

Abstract Submitted
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Blending CFD simulations with clinical measurements¹ VITALIY RAYZ, GABRIEL ACEVEDO-BOLTON, Radiology, UCSF, LOIC BOUSSEL, Creatis-LRMN (LB, PCD), Lyon, France, DAVID SALONER, Radiology, UCSF — Patient-specific CFD models accurately capture complex flows in aneurysmal arteries and predict flow-derived parameters affecting disease progression, such as wall shear stress (WSS). A disadvantage of CFD is convergence time. Blood flow can also be measured in vivo with phase-contrast magnetic resonance velocimetry (PC-MRV). This method provides time-resolved 3D velocity field at the time of imaging, but it lacks accuracy required for WSS calculations. In this study we combine PC-MRV with CFD in order to quickly achieve an accurate solution. PC-MRV data obtained for 3 cerebral aneurysm patients were used as initial and boundary conditions for CFD simulations carried out in the same geometries. Lower-resolution MR data were interpolated into a finer computational mesh. Simulation time was reduced in all cases and excellent agreement was observed between the flow fields obtained with this technique and those obtained with fully convergent simulations started from zero initial conditions. The proposed method can help clinicians obtain relevant quantitative data in just a few hours after imaging.

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