Abstract citation ID: afac218.125

ORTHOSTATIC HEMODYNAMICS AND ACCELERATED BRAIN AGING

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Background: Impaired recovery of blood pressure (BP) in response to standing up is a prevalent condition in older individuals. We evaluated the relationship between the recovery of hemodynamic responses to standing and brain health in adults over 50.

Methods: Participants from The Irish Longitudinal Study on Aging (TILDA) (n=418) performed an active stand challenge while BP and heart rate (HR) were continuously monitored. The recovery of these parameters was determined as the difference in measurements taken at 10 s and 20 s after standing, in relation to the baseline value. The difference between biological and chronological brain age was determined using BrainPAD, a novel validated measure of accelerated brain ageing. The data was fitted using linear regression models, using age, sex, weight, height, cardiac disease prevalence, antihypertensive and antidepressant use, smoking status, standing speed and pulse wave velocity as covariates.

Results: Adjusting for age and sex only, each additional year of BrainPAD was associated with a −0.35 mmHg (95% CI: −0.54 to −0.16, P < .001) change in orthostatic systolic BP recovery. In a fully adjusted model, the regression coefficient was estimated at −0.29 mmHg (95% CI: −0.48 to −0.10, P < .01). Similarly, a year increase in BrainPAD was associated with −0.21 mmHg (95% CI: −0.32 to −0.10, P < .001) and −0.14 mmHg (95% CI: −0.25 to −0.04, P < .01) change in orthostatic-diastolic BP recovery, for minimally and fully adjusted models respectively. HR recovery was not significantly associated with BrainPAD.

Conclusion: These results demonstrate that impaired systolic and diastolic BP recovery after standing is associated with accelerated brain aging in older individuals. This suggests that the BP response to standing, measured using heat-to-beat monitoring, has potential to be used as a marker of accelerated brain aging, relying on a simple procedure and devices that are easily accessible for clinical use.