Mechanical Atrial Dysfunction Reveals the Prognostic Relationship Between Heart Failure with Preserved Ejection Fraction and Atrial Fibrillation

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Purpose:
Heart failure with preserved ejection fraction (HFpEF) and atrial fibrillation (AF) are intertwined pathologies, and yield worse outcome. This study assessed the interplay and prognostic implications between mechanical atrial dysfunction and different stages of AF in HFpEF.

Methods:
258 HFpEF patients systemically underwent an extensive clinical characterization, including echocardiography and 24-hour Holter monitoring. Speckle-tracking echocardiography was performed to assess cardiac mechanical function, including left atrial reservoir strain (LASr). Patients were categorized according to rhythm and stages of AF: no history of AF (no AF), paroxysmal AF (PAF), and sustained (persistent/permanent) AF (SAF).

Results:
The study groups consisted of 112 no AF, 56 PAF and 90 SAF patients. A progressive decrease in mechanical atrial function was seen: LASr 30.5±10.5% (no AF), 22.3±10.5% (PAF) and 13.9±7.8% (SAF), $p<0.001$. Independent predictors for lower LASr values were AF, absence of COPD, higher NT-proBNP, LA volume index, and relative wall thickness, lower left ventricular global longitudinal strain, and echocardiographic signs of congestion. LASr was an independent predictor of adverse outcome (all-cause mortality/HF hospitalization) (HR per 1% decrease =1.049, 95%CI 1.014-1.085). Moreover, LASr mediated the adverse outcome associated with AF in HFpEF ($p=0.008$).

Keywords:
Heart failure with preserved ejection fraction, Atrial fibrillation, Atrial failureHeart failure with preserved ejection fraction

Figure:
Legend: Panel (A) displays violin plots (data distribution plot with mean and standard deviation) showing mechanical atrial dysfunction at different atrial fibrillation (AF) stages in HFpEF; Panel (B) displays Kaplan-Meier survival curves for freedom of heart failure hospitalization or all-cause mortality for abnormal left atrial reservoir strain (LASr) (defined as <22.7%); Panel (C) displays the combination of AF and mechanical atrial dysfunction on clinical outcome.