

Abstract Submitted
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Mild coarctation of the aorta: to touch or not to touch the patient? ZAHRA KESHAVARZ-MOTAMED, MIT, AMANDA RANGLES, Duke University, FARHAD RIKHTEGAR NEZAMI, MIT, RAMON PARTIDA, MIT; Massachusetts General Hospital, KENTA NAKAMURA, PEDRO V. STAZIAKI, BRIAN GHOSHHAJRA, AMI BHATT, Massachusetts General Hospital, ELAZER R. EDELMAN, MIT; Brigham and Women's Hospital — Coarctation of the aorta (COA) is an aortic obstruction. A peak-to-peak trans-coarctation pressure gradient (P_{KdP}) of greater than 20 mmHg warns severe COA and the need for interventional/surgical repair. The optimal method and timing of intervention remain uncertain especially for mild COA ($P_{KdP} < 20$ mmHg); even it is unclear if mild COA should be treated at all. Although it was recently suggested that treatment strategies for mild COA may need to be redefined as transcatheter interventions emerge, benefits of such interventions are unclear. We investigated the effects of transcatheter interventions on the aorta and left ventricle (LV) hemodynamics in 11 patients with mild COA using a developed computational fluid dynamics and lumped parameter modeling framework along with particle image velocimetry and clinical measurements. Such interventions can improve aortic hemodynamics to some extent (e.g., time-averaged wall shear stress and kinetic energy were reduced by about 20%). However there is no concomitant effect on the LV hemodynamics (e.g., stroke work and LV pressure were reduced by only less than 4%). Our computational approach can effectively predict clinical conditions. Herein one must question intervention for mild COA, as it has limited utility in reducing myocardial strain.

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