Numerical Prediction of Shear Stress Distributions for a Dissected Aorta

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Abstract

In this study, the formation of the shear stress on the three-dimensional realistic health and dissected aortic dissection models is investigated under the laminar Newtonian flow assumption with Reynolds numbers 100 to 600. Numerical simulation shows that strong oscillating positive-negative wall stress distributions are found along both the lower and upper aortic vessels during the whole pulsatile cycle. Especially, the location of maximum wall shear stress is always found around the beginning of dissected aortic vessel. However, due to three ascending branch effects, the location of the wall stress extreme on upper arch is moved upward from the dissected vessel surface to the location behind the third ascending branch.

Keyword：Aorta, Aortic Dissection, Newtonian Laminar Flow, Shear Stress