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FSI and CFD Modeling of Cerebral Aneurysm Model and Comparing to PIV Experiments ZHAOPENG WANG, Indiana University Bloomington, QING HAO, Indiana University Purdue University Fort Wayne — Wall shear stress or strain is considered as an important factor for cerebral aneurysm growth and even rupture. The objective of present study is to evaluate wall shear stress in aneurysm sac and neck by Fluid Structure Interaction (FSI) and solid wall Computational Fluid Dynamics (CFD) approaches and compare the simulation results against Particle Image Velocimetry (PIV) experimental data from an elastic in vitro aneurysm model. The FSI and CFD simulation results showed that both approaches captured the flow patterns inside the aneurysm sac under pulsatile flow, that in diastole time period the flow inside the aneurysm sac was a stable circular clock-wise flow; when higher velocity entered into the aneurysm sac during systole and in a short diastole time period an anti-clock circular flow pattern emerged near the distal neck. Both approaches showed that the shear stress near the proximal neck experienced higher shear stress than the distal neck, while in the aneurysm dome the shear stress was always the lowest. In this study, we also showed that shear stress values at proximal neck and distal neck from FSI approach were lower than solid wall CFD approach.

Qing Hao
Indiana University Purdue University Fort Wayne

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