

**#22 ABDOMINAL AORTIC ANEURYSM (AAA) GEOMETRY AND SYSTEMIC BLOOD PRESSURE ARE THE PRINCIPLE DETERMINANTS OF RUPTURE RISK IN AAA**

Arcot Venkatasubramaniam, F.R.C.S., Michael J. Fagan, Ph.D.,  
Ian C. Chetter, F.R.C.S., B. Ray, F.R.C.S., K.J. Mylankal, F.R.C.S.,  
T. Mehta, F.R.C.S., Peter T. McCollum, M.D., F.R.C.S.  
Sponsored by: John D. Corson, M.D.

Hull Royal Infirmary, Hull, UK

**Objectives:** To compare AAA geometry and systemic blood pressure in ruptured and non-ruptured AAA.

**Methods:** 27 patients with infra-renal AAA who had CT scan as part of their elective or emergency evaluation were included in the study. 3D geometry of each AAA was reconstructed manually with the help of image rendering software Rhinoceros (v2.0). The highest systolic pressure was used as the maximum pressure acting on the wall and literature derived material properties of aorta was used for the analysis. Peak wall stress was calculated using finite element analysis. The test was repeated by maintaining the systolic pressure as a constant at 120mmHg and wall stress compared in ruptured and non-ruptured AAA. Independent sample t test was used for statistical Analysis.

**Results:** There were 12 ruptured and 15 non-ruptured patients in this study. There was no significant difference in the mean diameter between the two groups (ruptured group 7.6 cm, non-ruptured 6.8 cm,  $P > 0.05$ ). Peak wall stress was significantly different in ruptured (0.8950 Mpa) than the non-ruptured (0.5610 Mpa) AAA ( $P < 0.05$ ), as was systolic blood pressure (ruptured 160 and non-ruptured 135mmHg,  $P < 0.05$ ). With blood pressure as a constant, wall stress was still significantly different in both groups ( $P < 0.05$ ), implying significance of AAA geometry in wall stress/rupture risk.

**Conclusion:** AAA geometry and systemic blood pressure were significantly different in ruptured and non-ruptured AAA, and may play a vital role in determining the rupture risk.