

Abstract Submitted
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Effects of the changes in the wall shear stresses (WSS) acting on endothelial cells (EC) during the enlargement of Abdominal Aortic Aneurysms (AAA) ANNE-VIRGINIE SALSAC, STEVEN SPARKS, JUAN C. LASHERAS, University of California, San Diego, JEAN-MARC CHOMAZ — The changes in the spatial and temporal distribution of the WSS and gradients of WSS during the enlargement of AAAs are important to understand the etiology and progression of this vascular disease, since they affect the wall structural integrity, primarily via the changes induced on the shape, functions and metabolism of the endothelial cells. PIV measurements were performed in aneurysm models, while changing systematically their size and geometry. Two regions with distinct patterns of WSS were identified. The region of flow detachment extends over the proximal half and is characterized by oscillatory WSS of very low mean. The region of flow reattachment, located distally, is dominated by large, negative WSS and sustained gradients of WSS that result from the impact of the vortex ring on the wall. Cultured EC were subjected to these two types of stimuli in vitro. The permeability of the endothelium was found to be largely increased in the flow detachment region. Endothelium cell-cell adhesion, proliferation and apoptosis were also affected by the high gradients of WSS.

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