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Computational Study of Intracranial Aneurysms with Flow Diverting Stent: Correlation with Surgical Outcome YIK SAU TANG, TIN LOK CHIU, ANDERSON CHUN ON TSANG, GILBERTO KA KIT LEUNG, KWOK WING CHOW, University of Hong Kong — Intracranial aneurysm, abnormal swelling of the cerebral artery, can cause massive internal bleeding in the subarachnoid space upon aneurysm rupture, leading to a high mortality rate. Deployment of a flow diverting stent through endovascular technique can obstruct the blood flow into the aneurysm, thus reducing the risk of rupture. Patient-specific models with both bifurcation and sidewall aneurysms have been investigated. Computational fluid dynamics analysis with physiological boundary conditions has been performed. Several hemodynamic parameters including volume flow rate into the aneurysm and the energy (sum of the fluid kinetic and potential energy) loss between the inlet and outlets were analyzed and compared with the surgical outcome. Based on the simulation results, we conjecture that a clinically successful case might imply less blood flow into the aneurysm after stenting, and thus a smaller amount of energy loss in driving the fluid flow in that portion of artery. This study might provide physicians with quantitative information for surgical decision making. (Partial financial support by the Innovation and Technology Support Program (ITS/011/13 & ITS/150/15) of the Hong Kong Special Administrative Region Government)

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