

Numerical modelling of blood cells distribution in flow through cerebral artery aneurysm

ABSTRACT

Recent aneurysm studies have focused on the correlation between different parameters and rupture risk; however, there have been conflicting findings. Computational fluid dynamics (CFD) allows for better visualization but idealized aneurysm models may neglect important variables such as aneurysm shape and blood flow conditions. In this paper, one case of an aneurysm was studied with CFD using a non-Newtonian Power Law Model to investigate the correlation between wall shear stress and blood cells distribution. Results show that velocity of blood flow decreased as it entered the aneurysm and the neck of the aneurysm experienced a greater magnitude of wall shear stress than the remainder of the cerebral artery. Besides, the blood cells generally begin at low velocities and increase after the first curve of the artery. Findings and further studies with larger cases of patients will improve treatment and prevention of aneurysm ruptures.

Keyword: Aneurysm; CFD; Wall shear stress; Blood cells