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Hemodynamic simulations in coronary aneurysms of a patient with Kawasaki Disease DIBYENDU SENGUPTA, ALISON MARSDEN, Mechanical and Aerospace Engineering Dept, UCSD, JANE BURNS, Pediatrics Dept, UCSD — Kawasaki Disease is the leading cause of acquired pediatric heart disease, and can cause large coronary artery aneurysms in untreated cases. A simulation case study has been performed for a 10-year-old male patient with coronary aneurysms. Specialized coronary boundary conditions along with a lumped parameter heart model mimic the interactions between the ventricles and the coronary arteries, achieving physiologic pressure and flow waveforms. Results show persistent low shear stress in the aneurismal regions, and abnormally high shear at the aneurysm neck. Correlation functions have been derived to compare wall shear stress and wall shear stress gradients with recirculation time with the idea of localizing zones of calcification and thrombosis. Results are compared with those of an artificially created normal coronary geometry for the same patient. The long-term goal of this work is to develop links between hemodynamics and thrombotic risk to assist in clinical decision-making.

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