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Ascending Aorta Size and Outcome in Heart Failure: A Reflection of Biological Aging?

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Aims:

The ascending aorta (AA) dimensions vary between individuals based on age, body size and gender and are easily evaluated by trans-thoracic echocardiography. Ascending aorta index calculated as the ratio of the ascending aorta size and body surface area has recently been proposed to be a more robust measure of the expected aorta's size. We evaluated the ascending aorta index in patients with chronic heart failure (HF) and its relation to mortality.

Methods and Results:

A total of 618 HF patients were included in this study. Patients with aortic valve disease were excluded. Median ascending aorta size was 3.3 cm (inter-quartile range (IQR) 3.0-3.7). The median AAI was 1.8 cm/m^2(IQR 1.6-2.1). AAI was closely related to increased age, did not differ between genders and was not related to left ventricular size or function. The median follow-up was 576 days. AAI was a significant predictor of reduced survival (Figure). Multivariable Cox regression analysis after adjustment for age, gender, diabetes, IHD, hypertension, BMI, serum hemoglobin, eGFR and urea levels and the presence of severe mitral regurgitation demonstrated that increased AAI was a significant predictor of increased mortality (AAI>1.9 versus AAI<1.7 cm/m^2: hazard ratio (HR) 3.18, 95% confidence interval (CI) 1.44-7.00, P=0.004). Sub-analysis of patients with the exclusion of patients with severe mitral regurgitation (N=491) demonstrated that the AAI was independently associated with increased mortality (AAI>1.9 versus AAI<1.7 cm/m^2: HR 6.76, 95% CI 2.1-21.5, P=0.001). Inclusion of standard HF medications did not change significantly the result in either cohort and AAI remained a significant incremental predictor of increased mortality.

Conclusions:

The AAI has significant predictive value in patients with heart failure. The aorta size may represent vascular aging and be a reflection of the *biological age* of the patient.