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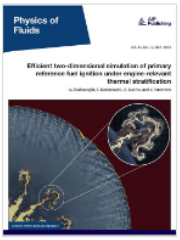

RESEARCH ARTICLE | DECEMBER 14 2023

Influence of deformed parent vessel on rupture risk of micro cerebral aneurysm: Numerical study

Special Collection: Microscopic Channel Flows

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One of significant impact of stent usage for the treatment of the saccular aneurysm is deformation of the parent vessel. Present study demonstrates the influence of the aneurysm deformation caused by the stent on the risk of aneurysm rupture. Computational fluid dynamic is applied for the modeling of the blood flow inside three internal carotid artery (ICA) aneurysms with different neck angles. One-way fluid–structure interaction model is applied for the interaction of the blood and vessel. Two stage of deformation is applied on the parent vessel to analyze the influence of deformation on the hemodynamic factors of wall shear stress and oscillatory shear index. Achieved results indicate that the deformation of the aneurysm by the stent significantly reduce wall shear stress ,s on the sac wall and decrease the risk of internal carotid artery ICA aneurysm rupture. Our finding confirm that the main effect of aneurysm deformation is reduction of the blood velocity near ostium region.