PS4.

Biomechanical Rupture Risk Assessment of AAA Made Easier for Clinicians

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Objectives: Finite Element (FE) Analysis has been used to estimate peak wall stress(PWS) and peak wall rupture risk(PWRR) of Abdominal Aortic Aneurysms(AAA).

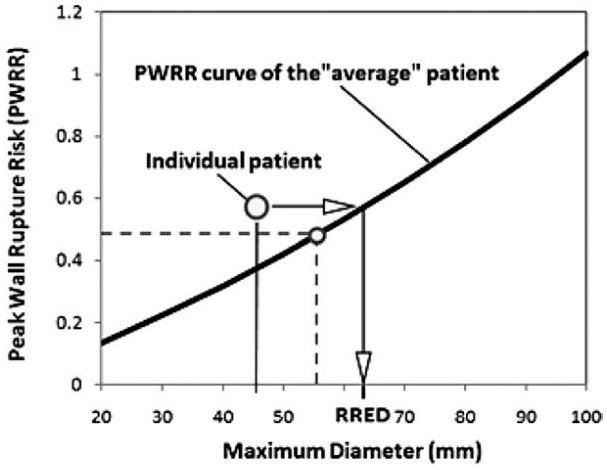

Fig.

However, these values are not familiar for Clinicians. The aim of this study was to introduce a patient specific and clinically applicable biomechanical rupture risk assessment tool that would be easy for Vascular Surgeons to comprehend.

Methods: Clinical data(gender, age, Smoking, chronic obstructive lung disease, mean arterial pressure, family history) and CT images were retrospectively gathered from 200(142 male, 44 female) non ruptured AAA patients from 4 different hospitals in Sweden, Belgium and Germany. FE models were created using the diagnostics system A4 Clinics (VASCOPS, Austria) and the maximum diameter, PWS and PWRR was calculated automatically. Statistical analysis was performed with Mathematica (Wolfram Research Inc, USA).

Results: The maximum diameter was normally distributed in males and females and no difference was found between PWS levels in men and women ($P = .091$) but the PWRR was higher in women ($P = .005$). PWS increased in a linear fashion and PWRR exponentially with diameter. We then related PWRR to the maximum diameters of patients and calcuated the Rupture Risk Equvialent diameter (RRED) as shown in the figure. A PWRR of 0.48 corresponds to an RRED of 55 millimeters.

Conclusions: Biomechanical AAA rupture risk assessment integrates risk based on clinical parameters and data from CT images. The RRED expresses this information as a diameter that is comprehensible for clinicians.

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