CFD MODELLING OF BLOOD FLOW IN PORTAL VEIN HYPERTENSION WITH AND WITHOUT THROMBOSIS FOR NON-NEWTONIAN

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ABSTRACT

Portal vein hypertension is a phenomenon where the pressure is increasing within the portal vein which carries blood from the digestive organs to the liver. Portal vein hypertension commonly accompanies liver cirrhosis. Cirrhosis is one of liver diseases resulting from a scarring of liver tissue injury caused by hepatitis and alcohol abuse. In cirrhosis, scar tissue blocks the flow of blood through the liver which leads to increasing pressure. In this project, Computational Fluid Dynamics software (CFD) is used to analyze and simulate non-Newtonian blood flow in a model of portal vein with and without obstructions. The model geometry is constructed by using CAD (CATIA) while the simulation is done using CFD software (STAR CCM+). First is a normal portal vein is analyzed and second is a blockage portal vein with three different blockage sizes. Based upon the study, it is planned to study the influence of the velocity magnitude, pressure, and shear stress of flow in normal and blocked portal veins. Based upon the work, it is possible to predict the effects of blockages to the blood flow in portal vein which can help to understand more about the portal vein hypertension phenomenon.

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