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**The intraventricular filling vortex under heightened aortic blood pressure** NICHOLAS NELSEN, MANIKANTAM GADDAM, ARVIND SANTHANAKRISHNAN, Oklahoma State University — Hypertension, or high aortic blood pressure, can induce structural changes in the left ventricle (LV) such as concentric hypertrophy. Previous studies have identified that the intraventricular filling vortex serves as an effective means of blood transport during diastolic filling. However, a fundamental understanding of how hypertension affects this vortex is unavailable. This knowledge can be useful for improving diagnosis and treatment of related heart disease conditions, including hypertensive heart failure. In this experimental study, we hypothesized that the circulation of the filling vortex would diminish with increased aortic pressure. Using a LV physical model within a left heart simulator, we performed hemodynamic measurements to acquire pressure and volumetric inflow profiles and 2D particle image velocimetry to visualize the intraventricular flow fields. Peak aortic pressures of 120 mm Hg, 140 mm Hg, and 160 mm Hg were each tested at heart rates of 70, 100, and 110 beats per minute, under: 1) reduced ejection fraction (EF), and 2) constant EF. Our results indicate that peak vortex circulation is reduced under elevated aortic pressures. Hemodynamics and characteristics of the intraventricular filling vortex in all examined experimental cases will be presented.

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