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Hemodynamic Changes in Treated Cerebral Aneurysms and Correlations with Long-Term Outcomes[1] PATRICK MCGAH, MICHAEL BARBOUR, MICHAEL LEVITT, LOUIS KIM, ALBERTO ALISEDA, University of Washington — The hemodynamic conditions in patients with cerebral aneurysms undergoing treatment, e.g. flow diverting stents or coil embolization, are investigated via computational simulations. Patient-specific 3D models of the vasculature are derived from rotational angiography. Patient-specific flow and pressure boundary conditions are prescribed utilizing intravascular pressure and velocity measurements. Pre-treatment and immediate post-treatment hemodynamics are studied in eight cases so as to ascertain the effect of the treatment on the intra-aneurysmal flow and wall shear stress. We hypothesize that larger reductions in intra-aneurysmal inflow and wall shear stress after treatment are correlated with an increased likelihood of aneurysmal occlusion and treatment success. Results indicate reductions of the intra-aneurysmal inflow and wall shear stress in all cases. Preliminary clinical six-month follow-up data, assessing if the treatment has been successful, shows that the cases with a persistent aneurysm had a smaller reduction in inflow and wall shear stress magnitude in the immediate post-treatment conditions. This suggests that CFD can be used to quantify a treatment's probability of success by computing the change in pre- and- post-treatment hemodynamics in cerebral aneurysms.

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