parameters revealed significant direct correlation between changes in QoS2 and changes in stroke volume index (r=0.383, P=0.004) (Figure) and between changes in S3 Intensity and changes in trans mitral flow E/A (r=0.571, P=0.001) (Figure).

Conclusion: Temporal changes of CABs reflect alterations of disease status and cardiac functions in patients hospitalized for ADHF.
Abstract: P1071
Cardiac acoustic biomarkers reflect disease status and cardiac functions in patients with acute decompensated heart failure: the ACTOR-HF trial

Authors: J Shitara1, T Kasai1, S Yatsu2, A Kurita1, H Matsumoto1, M Hiki1, H Daida1,1 Juntendo University, Circulation - Tokyo - Japan, 2 Juntendo University Shizuoka Hospital, Circulation Department - Izunokuni - Japan.

Topic(s): Acute Heart Failure: Biomarkers

Introduction: Biomarkers reflecting rapid changes in disease status and cardiac function are important for patient care of heart failure (HF), whereas only a few biomarkers are available and most of them have limitations for daily use. Cardiac acoustic biomarkers (CABs), which are acoustic and temporal metrics incorporating heart sounds and electrocardiographic signals, can be recorded noninvasively and easily, and can be assessed on daily basis using an ambulatory acoustic cardiography device on the chest. The aim of this study is to assess temporal changes of CABs and their association with disease status and cardiac functions in patients hospitalized for acute decompensated HF (ADHF).

Methods: We prospectively enrolled 60 patients hospitalized for ADHF. Echocardiographic parameters and CABs were evaluated at admission, pre-discharge and the first clinic visit following discharge. The following CABs were recorded by an ambulatory acoustic cardiography device for 5 minutes at rest: electromechanical activation time (EMAT, time-interval from Q wave onset to S1) and total electromechanical systolic interval (QoS2, time-interval from Q wave onset to S2), both of which are generally regarded as an indicator of left ventricular systolic performance; and S3 Intensity (peak-to-peak amplitude of S3).

Results: A total of 60 patients with ADHF enrolled from April, 2017, to December, 2018 in this trial. The mean age was 70±13 years, and 76.7% were men. One third of them have HFpEF (defined as ejection fraction > 50%). The mean hospitalization period was 20±11 days. The prolonged EMAT (i.e. EMAT=120msec) was detected in 17 patients (28%) and the increased S3 Intensity (i.e. S3 Intensity=2.0) was observed in 15 patients (25%) at admission. From admission to the pre-discharge and to the first clinic visit, S3 Intensity significantly decreased (P<0.001 and P<0.001, respectively) and QoS2 significantly increased (P=0.002 and P<0.001, respectively) while EMAT was not changed. Correlations between changes in CABs and echocardiographic parameters revealed significant direct correlation between changes in QoS2 and changes in stroke volume index (r=0.383, P=0.004) (Figure) and between changes in S3 Intensity and changes in trans mitral flow E/A (r=0.571, P=0.001) (Figure).

Conclusion: Temporal changes of CABs reflect alterations of disease status and cardiac functions in patients hospitalized for ADHF.