THREE-DIMENSIONAL ACTIVATION IMAGING ECHOCARDIOGRAPHY: A NOVEL ASSESSMENT OF RIGHT VENTRICULAR MECHANICS IN PATIENTS WITH PULMONARY HYPERTENSION

Poster Contributions
Hall C
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Background: Right ventricular (RV) mechanics are of important prognostic value in patients with pulmonary hypertension (PH), but details remain unclear.

Methods: Activation Imaging (AI) is a novel echoc method to quantify mechanical activation in three-dimensions (3D). We applied AI to assess RV mechanics in 34 subjects; 20 PH patients and 16 normal subjects. AI assessed timing of regional RV deformation by area change ratio. RV dyssynchrony was defined as maximum time difference in time-to-peak AI activation and standard deviation of time-to-peak activation among 16 segments, corrected for heart rate / (RR)^1/2.

Results: AI demonstrated RV apical to basal toward outflow tract mechanical propagation in normal subjects from 58ms to 177ms, with the time difference of 119ms between the first and latest site. In contrast, PH patients had significantly greater RV activation heterogeneity than normal subjects. (AC-D: 61±23 vs. 324±69, p<0.001, AC-SD: 48±33 vs. 141±43, p<0.001, and AI-SD: 42±17 vs. 69±21, p<0.001) AC-SD and AI-SD correlated significantly with QRS duration (r=0.60, p<0.01 and r=0.32, p<0.05) and systolic pulmonary artery pressure (r=0.67, p<0.001 and r=0.42, p<0.001, respectively) in all subjects.

Conclusions: AI is a new 3D speckle tracking echo method to quantify RV mechanical activation and is useful to evaluating RV function in PH patients. Activation Imaging of RV has the potential for additional value for evaluating RV function.