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DOI: 10.1111/jch.13362

COMMENTARY

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Arterial stiffness: A helpful guide to prognosis and therapy in populations with a high baseline cardiovascular risk

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One of the major effects of aging on the cardiovascular (CV) system is the decreased compliance (elasticity) of the arterial system, ie, increased arterial stiffness, with a consequential rise in pulse wave velocity (PWV). This increases left ventricular afterload along with the systolic blood pressure, promotes left ventricular hypertrophy, and reduces myocardial blood supply resulting in myocardial ischemia. Therefore, measuring the degree of arterial stiffness, PWV becomes a surrogate marker of unfavorable CV outcomes, connecting the traditional cardiovascular continuum with the novel concept of vascular aging.[1] Additionally, the predictive value of aortic PWV for future CV events and all-cause mortality is higher in subjects with a higher baseline CV risk (hypertension, renal disease, coronary artery disease) compared to the general population.[2] Moreover, an increased pulse pressure, which is reflective of aortic stiffness, is an important risk factor for incident atrial fibrillation (AF) in the general population.[3] The incidence of AF, with its deleterious impact on CV outcomes, exponentially rises with age together with age-related increases in aortic stiffness.[4,5] Hence, the 2013 European Society of Hypertension/European Society of Cardiology guidelines for the management of arterial hypertension recommended the measurement of aortic PWV for evaluation of subclinical organ damage in hypertensive patients, with a suggested cutoff value of 10 m/s (recommendation Class IIa, Level of Evidence B).[6]

In this issue of the journal, Silva and colleagues[7] investigated data (1192 participants) on arterial stiffness in the mostly hypertensive (81%) elderly (inclusion criterion was ≥ 60 years, mean age 69.2 years) multiethnic population of a large urban area in Brazil. These normative values from Brazil are interesting in that they provide information from an intriguing ethnic group, as Latin American countries are traditionally characterized by a high degree of miscegenation between whites and blacks making the assessment of ethnic differences very challenging. Although nonblack patients represented the majority of the studied population, no significant differences regarding PWV were observed between the ethnic categories.

Of note, studies from different European centers (PWVs were 9.3 and 11.1 m/s in normotensives and hypertensive elderly patients, respectively) and from Chinese hypertensive patients (PWV was 12.5 m/s) have reported higher PWV values than those found in this Latin American study (PWVs were 9.1 and 9.4 m/s in controlled and uncontrolled elderly hypertensives, respectively).[8,9]

In this elderly hypertensive population, the PWV values increased with age and reached a plateau at the age of 75 years. Controlled hypertensive patients exhibited PWV values that were similar to normotensives and significantly lower ($P = 0.04$, adjusted for age, gender, and mean arterial pressure) than those of the uncontrolled hypertensive population, suggesting that effective antihypertensive treatment can delay or maybe even reverse arterial stiffening. Future studies will show the potential role of PWV as an independent treatment target, ie, the role of PWV as a potential surrogate end-point of unfavorable CV outcomes.

Notably, the renin-angiotensin system inhibitors proved to be superior to all other antihypertensive drugs in reducing arterial stiffness.[10] This is most likely due to abolishing the pro-fibrotic action of angiotensin II, although this was not shown in the aforementioned study.

In conclusion, aortic PWV integrates the long-term effects of the traditional risk factors together with the individual's genetic background on the arterial wall and serves as a barometer of vascular aging with greater prognostic impact in populations with a higher baseline CV risk.

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