Author's Accepted Manuscript

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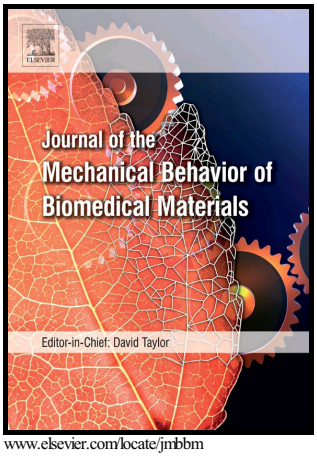

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PII: S1751-6161(18)30703-3
DOI: https://doi.org/10.1016/j.jmbbm.2018.06.018
Reference: JMBBM2839

To appear in: *Journal of the Mechanical Behavior of Biomedical Materials*

Received date: 3 May 2018
Revised date: 10 June 2018
Accepted date: 12 June 2018

Cite this article as: Wen Xue, Liheng Gao, Xuan Fang, Fan Zhao, Jing Gao, Guoping Guan, Jing Lin, Fujun Wang and Lu Wang, Experimental and analytical evaluation on the mass transfer performance of braided stent-grafts, *Journal of the Mechanical Behavior of Biomedical Materials,* https://doi.org/10.1016/j.jmbbm.2018.06.018

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Experimental and analytical evaluation on the mass transfer performance of braided stent-grafts

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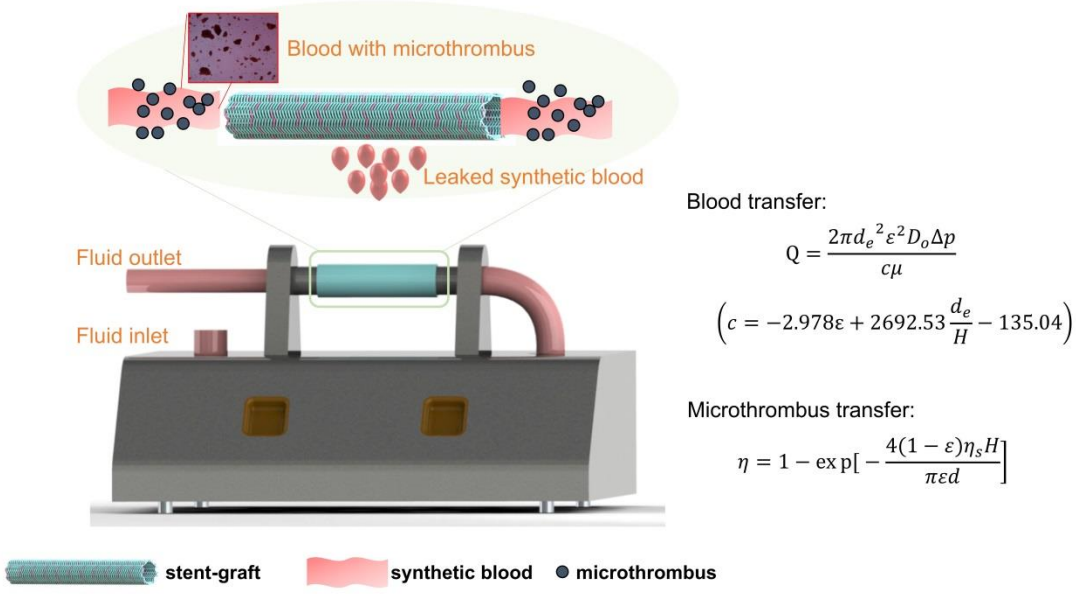
Abstract

Endoleak and luminal loss related to blood permeation and microthrombus migration remain the main challenges in the aneurysm treatment, although stent-grafts have been widely applied. Stent-grafts provide a boundary to shield blood and microemboli transport, which are correlated with their mass transfer performance. Water permeability of vascular prostheses with woven and knitted structures has been analyzed and documented by many researchers, as well as oxygen and protein transfer. However, it is almost a total lack of blood and microemboli transfer along the braided stent-graft thickness direction. In this research, we provided a methodology for the vascular prostheses mass transfer evaluation. Braided stent-grafts in our former research were conducted on a self-developed testing system to investigate their blood permeability and microthrombus transfer behaviors. The pressure along wall thickness direction can be changed. Analytical models were also established based on pore parameters, making them applicative to different structures. Results revealed that the mass transfer behavior of stent-grafts was positively affected by porosity and pore diameter while negatively influenced by their thickness.

Graphical abstract



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