



Right atrial function is associated with right ventricular diastolic stiffness: RA–RV interaction in pulmonary arterial hypertension

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Despite increased RA stroke work in PAH patients, severe RV diastolic stiffness is associated with lower RV active filling and high vena cava backflow. Upon treatment, severe RV diastolic stiffness and RA–RV interaction improve in only ~50% of patients. <https://bit.ly/31qai5Z>

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Abstract

Background Pulmonary arterial hypertension (PAH) patients have altered right atrial (RA) function and right ventricular (RV) diastolic stiffness. This study assessed the impact of RV diastolic stiffness on RA–RV interaction.

Methods PAH patients with low or high end-diastolic elastance (E_{ed}) ($n=94$) were compared with controls ($n=31$). Treatment response was evaluated in 62 patients. RV and RA longitudinal strain, RA emptying and RV filling were determined and diastole was divided into a passive and active phase. Vena cava backflow was calculated as RA active emptying–RV active filling and RA stroke work as RA active emptying \times RV end-diastolic pressure.

Results With increased E_{ed} , RA and RV passive strain were reduced while active strain was preserved. In comparison to controls, patients had lower RV passive filling but higher RA active emptying and RA stroke work. RV active filling was lower in patients with high E_{ed} , resulting in higher vena cava backflow. Upon treatment, E_{ed} was reduced in ~50% of the patients with high E_{ed} , which coincided with larger reductions in afterload, RV mass and vena cava backflow and greater improvements in RV active filling and stroke volume in comparison with patients in whom E_{ed} remained high.

Conclusions In PAH, RA function is associated with changes in RV function. Despite increased RA stroke work, severe RV diastolic stiffness is associated with reduced RV active filling and increased vena cava backflow. In 50% of patients with high baseline E_{ed} , diastolic stiffness remained high, despite treatment. A reduction in E_{ed} coincided with a large reduction in afterload, increased RV active filling and decreased vena cava backflow.

