Adverse cardiovascular outcome predicted by left atrial strain in acute decompensated heart failure

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Background: A significant proportion of patients hospitalized for acute decompensated heart failure (ADHF) are readmitted to the hospital within 30 days, resulting in a major social and economic burden. Thus, risk stratification and identification of targets of therapy is of basic importance. Non-invasive imaging modality such as transthoracic echocardiography (TTE) represents a cornerstone tool to approach this clinical scenario for early recognition of high-risk patients.
Purpose: To define whether left atrial (LA) dynamics, evaluated by means of speckle tracking echocardiography (STE), may represent a predictor of cardiac events and early re-hospitalization in patients admitted to the emergency department (ED) for ADHF, in comparison with other non-invasive established prognostic index in heart failure (HF) such as NT-proBNP, B-lines at lung ultrasonography (LUS) and right ventricular (RV) to Pulmonary Circulation (PC) uncoupling evaluated through Tricuspid Annular Plane Systolic Excursion (TAPSE)/Pulmonary Arterial Systolic Pressure (PASP) ratio.
Methods: Seventy patients (mean age 75.6±11 years, 57% males) presenting with ADHF were prospectively enrolled within 24–48 hours from admission. In the acute phase and at pre-discharge the following variables have been collected: NT-proBNP, B-lines, TAPSE/PASP ratio, Left Atrial Volume indexed (LAVi) and global-peak atrial longitudinal strain (G-PALS).
Results: During a median follow-up of nine months we observed 18 events consisting of 7 deaths, 8 re-hospitalizations for ADHF, 1 re-hospitalization for acute coronary syndrome, 1 stroke and 1 mitral valve replacement. Multivariate Cox-regression analysis identified LAVi and GPALS at discharge, along with NT-proBNP, B-lines and TAPSE/PASP ratio, as independent predictors of major adverse CV events (LAVi: p=0.04; GPALS: p=0.05; NT-proBNP: $p<0.001$; B-lines: p=0.03; TAPSE/PASP: $p<0.001$) (Table 1).
Conclusions: Short-term re-hospitalization in ADHF is crucial and the identification of a higher risk through sensitive and potentially new hemodynamic phenotypes is of relevance. Our findings, although preliminary, may suggest a primary role of LA dynamics in this context.

Table 1. Univariate and Multivariate analysis

	Univariate p-value	Multivariate p-value
NT-proBNP (ng/L)	0.02	<0.001
B-lines	0.05	0.03
TAPSE/PASP (mm/mmHg)	0.02	<0.001
LAVi (ml/m^2)	0.05	0.04
GPALS (%)	0.05	0.05