Male-female specific aortic growth after 10 year follow-up in an aged population

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Background: Aortic diameters are known to increase with age. However, longitudinal data on normal thoracic aortic growth rate over the adult life course are lacking. To better understand and recognize pathological aortic growth and factors influencing aortic dilatation, it is crucial to study aortic growth patterns in the general population.

Purpose: To study sex- and age-specific aortic growth rates in the general population, and to identify factors associated with aortic growth rate and developing aortic pathology.

Methods: Participants of the prospective population-based Rotterdam Study who underwent non-enhanced cardiac CT (2003–2006) were invited for a follow-up non-enhanced cardiac CT (2018–2019). On both CT-scans, diameters of the ascending (AA) and descending aorta (DA) were measured at the level of the pulmonary bifurcation. Mean aortic growth rates and 95th percentiles were calculated. Linear regression models were built to identify factors associated with aortic growth.

Results: In this preliminary analysis, 933 participants were included (52% females, median age 65 years). During a mean follow-up time of 14 years, the mean aortic growth rates of the ascending aorta (AA) were 0.08 mm/year in males and 0.07 mm/year in females. For the descending aorta (DA) these were 0.07 mm/year in males and 0.05mm/year in females. Participants with AA diameters of ≥40 mm (n=147) or DA diameters of ≥35 mm (n=11) at baseline did not show accelerated growth compared to the other participants. Higher systolic blood pressure (SBP), and use of antithrombotic agents were associated with less AA growth. Age, diastolic blood pressure (DBP) and male sex were associated with more AA growth. For the DA, higher DBP and smoking were associated with a higher growth rate. Higher SBP, diabetes and use of antithrombotic agents were associated with less DA growth.

Conclusion: Thoracic aortic growth rates in the general population are low. Differences in growth were found between men and women, although these differences may not be clinically relevant. Antithrombotic medication use was related to lower thoracic aortic growth rates, emphasizng the need for further investigation into the potential effect of this treatment.

Aortic growth rates by sex and age

			Ascending aorta			Descending aorta		
	Age group		Total	Males	Females	Total	Males	Females
Aortic growth rate – mm/year	Total	Mean	0.07	0.08	0.07	0.06	0.07	0.05
		95th	0.29	0.29	0.29	0.23	0.29	0.21
	55-64	Mean	0.07	0.07	0.06	0.06	0.07	0.07
		95th	0.23	0.23	0.23	0.23	0.23	0.23
	65-74	Mean	0.08	0.08	0.07	0.06	0.07	0.04
		95th	0.29	0.29	0.29	0.23	0.29	0.21
	≥ 75	Mean	0.07	0.11	0.04	0.04	0.13	-0.02
		95th	0.31		0.27	0.29		0.20

* Significant at the 0.05 level
** Significant at the 0.01 level