Modeling Abdominal Aortic Aneurysm Endotension with Finite Element Analysis

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Endotension is the presence of pressure within the aneurysm sac (AS) following endovascular exclusion of abdominal aortic aneurysm (AAA). A previous study entailed embedding eight elastic diaphragm pressure transducers at specific locations within each of three *in vitro* canine AAA specimens. Following successful endovascular exclusion with a stent-graft, pressure measurements were taken at varying systemic blood pressures in an effort to quantify and evaluate endotension distribution throughout the AS. Computed tomography (CT) images were utilized to construct geometry models, which were subsequently meshed into finite elements. Properties were defined for three different materials: AAA wall, intraluminal thrombus, and the stent-graft. All materials were assumed to be homogenous, incompressible, and, due to the small deformations, elastic. Element sets were defined to represent each pressure transducer at its experimental location. The computational normal stress was compared to the experimental pressure for each transducer, and statistical significance was assigned at $p \leq 0.05$. Correlations, stress and pressure distributions, and implications will be discussed.

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