653

Aortic Dilatation is Present among Men with HIV

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BACKGROUND

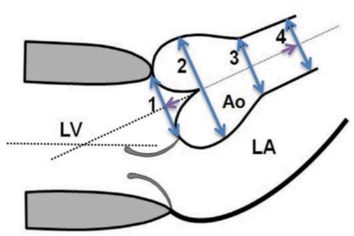
- HIV is associated with increased cardiovascular risk, but it is unknown to what extent HIV affects the extracardiac vascular system
- Ascending aortic aneurysms can result in dissection or rupture
- Aortic aneurysms are commonly associated with traditional atherosclerotic risk factors or connective tissue disease
- Increased inflammation associated with HIV may result in increased risk for dilatation

PURPOSE

- Compare aortic dimensions in men with and without HIV in the Multicenter AIDS Cohort Study (MACS)

METHODS

- 1179 MACS participants who underwent complete echocardiograms since October 2017 were included
- Aortic measurements were performed at the aortic annulus (1), aortic root (level of the Sinuses of Valsalva) (2), sinotubular junction (3), and proximal ascending aorta (4), as below per the 2015 ASE and EACI Guidelines



- Multivariable linear regression was performed to assess the association between HIV serostatus and aortic diameters indexed for body surface area (BSA), after adjusting for potential confounders
- Multivariable linear regression was then performed for HIV+ men to assess the association between nadir CD4 cell count and viremia with aortic dimensions, after adjusting for potential confounders

HIV is associated with increased cardiovascular risk, although the extent of extracardiac vascular risk is unknown. This study demonstrates that compared to men without HIV, ***men with HIV have larger ascending aortic diameters particularly among those with lower nadir CD4 counts.***

RESULTS

Table 1. Study participant characteristics

	HIV- (n=526)	HIV+ (n=653)
Mean age (years)	60.4 ± 12.2	54.6 ± 11.0
White, non-Hispanic	363 (69.0%)	312 (47.8%)
Black, non-Hispanic	114 (21.7%)	213 (32.6%)
Diabetes	62 (11.8%)	110 (16.8%)
Antihypertensive medication use	222 (46.4%)	256 (53.6%)
Mean systolic blood pressure (mmHg)	132 ± 17	128 ± 16
Mean total cholesterol (mg/dL)	179 ± 41	180 ± 45
Mean high density lipoprotein (HDL) (mg/dL)	56 ± 17	52 ± 17
Mean cumulative pack-year smoking	12.5 ± 20	13.0 ± 19
Cocaine Use	34 (6.5%)	64 (9.8%)
Statin Use	209 (39.7%)	243 (37.1%)
Viral Load		
High (≥50 copies)	N/A	99 (15.4%)
Low (<50 copies)		546 (84.7%)
Nadir CD4 count (cells/mm^3)		
cell count ≤200		171 (26.5%)
200 < cell count ≤ 350	N/A	195 (30.2%)
350 < cell count ≤ 500		151 (23.4%)
cell count > 500		128 (19.8%)
Enrollment		
Pre 2001	333 (28.2%)	219 (18.6%)
Post 2001	193 (16.4%)	434 (36.8%)
MACS Study Site		
Baltimore	125 (10.6%)	137 (11.6%)
Chicago	104 (8.8%)	165 (14.0%)
Los Angeles	111 (9.4%)	166 (14.1%)
Pittsburg	186 (15.8%)	185 (15.7%)

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Table 2. Mean adjusted* indexed dimensions and adjusted differences* in indexed aortic diameters between men with HIV and men without HIV

	Mean indexed dimensions in HIV- men (cm/m^2)	Mean adjusted difference in aortic root size between HIV+ and HIV- (cm/m^2) [95% CI]	p-value
Aortic annulus	1.48	0.02 [-0.01-0.05]	0.253
Aortic root	1.65	0.03 [0.01-0.06]	0.008
Sinotubular junction	1.39	0.03 [0.01-0.06]	0.014
Ascending aorta	1.43	0.04 [0.02-0.07]	0.002

* Adjusted for age, race/ethnicity, MACS site, enrollment period (pre/post 2001), atherosclerotic risk factors (systolic blood pressure, hypertension, smoking history, diabetes, total cholesterol and HDL), cocaine use and statin use

- After adjusting for covariables and indexing for BSA, aortic root (p<0.01), sinotubular junction (p=0.01) and ascending aorta (p<0.01) were all significantly larger in HIV+ men compared to HIV- men
- Among HIV+ men, with nadir CD4 count >500 cells/mm^3 compared to men with CD4 counts <200 cells/mm3, indexed aortic root was 0.019 cm/m^2 smaller (p=0.045), sinotubular junction was 0.099 cm/m^2 smaller (p=0.046) and ascending aorta was 0.07 cm/m^2 smaller (p=0.047)
- Among HIV+ men, higher viral load was not associated with larger aortic sizes when comparing to those with undetectable viral load
- Overall the prevalence of aortic aneurysm was low with only 1 HIV+ and 1 HIV- man having aortic size >5 cm

CONCLUSIONS

- To our knowledge, this is the first study to demonstrate that there is an independent association between HIV serostatus and ascending aortic dimensions, after controlling for traditional atherosclerotic risk factors
- Lower nadir CD4 count was associated with larger aortic dimensions in HIV+ men but viremia was not associated
- It is possible that increased inflammation associated with HIV may result in increased ascending aortic size
- Future studies should be conducted to determine if elevated inflammatory markers are associated with aortic dilatation