

Brief Review on Recent Advancement of Computational Analysis on Hemodynamics in Peripheral Artery Disease



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Abstract Peripheral Artery Disease (PAD) occurs due to presence of atherosclerotic plaque in blood vessels which reduce the blood flow to extremities at lower part of the body. Failure in treating this impairment will lead to serious vascular disorders such as ulceration and gangrene of feet. Computational Fluid Dynamics (CFD) and Fluid-Structure Interaction (FSI) can be considered as non-invasive atherosclerosis diagnosis method to evaluate the blood flow parameters and wall structural interaction. Previous studies illustrated that uncertainty of stenosis area majorly relies on the assumption of the model geometry to evaluate the pathology of peripheral artery. However, the interaction between mechanical and flow condition that occurs in the peripheral artery using independent computational model of cardiovascular system is still poorly resolved. This study aimed to systematically review the recent progress on the implementation of CFD and FSI in PAD from 2017 to 2021. The findings were classified into geometry, viscosity models, analysis method, wall characteristic and validation, accordingly. This study may provide a systematic information to future research in producing a better computational analysis.

Keywords Peripheral Arterial Disease · Computational Fluid Dynamics · Fluid Structure Interaction

1 Introduction

Peripheral Arterial Disease (PAD) is a form of cardiovascular disease (CVD) that affects the blood vessels in the lower part of the body. Until the year 2020, it has

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