

## Three-Dimensional Right Ventricular Regional Strain in Pediatric Pulmonary Hypertension

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**Background:** Right ventricular (RV) function is important in the evaluation of pediatric pulmonary hypertension (PH). Three-dimensional echocardiography (3DE) RV regional deformation has been shown in adult PH to become progressively worse and affect survival. 3DE RV regional deformation has not been studied in pediatric PH. We compared 3DE RV regional and global deformation between normal controls, associated pulmonary arterial hypertension with congenital heart disease (APAH-CHD), and idiopathic pulmonary arterial hypertension (IPAH).

**Methods:** Fifty controls, 49 APAH-CHD patients, and 42 IPAH patients were retrospectively evaluated. 3DE RV sequences were analyzed by semi-automated software (TomTec 4D RV function 2). RV output meshes were post-processed to extract global and regional deformation [circumferential, longitudinal, and area strain (AS)]. Pair-wise comparisons of least square means adjusting for age, gender, and BSA were performed.

**Results:** Significant differences were found in global and regional deformation between normal controls and 2 groups of PH patients ( $p < 0.001$ ) (Figure 1). Significant differences were found in

AS (inlet septum) and circumferential strain (inlet septum, inferior wall, and lateral wall) between APAH-CHD and IPAH patients ( $p < 0.043$ ,  $p < 0.023$ ,  $p < 0.007$ ,  $p < 0.030$  respectively) (Table 1).

No significant differences were found in longitudinal strain between PH patients.

**Conclusion:** RV regional deformation provides mechanistic insights into changes in RV shape in pediatric PH. Future studies are needed to use regional deformation as a prognostic tool for pediatric PH.

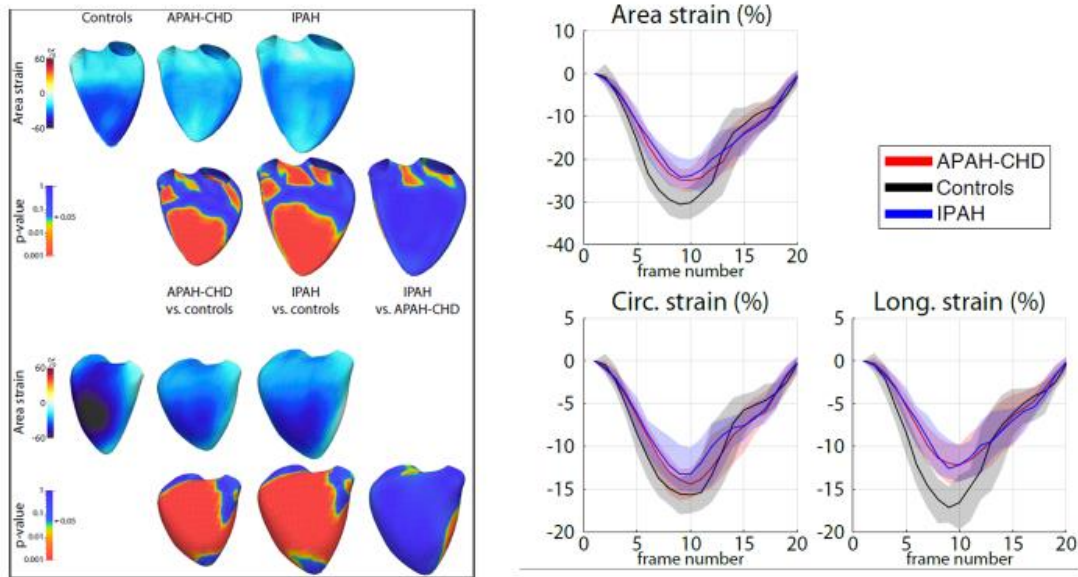


Figure 1: Three-dimensional strain between normal controls, APAH-CHD, and IPAH patients.