Normal values of aortic root diameters in sub saharan africans: the TAHES study

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Introduction: Reference values of aortic root diameters (ARD) are proposed to define normal versus diseased aorta. However, reported ranges of normal values are mostly issued from Caucasian cohorts. Data on blacks African subjects are sparse and not issued from community-dwelling cohorts.

Purpose: Our study aimed to establish reference values for ARD in a Beninese general population cohort.

Methods: This study is a part of TAHES, a population-based prospective cohort study initiated in 2015 in the district of Tanvè, Republic of Benin. Demographic, blood pressure and blood glucose data were collected using a questionnaire adapted from WHO-STEPS tools. Transthoracic echocardiography examinations were performed by 4 cardiologists, and analyzed offline by a single observer. ARD were measured using inner-edge to inner-edge diameters during diastole for sinuses of Vasalva (SV), sinotubular junction (STJ) and proximal ascending aorta (AA), and during systole for annulus. Normal limits were defined as the 95th percentiles. Variables are presented as mean ±SD (5th-95th percentiles).

Results: We included 513 normotensive, non-diabetic and cardiovascular disease-free individuals (206 men and 307 women, age 40±14 years [26–68]). The absolute values of ARD were significantly greater in men: the non-indexed ARD values for the annulus, SV, STJ and AA were respectively 21.3±2 (18.5–25), 28.5±3.4 (23–34), 24.1±3 (19–29) and 27±3 (22.5–32) mm for men and 19.3±1.8 (1.8 (15- 22), 25.8±2.8 (21.6–30), 22±2.7 (18–26) and 24.8±2.8 (21–30) mm for women, respectively (all $p<0.0001$). No significant differences between sexes were recorded for body surface area (BSA)-indexed ARD for Annulus, STJ and AA. BSA-indexed SV dimension was greater in men (17.3±2.6 mm; 13.5–22) than women (16.8±2.5 mm; 13–21). There was a correlation between SV, STJ, AA indexed-diameters and age in both sexes but not for annulus indexed-diameter (r=0.14, 0.19 and 0.36 for women and 0.34, 0.45 and 0.32 for men, all $p<0.05$). The upper limits for ARD are summarized in Table 1. In order to compare these values to those in Caucasians, the data of the NORRE study are also displayed.

Conclusion: Normal values from a general population in West Africa appear could to differ from those established in Caucasian populations. This ethnic-appropriate reference is proposed for appropriate diagnosis in patients in sub-Saharan Africa.

Parameters (Indexed-BSA) m/m^2	TAHES Men (n= 206)	NORRE Men (n = 310)	TAHES Women (n = 307)	NORRE Women (n = 394)
Inner-edge to inner-edge convention				
Annulus				
Mean ±SD	12.9 ± 1.6	12.1 ± 1.1*	12.6 ±1.6	11.7 ± 1*
95th percentiles	> 16		> 15	
Sinuses of Vasalva				
Mean ± SD	17.3 ± 2.6	17.8 ±2*	16.8 ± 2.5	16.9 ± 1.9
95th percentiles	>22		> 21	
Sinotubular junction				
Mean ± SD	14.8 ±2.4	15 ± 1.8	14.4 ± 2.3	14.4 ± 1.7
95th percentiles	> 19		> 18	
Ascending Aorta				
Mean ±SD	16.3 ± 2.7	15.7 ±2.1*	16.4 ± 2.5	15.6 ± 2.1*
95th percentiles	> 20.5		> 20.5	

*p<0.05 between TAHES and NORRE with Welch t-test.

Table 1