

Attenuated Pulsatile Load During Metaboreflex Activation is Associated with Excess Adiposity in Dynapenic Postmenopausal Women

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ABSTRACT

The age-related loss in muscle strength (dynapenia) is associated with elevated blood pressure (BP) and fat mass (FM). Aortic pulse pressure (PP), rather than brachial PP, more closely relates to cardiovascular events because it represents left ventricular pulsatile load, which is particularly important in older women. **PURPOSE:** To examine the impact of dynapenia and adiposity on aortic BP responses to metaboreflex activation (post-exercise muscle ischemia, PEMI) in postmenopausal women. **METHODS:** 71 postmenopausal women [(dynapenic, n=41, 57±1 years), (non-dynapenic, n=30, 59±1 years)] were included in this study. FM, percent body fat (BF%) and percent lean mass (LM%) were measured using Dual Energy X-Ray Absorptiometry. Normalized handgrip strength (nMVC) was calculated as maximal voluntary contraction/body weight. Dynapenia was classified as an nMVC ≤ 0.30 kg/kg. Heart rate and aortic BP (radial applanation tonometry) were measured at rest and during 3-min PEMI following 2-min isometric handgrip exercise at 30% MVC. **RESULTS:** Resting BP was similar in both groups. The dynapenic group had significantly lower nMVC (0.24 ± 0.01 vs 0.38 ± 0.01 kg/kg, p < 0.001) and LM% (51.5 ± 0.6 vs 60.9 ± 0.9, p < 0.001), and higher FM (44.5 ± 1.7 vs 26.5 ± 1.3 kg, p < 0.001) and BF% (48.5 ± 0.6 vs 39.1 ± 0.9, p < 0.001) compared to the non-dynapenic group. The dynapenic group exhibited a blunted brachial PP (9 ± 2 vs 16 ± 2 mmHg, p < 0.05) and aortic PP (9 ± 2 vs 15 ± 2 mmHg, p < 0.05) response to PEMI without differences in heart rate response to PEMI (3 ± 1 vs 3 ± 1 beats/min) compared to the non-dynapenic group. In the dynapenic group, attenuated brachial and aortic PP responses to PEMI were related (all p < 0.05) to FM (r= -0.48; r= -0.47) and BF% (r= -0.51; r= -0.49). **CONCLUSION:** Pulsatile load responses to PEMI were blunted in dynapenic postmenopausal women. Excess adiposity contributes to the attenuated pulsatile response to metaboreflex activation in dynapenic postmenopausal women.