Arterial stiffness may be a novel risk factor for hypertension from a young age

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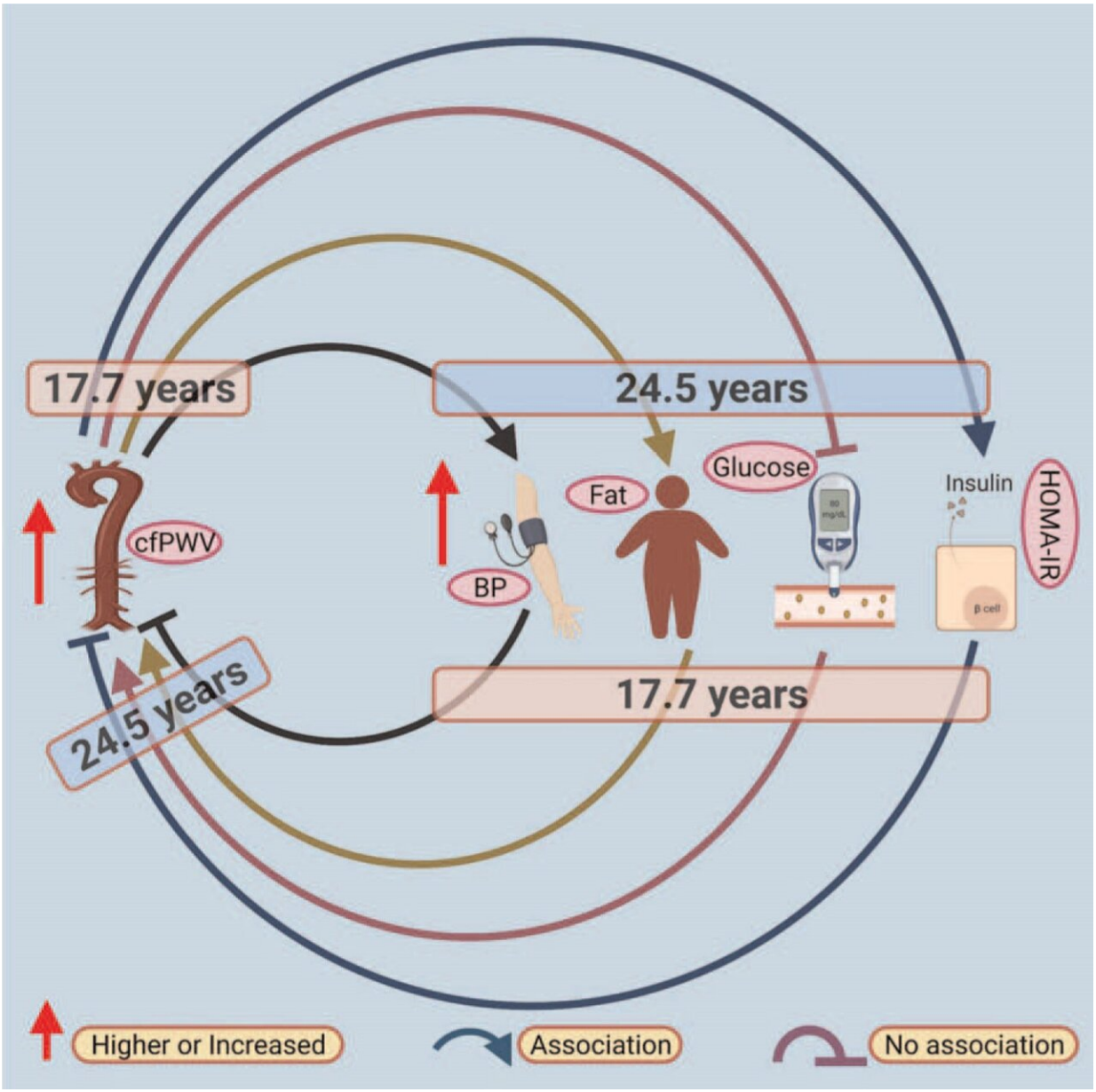

Temporal causal associations between arterial stiffness and cardiometabolic risk factors and/or diseases from adolescence through young adulthood. Arterial stiffness accessed by carotid-femoral pulse wave velocity (cfPWV) was repeatedly measured at 17.7 and 24.5 years in 3862 participants. Other outcomes such as blood pressure, dual-energy X-ray absorptiometry measured body composition (total and trunk fat mass and lean mass) or calculated BMI, fasting glucose, fasting insulin and computed insulin resistance were repeatedly measured. The schematic shows that higher cfPWV at 17.7 years was directly and independently associated with higher blood pressure at 24.5 years but higher blood pressure at 17.7 years was not associated with higher cfPWV at 24.5 years, suggesting temporal association. A higher cfPWV at 17.7 years was associated with all measures of body composition viz, total fat mass, trunk fat mass, lean mass and BMI at 24.5 years and higher body composition measures at 17.7 years was associated with higher cfPWV at 24.5 years, suggesting bidirectionality. A higher cfPWV at 17.7 years was not associated with higher fasting glucose at 24.5 years, but higher glucose at 17.7 years was associated with higher cfPWV at 24.5 years. A higher cfPWV at 17.7 years was associated with higher fasting insulin concentration and insulin resistance at 24.5 years, but higher fasting insulin and insulin resistance at 17.7 years was not associated with higher cfPWV at 24.5 years. Credit: *Journal of Hypertension* (2022). DOI: 10.1097/HJH.0000000000003239

The prevalence of hypertension and obesity has been on the increase globally, despite the targeted effort at promoting weight loss, increasing physical activity, and decreasing sedentary time in the general population. This global challenge informed a recent scientific statement from the American Heart Association on further research into obesity and hypertension in order to mitigate this health burden.

Among middle-aged and older adults, arterial stiffness has been established as a strong predictor of cardiovascular events and all-cause mortality. Hence, a few clinical trials among adults are currently ongoing that examine the likelihood of reversing arterial stiffness. However,

among children, adolescents, and young adults, arterial stiffness has been consigned to an intermediate marker of cardiovascular disease and death that occurs in middle age, no thanks to limited longitudinal data and repeated measures of arterial stiffness in a fairly healthy growing young population.

Also, the clinical utility of arterial stiffness as a risk factor for early vascular and metabolic diseases is largely unknown in pediatrics. In this review, recent prospective evidence in a large adolescent population and a middle-aged population that emphasized the value of arterial stiffness as a novel risk factor for hypertension, overweight/obesity, insulin resistance, dyslipidemia, and type 2 diabetes mellitus were summarized. It is often asked what are the risk factors for higher arterial stiffness in adolescents? It is known that maternal smoking habits, early life smoking patterns of adolescents, high salt intake, genetic inheritance, obesity, and elevated blood originating in childhood may contribute to higher arterial stiffening in adolescence.

"Arterial stiffening in adolescence seems to be a subtle, stealthy, but potent risk factor for high blood pressure and metabolic alteration initiating a cascade of biological events finally leading to disease formation such as type 2 diabetes mellitus and premature organ damage. It is therefore expedient for clinicians, pediatricians, public health experts, and policymakers to focus on ways to treat, reduce, and possibly reverse arterial stiffness, particularly from adolescence. An arterial stiffness intervention in adolescence may decrease the incidence of hypertension and metabolic diseases in later life, but further studies are needed," says Andrew Agbaje, a physician and clinical epidemiologist at the University of Eastern Finland.

More information: Andrew O. Agbaje, Arterial stiffness precedes hypertension and metabolic risks in youth: a review, *Journal of Hypertension* (2022). DOI: 10.1097/HJH.0000000000003239