Among cigarette smokers, chronic obstructive pulmonary disease is associated with aortic wall calcification

Poster Contributions
Poster Hall B1
Saturday, March 14, 2015, 3:45 p.m.-4:30 p.m.

Session Title: Non Invasive Imaging: CT/Multimodality, Angiography, and Non-CT Angiography
Presentation Number: 1136-034

Authors: Dong Li, Song Shou Mao, Richard Casaburi, Gregory L. Kinney, John E. Hokanson, Matthew Budoff, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, USA

Background: The association between cigarette smoking and aortic wall calcification (AWC) requires further investigation, especially in smokers with chronic obstructive pulmonary disease (COPD). We performed a cross-sectional study to determine if COPD is independently associated with aortic calcification.

Methods: The COPDGene study gathered data from 21 clinical study centers across the United States. Aortic calcification in both ascending and descending aorta was assessed by AWC scores using high resolution chest CT scans. Subjects with at least 10 pack-years of smoking and normal spirometry were assigned as a control, and those with GOLD stages 2-4 COPD was assigned as cases. The association of smoking and COPD with aortic calcification was assessed by a multivariable regression model with covariates adjustment.

Results: A total of 8908 subjects with AWC score were included (age 59.8±9.0 yrs, females 46.9%). COPD cases had longer duration of smoking than controls (40.1±9.4 yrs vs 33.1±9.8 yrs, P<0.001) and higher pack-years (53.2±27.6 vs 37.2±20.3, P<0.001). COPD was significantly associated with higher AWC scores than controls (average AWC mean 2081.3±3652.5 vs 567.0±1656.2, P<0.001). After adjustment for age, gender, race and traditional cardiovascular disease risk factors, the difference in AWC scores were narrower but remained significant (1549.2±3302.6 vs 1082.0±1632.5, P<0.001). Examining gender differences, we found that female COPD subjects have more greater aortic calcification than female controls (average AWC score 1645.3±3652.5 vs 567.0±1656.2, P<0.001) after covariate adjustment. Similar results were found in male COPD subjects compared to male controls (AWC score 1472.1±3455.5 vs 1152.2±1790.2, P<0.001).

Conclusion: COPD is an independent risk factor for aortic wall calcification. These findings support that the chronic hypoxia-induced remodeling/injury hypothesis may involve large vessels; mechanisms of the relation of COPD with aortic calcification warrant evaluation in future studies.