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Association of Muscular Strength with Pulse Pressure and Aortic Calcification in Older Adults

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Age is a well-known risk factor for the development of atherosclerotic cardiovascular disease (CVD). Pulse pressure (PP) and abdominal aortic calcification (AAC) increase with advancing age and are markers of subclinical atherosclerotic CVD. Muscular strength is an important measure of overall physical fitness and functional status that is associated with lower CVD risk. Older women tend to have lower levels of muscular strength and increased CVD mortality than men, but the relationship between muscular strength and CVD risk in older women is still unclear. **PURPOSE:** To examine the sex-specific association of muscular strength with PP and AAC in a nationally representative sample of older men and women. **METHODS:** Data from the 2013-2014 National Health and Nutrition Examination Survey (NHANES) – nationally representative data of the civilian, noninstitutionalized US population – were assessed in 942 older men and women (women: n=511) ages 68.4±0.2 years. PP was calculated as the difference between mean systolic and mean diastolic blood pressure measured manually via stethoscope and mercury sphygmomanometer. AAC was derived from DXA thoraco-lumbar spine images (L1-L4) and scored AAC relative to each vertebral height for the anterior and posterior aortic walls. Handgrip strength was assessed using a dynamometer and recorded as the maximal reading summed from each hand in kilograms. Sample weighted linear regression models analyzed the association between PP and AAC with handgrip strength, and were stratified by sex and adjusted for body mass index, smoking, high cholesterol/use of lipid medication, diabetes/use of diabetes medication, hypertension/use of anti-hypertensive medication, family history of myocardial infarction, and self-reported physical activity. **RESULTS:** Multivariable linear regression models showed 1) an inverse association between handgrip strength and extent of AAC in men ($\beta=-0.05$, $p<0.02$) and women ($\beta=-0.06$, $p<0.04$); and 2) an inverse association between handgrip strength and PP in men ($\beta=-0.16$, $p<0.02$) and women ($\beta=-0.33$, $p<0.007$). **CONCLUSION:** Higher muscular strength was associated with lower PP and AAC in older men and women. These findings provide novel insight into the cardio-protective role of greater muscular strength with lower atherosclerotic CVD risk in older adults.