

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Experimental Study of a Thoracic Aortic Aneurysm Prior to and After Surgical Repair Hemodynamics ANNA-ELODIE KERLO, Purdue University, STEVEN FRANKEL, Technion - Israel Institute of Technology, JUN CHEN, PAVLOS VLACHOS, Purdue University — Once a Thoracic Aortic Aneurysm (TAA) is detected, the risk of rupture is estimated based on the TAA diameter compared to the normal aortic diameter and its expansion rate. However, there are no reliable predictors that can provide accurate prognosis, and each aneurysm may progress differently. This work aims to assess the hemodynamic characteristics and flow structures associated with TAAs. The flow in a patient specific thoracic aortic aneurysm is compared to the same patient after treatment, in order to quantify the differences in the hydrodynamic forces acting on the aneurysm. Flow visualization with dye and Particle Image Velocimetry (PIV) are used to study flow features within both geometries. Local flow patterns are visualized to predict potential areas of recirculation and low shear stresses as they are associated with thrombogenicity. Understanding the differences in flow features between a thoracic aortic aneurysm and a normal aorta (or a TAA after surgical repair) may lead to a better understanding of disease mechanisms that will enable clinicians to better estimate the risk of rupture.

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Date submitted: 31 Jul 2014

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