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Physiologically-relevant measurements of flow through coils and stents: towards improved modeling of endovascular treatment of intracranial aneurysms MICHAEL BARBOUR, MICHAEL LEVITT, University of Washington, CHRISTIAN GEINDREAU, SABINE ROLLAND DU ROSCOAT, Universite Grenoble Alpes, LUKE JOHNSON, KESHAV CHIVUKULA, ALBERTO ALISEDA, University of Washington — The hemodynamic environment in cerebral aneurysms undergoing flow-diverting stent (FDS) or coil embolization treatment plays a critical role in long-term outcomes. Standard modeling approaches to endovascular coils and FDS simplify the complex geometry into a homogenous porous volume or surface through the addition of a Darcy-Brinkman pressure loss term in the momentum equation. The inertial and viscous loss coefficients are typically derived from published *in vitro* studies of pressure loss across FDS and coils placed in a straight tube, where the only fluid path is across the treatment – an unrealistic representation of treatment apposition *in vivo.* The pressure drop across FDS and coils in side branch aneurysms located on curved parent vessels is measured. Using PIV, the velocity at the aneurysm neck plane is reconstructed and used to determine loss coefficients for better models of endovascular coils or FDS that account for physiological placement and vessel curvature. These improved models are incorporated into CFD simulations and validated against *in vitro* model PIV velocity, as well as compared to microCT-based coil/stent-resolving CFD simulations of patient-specific treated aneurysm flow.

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