PHASE CONTRAST-MRI INTEGRATED CFD SIMULATION: EFFECT OF Cthres ON BLOOD FLOW FIELDS FOR PATIENT- SPECIFIC CEREBROVASCULAR

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Abstract **:**

Phase Contrast-Magnetic Resonance Image (PC-MRI) measurement integrated computational fluid dynamics (CFD) simulation are used to obtain details information of model boundaries on patient specific hemodynamics. This study focuses the effects of threshold coefficient (Cthres) on the solution of error estimation in PC-MRI measurement integrated blood flow simulation using computational fluid dynamics. The investigation involved five patient-specific aneurysm models reconstructed from digital subtraction angiography (DSA) image, where the aneurysm is developed at the bifurcation. To evaluate the effect of Cthres on the solution of error estimation, two different of CFD analysis with unphysiological and boundary adjustment method are performed. The quantitative comparison of the flow field between the CFD analysis and PC-MRI measurement data showed significant different were observed in the flow fields obtained between unphysiological and boundary adjustment method. The result shows, the geometry have the strongest influence on aneurysm hemodynamics where the lowest of velocity error was obtained at configuration of the Cthres value of 0.3 and the total of velocity error between measurement integrated CFD simulations reduces to less than 25% for all patients using the boundary adjustment method. Hence, this preliminary method is a possible solution to further understanding on error estimation between PC-MRI and CFD simulation for patient hemodynamics.

Keywords: *Digital Subtraction Angiography (DSA), Phase Contrast-MRI, Threshold image intensity, Computational fluid dynamics.*