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PII: S0021-9290(15)00359-0
DOI: http://dx.doi.org/10.1016/j.jbiomech.2015.06.022
Reference: BM7223

To appear in: *Journal of Biomechanics*

Received date: 22 December 2014
Revised date: 13 May 2015
Accepted date: 15 June 2015

Cite this article as: Yu Lei, Ming Chen, Guanglei Xiong and Jie Chen, Influence of virtual intervention and blood rheology on mass transfer through thoracic aortic aneurysm, *Journal of Biomechanics,* http://dx.doi.org/10.1016/j.jbiomech.2015.06.022

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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