

THE 3D FLOW ANALYSIS IN RUPTURED CEREBRAL ANEURYSM

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Hemodynamics is important in the formation, growth and rupture of the cerebral aneurysm. The treatments in the patients with aneurysm are closely related to the hemodynamic behaviors. However, clinical image studies and observations can't provide enough information needed during the surgery such as the hemodynamic forces that exert on the wall of the aneurysm. Therefore the goal of this research is to simulate the vascular flow field in patients with cerebral aneurysm, and guide clinicians to choose the best treatment method for aneurysm.

In the research, the 3D reconstruction aneurysm model was extracted from diagnostic CT image studies. The ruptured position was known in the aneurysm model. We used cerebral aneurysm model in three models to simulate pressure and shear stresses exerted on the vascular walls with computational fluid dynamics (CFD) methods. The wall shear stress (WSS) of the neck region of aneurysm was higher than that of the aneurysm and ruptured region near the neck of the aneurysm.

These results can help physicians to understand the cause of formation and rupture of the aneurysm and to predict the resulting flows after various possible types of treatments before an optimal therapeutic choice can be made. Hopefully it can reduce danger of the surgical operation and recurrence of the aneurysm.