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Influence of virtual intervention and blood rheology on mass transfer through thoracic aortic aneurysm

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Abstract

Computational fluid dynamics tools have been used to investigate blood flow through the human thoracic aortic models with aneurysm before and after virtual stent graft operation. The impact of blood rheology and aortic geometry on the wall shear stress (WSS), luminal surface low-density lipoproteins (LDL) concentration, and oxygen flux along the arterial wall, is investigated. The stent graft at the aneurysm has significant effects on WSS and mass transport in blood flow. Due to the low flow rate, Newtonian blood assumption generally under-estimates the WSS. The non-Newtonian blood rheology play an important role in the LDL transport as well as oxygen transport. It is found that WSS alone is insufficient to correctly predict the location with high risk of atherogenesis. The results suggest that WSS, luminal surface

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