INCREASED AORTIC AUGMENTATION INDEX IN TAKO-TSUBO CARDIOMYOPATHY

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Background: Tako-tsubo cardiomyopathy (TTC) remains poorly understood. Sympathetic surges are considered to be a common factor, most classically triggered by severe emotional stress. We hypothesized that this increased sympathetic tone may result in differences in measurements reflecting vascular smooth muscle tone. The aortic augmentation index (AI) is defined as the increment in pressure from the first systolic shoulder (inflection point) to the peak pressure of the aortic pressure waveform expressed as a percentage of the peak pressure. This index is dependent on aortic and large-artery pulse wave velocity reflecting vessel stiffness, as well as peripheral vascular smooth muscle tone.

Methods: We examined AI (derived directly from aortic waveform tracings acquired at the time of coronary angiography) in patients presenting with TTC (n=36, 94% female; 67.7±10.9 yrs) versus age- and sex matched individuals with acute ST-elevation myocardial infarction (STEMI, n=36; 68.1±10.6 yrs), and normal controls (n=36; 66.3±10.6 yrs).

Results: STEMI patients had a significantly elevated aortic AI compared with normal controls (35.79 ± 23.17 vs. 19.25 ± 24.33; p<0.005) independent of age, blood pressure, and heart rate. The TTC population, despite having a lower incidence of diabetes (5.5% vs. 33%; p<0.003) and obesity (5.5% vs. 30.5% p<0.006) than STEMI patients, had a similarly elevated AI at the time of coronary angiography (31.12 ± 22.85; p<0.05 vs. control).

Conclusion: Patients presenting with TTC had an elevated aortic AI to a similar degree as their STEMI counterparts. The increase in AI in the STEMI patients likely reflects their cardiac risk factor profile and associated vascular “stiffness”. However, the increase in AI in the TTC population may reflect transitory, sympathetically-driven increase in peripheral vasomotor tone. Characterizing vasomotor responses in patients with TTC both at the time of acute presentation, as well as in recovery, may help better understand the pathophysiology of this condition.