Abstract Submitted
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Disease severity index derived from hemolysis evaluation[1] SENOL PISKIN, ENDER A. FINOL, Department of Mechanical Engineering, University of Texas at San Antonio, Texas, USA, KEREM PEKKAN, Department of Mechanical Engineering, Koc University, Istanbul, Turkey, VASCULAR BIOMECHANICS AND BIOFLUIDS LABORATORY (VBBL) TEAM, PEDIATRIC CARDIOVASCULAR FLUID MECHANICS LABORATORY TEAM — Several cardiovascular diseases (CVDs) are characterized by stenosis of the vessel, leaflet malfunction, disturbance of blood flow (vorticity) due to geometric deformation or abnormal growth, and development of jet flow due to ventricle overload. All of these abnormalities are followed by degeneration of inner wall of the heart and the arteries and red blood cell damage (hemolysis). In this study, identification and classification of CVDs are being performed based on hemolysis evaluation (HE). Two commonly used hemolysis models are implemented to our computational fluid dynamics simulations of CV system. The capability of HE on disease diagnosis is investigated. The analysis will be carried out on our CVD templates such as artery stenosis or pulmonary artery hypertension. HEs depend mainly on the strain rate and for some computational hemolysis models there is a threshold of strain of which the hemolysis will not take place. In the current study, we investigate the effect of thresholding besides using pseudo exposure time for steady state simulations on the blood damage evaluations. Details of our methodology for HE by post processing simulation results without necessity of re-running the simulations will be presented.

[1]American Heart Association, National Institute of Health, European Research Council, TUBITAK

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