

Abstract Submitted
for the OSF12 Meeting of
The American Physical Society

Assessment of Pulmonary Artery Stiffness of Repaired Congenital Heart Disease Patients NAMHEON LEE, University of Cincinnati, RAJIT BANERJEE, Mason High School, MICHAEL TAYLOR, KAN HOR, Cincinnati Childrens Hospital Medical Center — Surgical correction or palliation of congenital heart disease (CHD) often requires augmenting the main pulmonary artery (MPA) with non-native material or placing a cylindrical graft. The degree to which this intervention affects PA compliance is largely unknown. In this study, the MPA stiffness characteristics were assessed by its compliance, distensibility, and pressure-strain modulus. Coregistered velocity encoded phase-contrast MRI and cardiac catheterization data were available for a cohort of repaired CHD patients (n=8) and controls (n=3). All patients were repaired with either an RV-PA conduit or a RV outflow tract patch. We measured the MPA area change by MRI and MPA pressure during the cath. The measurements were taken through or just distal to the conduit. The MPA compliance and distensibility for the patients were significantly lower than the controls: compliance (9.8 ± 10.8 vs $28.3 \pm 7.7 \text{mm}^2/\text{mmHg}$, $p < 0.05$), distensibility (2.2 ± 1.5 vs $6.6 \pm 2.1\%$ Area change/mmHg, $p = 0.05$). The patients had a significantly higher pressure-strain modulus ($152.3 \pm 116.4 \text{mmHg}$, $p < 0.05$) than the controls ($35.8 \pm 10.6 \text{mmHg}$). The abnormally elevated PA stiffness due to the rigidity of the conduit or patch material may cause a compliance mismatch resulting in high stress levels contributing to the observed progressive PA dilatation. This may be a factor in the progressive RV dilatation seen in this cohort of repaired CHD patients.

Namheon Lee
University of Cincinnati

Date submitted: 05 Sep 2012

Electronic form version 1.4