World Academy of Science, Engineering and Technology
International Journal of Computer and Systems Engineering
Vol:10, No:05, 2016

A Comparative CFD Study on the Hemodynamics of Flow through an Idealized Symmetric and Asymmetric Stenosed Arteries

Authors : B. Prashantha, S. Anish

Abstract : The aim of the present study is to computationally evaluate the hemodynamic factors which affect the formation of atherosclerosis and plaque rupture in the human artery. An increase of atherosclerosis disease in the artery causes geometry changes, which results in hemodynamic changes such as flow separation, reattachment, and adhesion of new cells (chemotactic) in the artery. Hence, geometry plays an important role in the determining the nature of hemodynamic patterns. Influence of stenosis in the non-bifurcating artery, under pulsatile flow condition, has been studied on an idealized geometry. Analysis of flow through symmetric and asymmetric stenosis in the artery revealed the significance of oscillating shear index (OSI), flow separation, low WSS zones and secondary flow patterns on plaque formation. The observed characteristic of flow in the post-stenotic region highlight the importance of plaque eccentricity on the formation of secondary stenosis on the arterial wall.

Keywords : atherosclerotic plaque, oscillatory shear index, stenosis nature, wall shear stress
Conference Title : ICCFD 2016 : International Conference on Computational Fluid Dynamics
Conference Location : Amsterdam, Netherlands
Conference Dates : May 12-13, 2016