

عنوان مقاله:

Effect of six non-Newtonian viscosity models on hemodynamic parameters of pulsatile blood flow in stenosed artery

محل انتشار:

دو فصلنامه تحقیقات کاربردی در مهندسی مکانیک، دوره 7، شماره 2 (سال: 1397)

تعداد صفحات اصل مقاله: 9

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خلاصه مقاله:

A numerical study of hemodynamic parameters of pulsatile blood flow is presented in a stenotic artery with non-Newtonian models using ADINA. Blood flow was considered laminar, and the arterial wall was considered rigid. Studied stenosis severities were 30, 50, and 70% of the cross-sectional area of the artery. Six non-Newtonian models were used to model the non-Newtonian behavior of blood, and their results were compared with the Newtonian model. The results showed that in Power-law and Walburn-Schneck models, unlike other models, shear stress values before and after the stenosis were smaller than Newtonian models. Also, in maximum flow rate, the Carreua, generalized Power-law, Casson, and Carreua-Yasuda models showed a reduction in global importance factor of non-Newtonian behavior, and subsequently, the results approached Newtonian model. In minimum flow rate, the global importance factor of Newtonian behavior increased, which highlighted the importance of Newtonian model. In minimum flow rate, Carreua-Yasuda model was more sensitive to the non-Newtonian behavior of blood compared to Carreua, Casson, and Power-law models. Also, in that time period, Walburn-Schneck was less sensitive to the non-Newtonian behavior of blood. On the other hand, this model did not show sensitivity when the flow rate was at its peak. Power-law model overestimated the global importance factor values. Therefore, Power-law model was not suitable, because it showed extreme sensitivity to dimension. Walburn-Schneck model was not suitable too because it lacked sensitivity

کلمات کلیدی:

Pulsatile flow, Non-Newtonian fluid, Stenosis, Important global factor

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