**THE EMERGING ROLE OF CIRCULATING AND URINARY BIOMARKERS IN THE ASSESSMENT OF ADULTS WITH CONGENITAL HEART DISEASE**

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**Objective:** Adults with congenital heart disease (ACHD) represent a growing and increasingly complex population. These patients are living longer because of surgical and medical advances, but they remain at increased risk for cardiovascular and other adverse events. Congenital heart disease is comprised of dozens of different diagnoses each with an array of evolving treatments. This poses a major challenge to systematic investigation. Clinical care of ACHD, therefore, often requires consideration of data from related fields or extrapolation from fundamental physiologic principles.

**Methods:**The Boston ACHD Biobank collects and stores biospecimens to provide a sustainable resource for the scientific investigation of biomarkers in ACHD. This initiative, started in 2012 at Boston Children’s and Brigham and Women’s Hospitals, includes biospecimens from >1,300 patients.

**Results:**Perturbations in levels of various circulating biomarkers representing distinct pathobiological dimensions may help describe individualized phenotypes for ACHD without dependence on congenital anatomy or hemodynamic pathophysiology. Biomarkers indicative of cardiac injury, ventricular wall stress, inflammation, endothelial dysfunction, extracellular matrix remodeling, end-organ dysfunction, or fibrosis are abnormal in subsets of ACHD and this often corresponds to an increased risk for specific adverse outcomes. Urinary biomarkers represent an even less invasive window on endothelial, hemodynamic, and renal pathophysiology. Microalbuminuria, for example, is present in almost 20% of ACHD patients, and is strongly associated with adverse outcomes among those with a biventricular circulation but not in the subgroup with single ventricle Fontan circulation.

**Conclusion:**Circulating and urinary biomarkers may improve the ability to predict which ACHD patients are most likely to sustain clinical events, independent of underlying anatomy. More exciting, these biomarkers may offer clues as to unexpected pathophysiology in individuals with CHD, providing a path towards novel therapies and overcome limitations of anatomic and functional cardiovascular classifications.